



# SUITS



Deliverable No.:	D4.2
<b>Guidelines to Developing bankable projects, new business models and partnerships</b>	
Project Acronym:	SUITS
Full Title:	
Supporting Urban Integrated Transport Systems; Transferable Tools for Authorities	
Grant Agreement No.:	690650
Work Package No.	4
Work Package Denomination:	
Innovative and sustainable financing, procurement and business innovation	
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Date:	03.12.2019
Status:	V2.0
Dissemination level:	PU



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The Guidelines represent a research document developed by SUITS (Supporting Urban Integrated Transport Systems; Transferable Tools for Authorities) Project, a four-year research and innovation action, intending to increase the capacity building of Local Authorities and transport stakeholders to implement sustainable transport measures. SUITS is one of the three projects of the EU's CIVITAS 2020 initiative focusing on sustainable urban mobility plans. SUITS project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement no. 690650 / 2016.

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### Abstract

Although many European cities are able to address transport and mobility issues, small and medium-sized (S-M) cities may lack institutional capacity to deal with current challenges such as poor air quality, limitless traffic, and overloaded parking spaces. The European Commission strives to address this shortfall by providing measures to improve urban mobility, knowledge transfer and capacity building. H2020 CIVITAS SUITS (Supporting Urban Integrated Transport Systems: Transferable Tools for Authorities)<sup>1</sup>, is one of three projects financed under the the HORIZON 2020 programme which aims to increase the capacity of local authorities in S-M cities to develop and implement sustainable, integrated transport strategies to improve the urban transportation system.

In line with the overall project objectives, these Guidelines aim to increase the capacity building of S-M cities' transportation authorities in their development of innovative business models and partnerships. D4.2 describes

- innovative mobility business models and partnerships,
- the most successful mobility services with examples of best practice and specimen Business Model Canvas (Annex1),
- the role of feasibility studies in enhancing the financial attractiveness or mobility projects.

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<sup>1</sup> <https://ec.europa.eu/inea/en/horizon-2020/projects/H2020-Transport/Urban-Mobility/SUITS>

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### Document History

Date	Author	Action	Status	Diss. Level
22.08.17	LEVER	Bike sharing brief	v0.1 - Draft	RE
14.09.17	INTECO	E-ticketing and Smart payment brief	v0.1 - Draft	RE
18.09.17	INNDEA	Multimodal journey planning brief	v0.1 - Draft	RE
18.09.17	ITENE	Taxi e-hailing brief	v0.1 - Draft	RE
19.09.17	TUIL	One-way carsharing brief	v0.1 - Draft	RE
21.09.17	RSM	Integrated mobility brief	v0.1 - Draft	RE
07.12.17	EUROKLEIS	Creation of the first draft of the Guidelines	v0.1 - Draft	RE
20.02.18	EUROKLEIS	Integration of the feedback on the first version of the Guidelines provided by ARCADIS, INTECO, ITENE, WI, INNDEA, MAIKOS	v0.2	PP

05.03.18	EUROKLEIS	Further development of Chapter 5	v0.3	PP
28.03.18	EUROKLEIS	Internal review of the document	v0.4	PP
30.03.18	EUROKLEIS	Upgraded version of the document	v1.0 – First issue	PP
20.04.19	EUROKLEIS	Integration of all the briefs developed into the document	v1.1	PP
28.04.19	EUROKLEIS	Upgraded version of the Guidelines	v1.2	PP
30.04.19	INTECO	Splitting up the Guidelines and the Annexes 1 into separate volumes, similarly for all the three Guidelines	V1.3	PP
29.11.2019	EUROKLEIS	Final version of the document	V2.0	PU
30.11.2019	CU	Final edit	V2.0	PU

Status: v0...- Draft, V1.0 - First Version for Pilot Application, V2.0 First version of final Guidelines, Final Version Submitted (to European Commission).

Dissemination Level:

PU - Public

PP - Restricted to other programme participants (including the Commission Services)

RE - Restricted to a group specified by the consortium (including the Commission Services)

CO - Confidential, only for members of the consortium (including the Commission Services)

# Table of Contents

List of Figures .....	7
List of Tables .....	7
Abbreviations .....	8
<b>Executive Summary .....</b>	<b>9</b>
<b>1. Introduction .....</b>	<b>10</b>
1.1. SUITS goals and objectives .....	10
1.2. Guidelines to developing bankable projects, new business models and partnerships .....	11
1.2.1. Goals .....	11
1.2.2. Objectives .....	11
1.2.3. Role of stakeholders in developing the present Guidelines .....	11
1.3 How to use the present Guidelines .....	12
<b>2. Research Methodology .....</b>	<b>12</b>
Limitations .....	12
<b>3. Present situation of transportation and urban mobility .....</b>	<b>13</b>
3.1 Urban mobility solutions .....	14
3.1.1 Mobility as a Service .....	15
3.1.2 Integrated mobility .....	16
3.1.3 Shared mobility .....	17
<b>4. Innovative forms of partnership .....</b>	<b>18</b>
4.1 Innovative Public Private Partnerships .....	18
4.1.1 PPP .....	18
4.1.2 IPPP .....	20
4.1.3 R&D Partnerships .....	22
<b>5. Innovative business models .....</b>	<b>24</b>
5.1 Business Model Canvas approach .....	24
5.2 Innovative Business Models in mobility sector .....	26
5.2.1 Car on-demand .....	27
5.2.2 Micro mobility .....	30
5.2.3 Scooter sharing .....	32
5.2.4 Car sharing .....	34
5.2.5 Ridesharing .....	35
5.2.6 Bike sharing .....	37
5.2.7 Smart parking .....	38
5.2.8 Public transport .....	39
5.2.9 Integrated mobility .....	41
<b>6. Making a project bankable .....</b>	<b>43</b>
6.1. Feasibility Studies and Important Aspects of Project Management .....	44
6.1.1 Executive summary .....	44
6.1.2 Project feasibility fields .....	44

<b>7. Recommendations</b>	<b>55</b>
7.1 New forms of partnership	56
7.2 Innovative business models	57
7.3 Make project bankable	57
<b>Conclusions</b>	<b>59</b>
<b>Links</b>	<b>60</b>
<b>References</b>	<b>61</b>

### List of Figures

Figure 1 – Business Model Canvas elaborated by Österwalder and Pigneur [18]	25
Figure 2 – Urban mobility ecosystem (source: author's elaboration)	26
Figure 3 – Assessment of the PPP models	57

### List of Tables

Table 1 – Traditional mobility schemes vs new mobility trends	15
Table 2 – Challenges of the PPP development	20
Table 3 – Guidelines for Taxi e-hailing project development	28
Table 4 – Guidelines for TNC project development	29
Table 5 – Guidelines for Shuttle buses project development	29
Table 6 – Guidelines for Dedicated micro mobility project development	31
Table 7 – Guidelines for Scooter sharing project development	33
Table 8 – Guidelines for Car sharing project development	34
Table 9 – Guidelines for Ridesharing project development	36
Table 10 – Guidelines for Bike sharing project development	37
Table 11 – Guidelines for Parking Guidance and Information System project development	39
Table 12 – Guidelines for Bus Rapid Transit project development	40
Table 13 – Guidelines for multi-modal journey planning project development	41
Table 14 – Guidelines for smart payment and e-ticketing project development	43
Table 15 – Changes in the mobility paradigm	55

## Abbreviations

App	Application
BM	Business Model
BMC	Business Model Canvas
AVL	Automated Vehicle Location
CBA	Cost Benefit Analysis
CSO	Civil Society Organisation
EC	European Commission
EV	Electric Vehicle
EU	European Union
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GPS	Global Positioning System
H2020	Horizon 2020
HOV	High-occupancy vehicle
ICT	Innovation and Communication Technologies
IoT	Internet of things
IPPP	Innovative Public Private Partnership
IPR	Intellectual property rights
IT	Information Technologies
ITS	Intelligent Transport Systems
MaaS	Mobility as a Service
NGO	Non-Governmental Organisation
POS	Point of sale
PPP	Public Private Partnership
R&D	Research and Development
RoC	Return on Capital
RoI	Return of Investment
S-M	Small and Medium
TNC	Transportation Network Companies
UVARs	Urban Vehicle Access Regulations
WP	Work Package
VMT	Vehicle Miles Travelled



### Executive Summary

Developing or reshaping business models requires organisational know-how and tools. A well-developed business strategy is essential for securing investment, high calibre partners and overall success.

SUITS Work Package 4 has developed three guidelines to support S-M local authorities and stakeholders in charge of decision-making processes in transport and mobility. This guideline concerns Developing Bankable Projects, New Business Models and Partnerships'. Ideally it should be read in conjunction with the Guidelines on Innovative Procurement and Innovative Financing

The Guidelines start with a brief introduction to the SUITS project and the contribution of different stakeholders to the document. The research methodology is described along with its the limitations, before describing the current situation with respect to urban mobility (e.g. current trends such as Mobility as a Service, integrated and shared mobility). This is followed by a chapter dedicated to innovative forms of partnerships in the sector paying special attention to the Public Private Partnership (PPP) as the most strategic form of alliance. The last two chapters present innovative business models and feasibility studies as ways to develop bankable projects.

Annex 1 provides the examples of the business model of some innovative mobility services.

# 1. Introduction

The situation in European cities regarding the urban environment has reached a critical level. A changing mobility paradigm that properly tackles today's challenges and accommodates current and emerging societal trends clearly requires research into new mobility scenarios, technological innovations, additional mobility services and solutions as well as new partnership schemes.

Over 70 % of the EU population lives in the cities (including small and medium-sized cities) accounting for approximately 85% of the EU's GDP (EC, Urban Mobility Package). Poor transport has created unsustainable conditions: with severe congestion, poor air quality, environmental pollution and decreased to quality of life. Increases in urban sprawl and commuting have accompanied an increase in private vehicle ownership as public transport networks have failed to deliver efficient transport. Sustainable mobility solutions have demonstrated a positive impact on economic, social and environmental factors.

The European Commission is committed to improving the efficiency of urban transport by significantly changing urban mobility to reach key policy objectives, by providing policies and papers, investing in research programmes and creating supporting tools. One of the examples of such programme is Urban Mobility Package<sup>2</sup> that provides supporting measures in the area of urban transport by:

- Sharing experiences, showcasing best practices, and fostering cooperation;
- Providing targeted financial support;
- Focusing research and innovation on delivering solutions for urban mobility challenges;
- Member States' involvement and international cooperation enhancement.

While many large European cities have been innovative and successful in addressing urban mobility problems, S-M cities are left behind and may lack the necessary institutional capacity to manage their rapidly growing populations and mobility needs [6]. The European Commission has recognised this issue and is searching to provide measures to help S-M cities solve their mobility problems.

## 1.1. SUITS goals and objectives

The H2020 CIVITAS SUITS project tackles the theme of 'strengthening the knowledge and capacities of local authorities' (MG-5.4-2015). Its overall aim is to enhance the capacity of S-M cities to develop sustainable mobility to improve overall quality of life, reduce congestion and air pollution and improve urban mobility. One way of achieving these goals is through decision-making supporting tools.

As part of this, Work Package 4 has developed three guidelines to support local authorities in S-M cities integrate new policies regarding sustainable transportation. These relate to

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<sup>2</sup> Urban Mobility Package - European Commission  
[https://ec.europa.eu/transport/themes/urban/urban\\_mobility/ump\\_en](https://ec.europa.eu/transport/themes/urban/urban_mobility/ump_en)

1. Innovative and sustainable financing approaches,
2. Innovative procurements,
3. Developing bankable projects, new business models and partnerships.

The applicability, usefulness and efficiency of the guidelines have been tested in a pilot project Alba Iulia Municipality, Romania. Following this, the nine partner cities (Coventry City Council, Stuttgart, Erfurt, Palanga, Rome, Valencia, Torino, Alba Iulia, Kalamaria) are integrating the know-how into their existing processes. To support this training activities (e.g. workshops, webinars, meetings with the stakeholders) have been organized in Work Packages 5, 8 and 9.

### **1.2. Guidelines to developing bankable projects, new business models and partnerships**

The effective urban mobility of passengers and goods is crucial to supporting economic growth. S-M European cities face similar challenges, such as congestion and pollution, and look to digitalization, the sharing economy and integrated mobility as potential solutions. To manage increasing demand and related societal challenges, a wide range of complementary mobility solutions and services are required, which adopt innovative user-centric, smart, multimodal and intermodal approaches. However, one of the key challenges is how to create sustainable businesses in this rapidly changing market. This requires coordinated actions from the private and public sectors. Technological advances and commercialization, funding, intelligent policies, and business model innovation are all needed.

#### **1.2.1. Goals**

This deliverable, along with its Guidelines has been written for private and public mobility authorities/stakeholders to organise/modify/consult or compare business ideas in order to optimise them and acquire funding. It covers the latest innovations in urban mobility business models, new partnership schemes and aims to provide guidance in preparing a project proposal for investment.

#### **1.2.2. Objectives**

Therefore its main objectives are to:

- Provide information about innovative business models in urban mobility services.
- Review new and existing partnership schemes.
- Enhance capacity to create fundable projects by providing feasibility analysis guidance.
- Identify the evolving commercially viable business strategies and associated risks and benefits.
- Improve the administrative and organizational capacity of the urban mobility authorities of S-M cities.

#### **1.2.3. Role of stakeholders in developing the present Guidelines**

The Guidelines were developed with the help of different stakeholders. Eurokleis led Task 4.3 and was responsible for the development of the Guidelines.

The partners of WP4 Task 4.3 provided knowledge and contributions to Section 5 “Innovative business models”. CIVITAS and Eltis platforms were consulted during the document preparation<sup>3</sup>.

- Each partner chose one innovative mobility service, developed a Business Model Canvas for service and provided best practice examples (see Annex 1).
- City partners shared their expertise and knowledge about their cities’ transport service that or of ones which they are aware.

### 1.3 How to use the present Guidelines

Many sustainable urban mobility projects face difficulty at the idea phase due to a lack of funding, limited knowledge of new business models and challenges in coordinating across different public and private sector agencies. The Guidelines to developing bankable projects, new business models and partnerships help to address each of these challenges to bridge the gap between ideas and their implementation.

In order to maximize the efficiency of the SUITS decision-making outputs these Guidelines should be read in conjunction with the *“Guidelines to Innovative Procurement”* and *“Guidelines to Innovative Financing”*.

## 2. Research Methodology

SUITS partners shared their knowledge and experience of innovative business models, partnership and feasibility studies for creating bankable projects in S-M cities. Primary and secondary data analyses and methods included:

- Primary sources: focus groups and conversations with key city partner informants regarding new business models to understand the urban mobility situation and identify the most relevant mobility services to be included in the Guidelines.
- Secondary data: analysis of official government documents, peer-reviewed publications, media publications, web sites and books, as well as open source reports and papers.
- A case study methodology was used to obtain more in-depth knowledge about new mobility services, their business models and integration in the wider transportation infrastructure.

### Limitations

Although the SUITS team have tried to ensure the usefulness, comprehensiveness and currency of the material, successful implementation depends on local governance and legislation and the ability of public and private authorities to provide resources for creation of

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<sup>3</sup> CIVITAS (<http://civitas.eu/>) is a network of cities for cities dedicated to cleaner, better transport in Europe and beyond.

Eltis Platform (<http://www.eltis.org>) facilitates the exchange of information, knowledge and experiences in the field of sustainable urban mobility in Europe.

new business opportunities. The present document should therefore be used to support decision-making, allowing the managers to adapt the findings and recommendations to their transport reality. The Guidelines do not represent an instruction manual.

### 3. Present situation of transportation and urban mobility

This Chapter aims to provide an overview of the current mobility situation identifying the mobility sector problems, how the EC addresses these and how mobility innovations may address them.

The current objectives of transportation and mobility sector are to gain more efficient and inclusive access to destinations, activities, services and goods whilst reducing CO2 emissions and traffic congestion. Sustainable urban mobility aims to improve the efficiency and effectiveness of transport systems to cover demand-orientated measures, such as promoting walking, cycling, and reducing use of private vehicles. This has created a shift away from traditional transport scenarios<sup>4</sup>. The EU's response to these issues has been delivered through policies and instruments, guidelines and recommendations and funding of urban mobility projects. While urban transport systems fall under the scope of European transport policy, other policies affecting the urban realm - such as the Cohesion Policy<sup>5</sup>, the Trans-European Networks policy<sup>6</sup>, environmental policy, health policy, and research policy have to be taken into account. The most recent European strategy in the area of transport - the 2011 White Paper<sup>7</sup> - specifically stated that urban mobility should apply a mixed strategy addressing land-use planning, pricing schemes, efficient public transport services and infrastructures for non-motorized modes, charging/refuelling of clean vehicles and the cities should be encouraged to develop Sustainable Urban Mobility Plans. In December 2013, the EC adopted an Urban Mobility Package<sup>8</sup>. With this measure, the EC strives to intensify its support and encourage Member States to create framework conditions for local authorities to develop and implement comprehensive and integrated urban mobility strategies.

The EC intends to support urban mobility in the Member States by:

- Facilitating best-practice exchange. Dissemination of experiences and best practices (studies, web portals): Urban Mobility Portal (Eltis)<sup>9</sup>; Platform on Sustainable Urban Mobility Plans; Member States Expert Group.
- Providing platforms for collaboration: Civitas Forum<sup>10</sup> and URBACT<sup>11</sup>.

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<sup>4</sup> Urban mobility. Shifting towards sustainable transport system. In depth analysis.

[http://www.europarl.europa.eu/RegData/etudes/IDAN/2014/538224/EPRS\\_IDA\(2014\)538224\\_REV1\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/IDAN/2014/538224/EPRS_IDA(2014)538224_REV1_EN.pdf)

<sup>5</sup> EU regional and urban development, The EU's main investment policy - European Commission

[http://ec.europa.eu/regional\\_policy/en/policy/what/investment-policy/](http://ec.europa.eu/regional_policy/en/policy/what/investment-policy/)

<sup>6</sup> Trans-European Networks (TENs) – European Commission

[http://ec.europa.eu/regional\\_policy/en/policy/what/glossary/t/trans-european-networks](http://ec.europa.eu/regional_policy/en/policy/what/glossary/t/trans-european-networks)

<sup>7</sup> European Commission, 2011: White Paper - Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system, COM (2011) 144 final

<sup>8</sup> COM (2013) 913 final, 'Together towards competitive and resource-efficient urban mobility'<http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52013DC0913&from=EN>

<sup>9</sup> ELTIS - <http://www.eltis.org/>

<sup>10</sup> CIVITAS - <http://civitas.eu/>

- Fostering local engagement of citizens and stakeholders European Mobility Week.
- Providing data and statistics on mobility situation in Europe.

New ways to create thriving, inclusive and liveable cities have appeared, for instance, non-motorized and electric vehicles are improving local air quality and citizen health; transit-oriented mobility is optimizing land use and reduce traffic congestion and urban sprawl etc. With new mobility trends and market entrants, new business models are emerging to improve the transport sector and make it more sustainable. Some of these solutions are discussed in the next section.

### 3.1 Urban mobility solutions

Automobile sales are predicted to increase from about 70 million a year in 2010 to 125 million by 2025 with more than half being purchased in cities. Some automotive analysts have predicted that today's 1.2 billion strong global car fleet could double by 2030 [7]. Existing urban infrastructure cannot support this. Congestion has reached unbearable levels causing time waste, wasted fuel, and increased cost of doing business.<sup>12</sup>

The transport and mobility communities are exploring innovative approaches to solve transport problems using rapidly evolving technologies and digitalization. The technological revolution has changed the way the mobility and transport sectors operate. New business models are changing the way transport organisations run their businesses revolutionizing service provision, introducing new value propositions and types of partnerships.

Innovative mobility management strategies improving mobility include transportation diversity (the travel options), incentives for users to change their way of travelling (frequency, mode, destination, route or timing). Others provide alternative ways of traveling through mobility substitutes or more efficient land use. Some require policy reforms to develop new planning practices.

Other means of improving urban mobility include new "multimodal" services that facilitate everyday journeys combining walking, cars, buses, bikes, and trains etc. as well as shared transportation services; Mobility as a Service; Urban Vehicle Access Regulations (UVARs); pedestrianisation of neighbourhoods and city districts; traffic circulation and road space arrangements that limit through-traffic. Such innovations need to form part of integrated mobility policies, (SUMP Guidelines - UVAR and SUMP<sup>13</sup>). These services not only create innovation in commuter movement but also help to solve related mobility problems such as time wasting and congestion.

Moreover, the European market of Intelligent Transport Systems (ITS) is growing fast. The market value of ITS in public transport vehicles such as buses and trams is expected to rise

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<sup>11</sup> URBACT - <http://urbact.eu/urban-mobility>

<sup>12</sup> Urban mobility at a tipping point – McKinsey & Company  
<https://www.mckinsey.com/business-functions/sustainability-and-resource-productivity/our-insights/urban-mobility-at-a-tipping-point>

<sup>13</sup> SUMP Guidelines - UVAR and SUMP: how to relate Urban Vehicle Access Regulations (UVARs)  
[https://www.eltis.org/sites/default/files/urban\\_vehicle\\_access\\_regulations\\_and\\_sustainable\\_urban\\_mobility\\_planning.pdf](https://www.eltis.org/sites/default/files/urban_vehicle_access_regulations_and_sustainable_urban_mobility_planning.pdf)

from €1.03bn in 2014 to €1.46bn by 2019 [4]. Developing apps for smartphones or other digital devices is an emerging economic sector especially regarding urban mobility. The largest platforms for apps for iTunes and Google Play, have more than 23450 and 17750 apps in the categories of health and fitness respectively, including pedometer tools encouraging walking<sup>14</sup>.

Table 1 provides insight into the shift from traditional to new mobility paradigms

**Table 1** – Traditional mobility schemes vs new mobility trends

Traditional mobility strategies	New mobility solutions
Individual car ownership as a main form of transport	Individual car ownership as one form of multimodal, on-demand and shared transport
Limited consumer choice and poor variety of services	Bigger variety of services and service providers
Government-funded public transit	Public and private partnership
Unconnected, suboptimal transportation system	On-demand, connected systems

Individual mobility changes are also affecting business models, in particular the shifts:

- from private car ownership to car sharing;
- from taxi services to e-hailing (process of ordering a taxi or car via on-demand application. App matches a client and a driver).

Group-based mobility is also changing:

- from public transit to on-demand private shuttles (more convenient than public transport and cheaper than a taxi) and carpooling.

A shift toward new urban business strategies can provide major savings to public budgets including health, environment or energy by providing safer transport, less congestion and higher rates of employment<sup>15</sup>. Examples of the most influential new mobility solutions are presented below.

### 3.1.1 Mobility as a Service

The concept of “transportation” based on a modal approach is evolving into the wider concept of mobility based on a service approach i.e. Mobility as a Service (MaaS). Nowadays, society gives preference to the customer experience more than vehicle ownership recognizing the use of various transport modes. It is predicted that emerging travel services (such as car- and bike-sharing, ridesharing) will reduce the number of private cars and traffic congestion in dense urban areas. Moreover, a shared or collaborative

<sup>14</sup> Berg Insight, 2015, ITS in Public Transport - [www.berginsight.com/ReportPDF/ProductSheet/bi-its4-ps.pdf](http://www.berginsight.com/ReportPDF/ProductSheet/bi-its4-ps.pdf)

<sup>15</sup> Eurostat figure. European Commission webpage on mobility facts and figures: [http://ec.europa.eu/transport/strategies/facts-and-figures/transport-matters/index\\_en.htm](http://ec.europa.eu/transport/strategies/facts-and-figures/transport-matters/index_en.htm)



economy is gaining more attention. Following from this, private car ownership is no longer a primary objective in urban areas. This conceptual change has changed mobility offers and the payment of mobility services. It also allows easier implementation of strategies for internalization of external costs in transport related domains. This requires the use of new business models.

MaaS objectives are to put the users at the core of mobility services, offering them personalised mobility solutions based on their individual needs with an easy access to the most appropriate transport mode or service. MaaS has three important dimensions which need to be considered when planning the innovation activities and developing new business models:

1. *The technological dimension*: data sharing, interoperability, standardization as well as connectivity and built-in sensors of smart devices supporting MaaS.
2. *Behavioural impact*: how to create do travel and logistics pattern change (e.g. for older commuters), what is the potential modal shift?
3. *Economic and policy dimension*, including organizational and regulatory aspects. This might involve a change of roles of different players involved.

According to Jittrapirom et al<sup>16</sup>, MaaS has the following core characteristics:

- *Integration of transport modes*: the use of public transport services, by bringing together multi-modal transportation enabling users to facilitate their trips.
- *Tariff option*: MaaS offers users two types of tariffs in accessing its mobility services – “mobility package” and “pay-as-you-go”.
- *One platform*: the service relies on a digital platform or web page through which the end user can access to all the services (trip planning, booking, ticketing, payment)
- *Multiple actors*: actors using the digital platform: mobility demanders (private or business customers), mobility suppliers (public or private) etc.
- *Use of technologies*: different technologies are combined to provide MaaS: devices, mobile/internet network, e-payment, e-ticketing, database management system, etc.
- *Personalisation*: permits to meet users’ needs and expectations with unique personal solution regarding the travel planning
- *Customisation*: users can modify the offered service according to their preferences.

### 3.1.2 Integrated mobility

Integrated mobility enables connecting commuters from trip origin to their final destination using all transportation modes through the integration of barrier-free planning, design, infrastructure, technology solutions and personalisation. The concept behind integrated mobility is that passengers typically use more than one mode of transportation. Travellers have different trip needs and often switch modes to suit their travel needs. The benefits of integrated mobility can provide are:

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<sup>16</sup> Jittrapirom, P., Knoflacher, H., & Mailer, M. (2017). The conundrum of the motorcycle in the mix of sustainable urban transport. *Transportation Research Procedia*, 25, 4873–4894.



- *Combined mobility.* Create a seamless travel experience for the door-to-door journey by integrating public and private transport modes in one single service, guided by an intermodal journey planner.
- *One-stop-shop.* Provide easier travel by combining journey planning, mobile ticketing and fare collection in one single application and perform one single transaction for the whole trip.
- *Personalized solutions.* Every traveller has her/his own travel behaviour that differs from person to person including the travel purpose, final destination and time. Therefore, each traveller needs the flexibility to choose and adapt her/his individual subscription package.

Technology plays an important role in providing valuable information that allows travellers to make smarter travel choices and should be an essential part of integrated mobility. A good example is Google Trip Planner that enables identification of the best route allowing smarter decisions of traveling time. The addition of alternative modes (transit, cycling and walking) to trip planning apps provide travellers with essential information to compare travel times, identify different travel routes and better navigation through the transit network. The next evolution of travel planning apps should give an increased focus on integrated mobility, providing more information on travel modes by allowing commuters to adapt in real time.

### 3.1.3 Shared mobility

The Swiss Mobility Academy, which organizes an annual European conference on shared mobility called Wocomoco<sup>17</sup> (WORLD COLlaborative MObility COngress), defines shared (or cooperative) mobility as follows: “*Collaborative mobility focuses on sharing journeys, modes of transport, and infrastructure. In between collective and individual transport, new peer-to-peer based networks are emerging, boosting new types of individual mobility beyond private car ownership.*”

Shared mobility, is part of the wider “collaborative economy” or “sharing economy”, defined in the European agenda for the collaborative economy as “[a variety of] innovative business models where activities are facilitated by collaborative platforms that create an open marketplace for the temporary usage of goods or services often provided by private individuals”<sup>18</sup>. Service providers offer their goods, assets, or skills to a variety of users via a platform provided by intermediaries. “Sharing” has also become an urban mobility reality. Shared mobility prioritizes the importance of reaching destinations, often at a smaller individual and societal cost than by using a private vehicle. As shared mobility serves a greater proportion of local transportation needs, multivehicle households can begin reducing the number of cars they own while others may abandon ownership reducing future demand.

Section 5 will provide further insight into innovative business models of some transportation services.

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<sup>17</sup> Mobility Academy, 2014, Wocomoco flyer (<http://bit.ly/2lnlwkg>).

<sup>18</sup> European Commission, 2016, Communication A European agenda for the collaborative economy <http://bit.ly/2cFpEKq>

## 4. Innovative forms of partnership

One of the first steps in developing a sustainable business model for a new project is to choose a form of partnership that will transform the innovation into a success. A well-organised partnership means that different partners can contribute to the project by providing different inputs to ensure financial viability needed for investors. This Chapter reviews innovative forms of partnership that local mobility authorities could consider when thinking about sustainable and long-term strategies.

### 4.1 Innovative Public Private Partnerships

Public-private partnerships are acknowledged to be powerful tools in carrying out transport and mobility projects. Before introducing the Innovative Public Private Partnership (IPPP) it is necessary to present the PPP form explaining its benefits and challenges for mobility organisations.

#### 4.1.1 PPP

Most EU member states, and the European Commission consider the PPP an important tool in attracting additional financial resources for high priority investments such as transport. The European Commission defines PPP as *“forms of cooperation between public authorities and businesses, with the aim of carrying out infrastructure projects or providing services to the public”* [8].

The public sector plays an important role in building urban transport infrastructure. However, the resources needed are greater than the public sector can provide, so public investment has to be supplemented by the private sector. This section focuses on providing insights into the combination of public and private partnership and how these can create benefits for both stakeholders.

PPP is an important part of the urban investment package (the presentation material and documents needed to obtain an investment). Some cities have established specific PPP departments to manage the role of the private sector in municipal service delivery, which tends to vary from city to city. PPPs can vary from basic service contracts with limited asset ownership, to mature, fee-based, build-operate-transfer projects where the private sector has full responsibility for a project's operations and investment.

##### 4.1.1.1 Benefits of using the PPP models

What are the benefits of using the PPP model according to the EC<sup>19</sup>?

There is a growing realization that cooperation with the private sector, in PPP projects, can offer a number of advantages, including:

- *Acceleration of infrastructure provision* - PPPs enable the public sector to transfer upfront capital expenses into on-going service payments. This ensures projects can

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<sup>19</sup> Guidelines for successful public – private partnerships – European Commission  
[http://ec.europa.eu/regional\\_policy/sources/docgener/guides/ppp\\_en.pdf](http://ec.europa.eu/regional_policy/sources/docgener/guides/ppp_en.pdf)

conduct activities even when the availability of public investment may be restricted, bringing forward much needed investment.

- *Faster implementation* - the allocation of design and construction responsibility to the private sector, together with payments connected to the availability of a service, provides incentives for the private partner to deliver capital projects within shorter timeframes.
- *Reduced entire life costs* - PPP projects that require operational and maintenance service provision provide the private sector with strong incentives to minimise costs over the whole project life cycle, which may be difficult to reach with the restrictions of public sector budgeting.
- *Better risk allocation* – one of the main characteristics of PPP is the allocation of risks. The scope is to optimise risk transfer, in order to ensure that best value is achieved.
- *Better incentives to perform* – the allocation of project risks make the private sector partner improve its management and performance. The private partner will be paid only if required service standards are met.
- *Improved quality of service* – the involvement of a private sector partner can improve the quality of service due to the better integration of services with supporting assets, improved economies of scale, the introduction of innovation in service delivery etc.
- *Generation of additional revenues* – the private sector partner may help to obtain additional revenues from third parties by reducing the cost by hiring a third-party service provider.
- *Enhanced public management* – by imposing responsibility for providing public services to private sector partner the public officials will concentrate on service planning and performance monitoring instead of executing the delivery of public services.

A very common PPP structure for transport and mobility projects is Design, Build, Finance and Operate. PPPs cover a large spectrum of projects where the private sector build, operate and finance assets providing public services. PPPs are known for long-term and complex contractual arrangements for risk transfer between the public and private sectors.

### 4.1.1.2 Possible disadvantages of PPP implementation

It is important to acknowledge risks to the partnership. Possible disadvantages include:

- *Large tendering and contracting costs* - PPP contracts are generally more complicated than conventional procurement contracts because of the need to anticipate all possible contingencies that may emerge in long-term contractual relationships. Significantly high legal costs can be incurred in contract negotiation. PPP projects request more highly specialized resources and attention by the government.
- *High government cost* – the division of project risk between the public and private partners means that private sector partner expects to be rewarded for accepting those risks. This can increase costs. The government may also have a higher cost on

project quality performance monitoring. However, this cost is included in the price of a more reliable quality of service.

- *Project profitability* - this aspect may vary depending on the assumed risk, competitive level, complexity, and the volume of the project being performed. PPP may be criticised for permitting private sector to profit from the provided services, which could have been provided by the public sector.
- *Long-term commitment* – this may cause constraints for the public authority, which need to be considered carefully.
  - *Political commitment*: political mandates may last less than the duration of PPP project.
  - *Planning constraints*: PPPs demand stable long-term planning and any non-compete provision may cause problems.
- *Frequent contract renegotiation* – contract renegotiation is more common in PPPs. It may also add extra costs.

#### 4.1.1.3 Key barriers to PPP implementation in urban mobility infrastructure

Several barriers can be identified while creating PPP. The main observation of such problems can be seen in the following table.

**Table 2** – Challenges of the PPP development

Challenges	Description
Policy and Institutional issues	Fragmented institutional framework, combined with poor organizational capacity and the absence of comprehensive guidelines.
Business planning and design	Lack of integrated planning with other transport modes, and the absence of business model planning are the key design and planning barriers. The lack of dedicated investment and an uncertain revenue stream make the investors doubt about the viability of the project.
Contractual framework	Lack of a comprehensive and well-organised contractual framework. If the contracts do not cover all project possibilities comprehensively it may provoke the subjectivity and ambiguity.
Project implementation	Absence of competent private partners who can provide a good set of services is an implementation barrier. Lack of revenue safeguards and delays in asset delivery may arise as significant barriers.

#### 4.1.2 IPPP

IPPP is a new form of partnership where the main actors are public and private organisations but may also include other types of organisations like civil society organizations (CSOs), non-governmental organisation (NGO) or communities. These new forms of collaboration enable identification of opportunities to design and implement long-term strategies for partnership. Each actor in the IPPP has an important role in the alliance.

For instance, state organisations oversee the drawing up, financing and implementation of policies and programmes. In the IPPPs public organisations, defined as important actors, not

only have key roles in supervising, creating incentives and regulatory frameworks, but also developing new opportunities and governance mechanisms to enable sustainable, long-lasting collaboration with the private sector and other organizations, in order to optimize outcomes, impact and sustainability.

The private sector has a significant role in the partnership, contributing investments and expertise to the alliance, with a for-profit business orientation.

Finally, other important actors in this type of partnership such as NGOs, CSOs or communities bring their expertise, local knowledge and visions for the transport and mobility sector.

Establishing an iPPP requires strengthening the capacities of all the actors involved.

Transport and mobility sector can benefit from this new form of partnership by having on board not only the traditional professionals - public and private sector organisations striving to solve mobility problems - but other important players that may be more familiar with the transport sector issues and needs. These provide their insights into the situation and help develop more effective measures to address real mobility issues. The logic of iPPPs is that transport and mobility issues should be analysed jointly, rather than separately, by governments, public and private sector and communities using a complementary approach and long-term common vision.

There is growing recognition of the benefits of this type of alliance: opportunity to enhance dialogue, foster collaborative approaches and identify innovative solutions in terms of design and implementation of interventions between governments, private sector and other types of organisations.

### 4.1.2.1 Benefits of iPPP for local authorities

The innovative PPP may provide the S-M cities' local authorities with a new way of organising business by providing additional values such as:

- Addressing market needs and tendencies.
- Transferring localized knowledge to public and private organisations.
- Creation of a collective awareness of innovative solutions developed by the alliance.
- Elaboration of the social standards and clarification of schemes.
- Enhancing the possibility to obtain investments by involving the NGOs, CSOs or communities in the consortium.<sup>20</sup>
- If the project addresses green or climate finance, mobility communities' participation may bring innovation and an ethical approach to investments.
- The CSOs or NGOs may gain social relevance and influence and build capacity for policy monitoring.

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<sup>20</sup> Civil Society and Public Private Partnership. Why collaborate? Three frameworks to understand business-NGO partnerships – The World Bank  
<https://blogs.worldbank.org/category/tags/civil-society-and-public-private-partnership>

### 4.1.2.2 Practical recommendations for developing successful collaboration between mobility communities and PPP

- *Create an identity and solidarity:* Choose the CSO/NGO that is well-known and relevant in transport and mobility sector. Its reputation and credibility should be undoubted. CSO/NGO should have a sphere of influence that gives access to relevant mobility networks and communities.
- *Resources and mapping:* CSO/NGO should find resources to increase effectiveness, e.g. funds, collaborations, information etc. They provide networking, effective communication, and co-creation of the communities.
- *Awareness-raising campaigns:* The CSO/NGO should be skilled in lobbying and campaigning to promote the innovative solutions created by the iPPP. The skills required include role modelling, relationship building, and negotiation.
- *Management and planning:* The CSO/NGO should manage their activities and plan the interventions in order to achieve the desired outcomes. It should have a realistic understanding of the social and political situation of the mobility and transport sector.
- *Monitoring and assessment:* The CSO/NGO should elaborate the mechanisms for monitoring and assessing governmental decisions, actions and plans in the mobility domain.

### Example of the CSO involvement in the transport projects

The Rhein-Main-Verkehrsverbund (RMV), CSO was involved in the improvement of the public transport in Germany in Rhine-Main-Area. RMV is the largest transport association in Germany that organises and coordinates public transport. RMV is an example of how the transport organisation involved the users in order to improve its services. RMV established a passenger advisory board that were represented by individuals and CSO. The advisory board organises meetings four times a year and has already initiated concrete improvements.<sup>21</sup>

### 4.1.3 R&D Partnerships

R&D partnerships are strategic alliances between businesses and organizations capable of developing or improving a new product or service, along with other actors economically interested in the development of such innovations. The resource-based view highlights that in order to exploit existing resources and to develop a long-term competitive advantage, organisations need to obtain external knowledge [9]. An organisation may benefit from R&D collaboration by coordinating a project of competent R&D partners, sharing risks, resources and expertise and building of new knowledge [3].

Depending on the actors involved in the R&D partnership this form of collaboration can include the following types:

- R&D-Public partnership.

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<sup>21</sup> RMV -

[http://www.rmv.de/de/Verschiedenes/Informationen\\_zum\\_RMV/Der\\_RMV/Wir\\_ueber\\_uns/Struktur\\_des\\_RMV/33022/RMV-Fahrgastbeirat.html](http://www.rmv.de/de/Verschiedenes/Informationen_zum_RMV/Der_RMV/Wir_ueber_uns/Struktur_des_RMV/33022/RMV-Fahrgastbeirat.html)



- R&D-Private partnership.
- R&D-PPP.

### 4.1.3.1 Benefits of the R&D partnerships for local authorities

- R&D partner may help to develop new products or services, improve current ones or innovate operations. R&D partnerships also enable mobility organizations to remain in the market by monitoring market needs and trends.
- Help public or private organisations to advance their business.
- Research and development costs and risk sharing associated with the investment of time, money and other resources.
- R&D partner may help to assess the market or test the prototype.
- R&D partner provides monitoring of the project results.
- The involvement of the R&D partner may provide an added value in searching for investments due to the expertise that this partner can provide.

### 4.1.3.2 Practical recommendations for developing successful collaboration between R&D and other partners

- The R&D organisation should be a leading organisation in the sector with a reliable reputation and strong, relevant experiences.
- The technical equipment of R&D should respond to current trends to ensure that the innovation will be aligned with the market and beyond state of the art.
- Intellectual property rights (IPR) should be established in the contractual form and include all the interested parties and their rights on the innovation.
- Each partner responsibility should be clearly specified in order to avoid the risk of having high costs.

### Example of the R&D institutions involvement in the transport projects

An R&D partnership for transport research was organised in Germany's central region Frankfurt RheinMain by major transport authorities and operators, including partners from industry and consultancy, and supported by the Hessen State Government. Namely, ZIV institute was founded at the Darmstadt University of Technology. It fosters exchange between research and practice. The Institute provides research in Integrated Traffic and Transport Systems covering Transport Infrastructure and Traffic Management, Traffic Engineering and Traffic Control, Public Transport etc. Approximately 25 research associates work together in ZIV on innovative concepts related to the optimisation of traffic and transport systems. The institute is funded exclusively through orders for planning and consulting with a focus on application-oriented research and development. ZIV founded a scientific advisory board that has added value when working on the projects. ZIV has conducted more than 60 projects with partners including Frankfurt Airport Authority (Fraport AG), German Rail (DB

Reise & Touristik AG), Deutsche Lufthansa AG, and the Regional Public Transport Authority (RMV) since 2000.<sup>22</sup>

## 5. Innovative business models

S-M-sized cities operate in situations where the mobility sector is competitive, rapidly changing and in an uncertain economic environment, where they have reduced staff making complex and difficult business decisions. On the other hand, transport and mobility organisations run their businesses in a digital era where new technologies innovate business models enabling them to solve current mobility problems.

This mismatch means that many factors need to be considered when starting a new business such as mobility business environment, strategic partnerships, technological innovation, market tendencies, revenue streams etc. Well-elaborated business models enable transport and mobility organisations to obtain the funds for innovation and exploitation with well-prepared feasibility studies proving the project's financial viability. This Chapter introduces new mobility services and their business models (BM). Annex 1 provides local authorities with the business strategic tool that enables S-M-sized cities to create innovative business models.

### 5.1 Business Model Canvas approach

This section introduces the Business Model Canvas (BMC)

A business model provides information on how to create a business and deliver value to customers [24]. Moreover, it explains the architecture of revenues, costs, and profits associated with the business organisation. BM represents the combination of the organizational and financial “architecture” of a business (Chesbrough and Rosenbloom, 2002). For urban mobility projects, it is crucial to choose the right business model, as it will set up the overall business development.

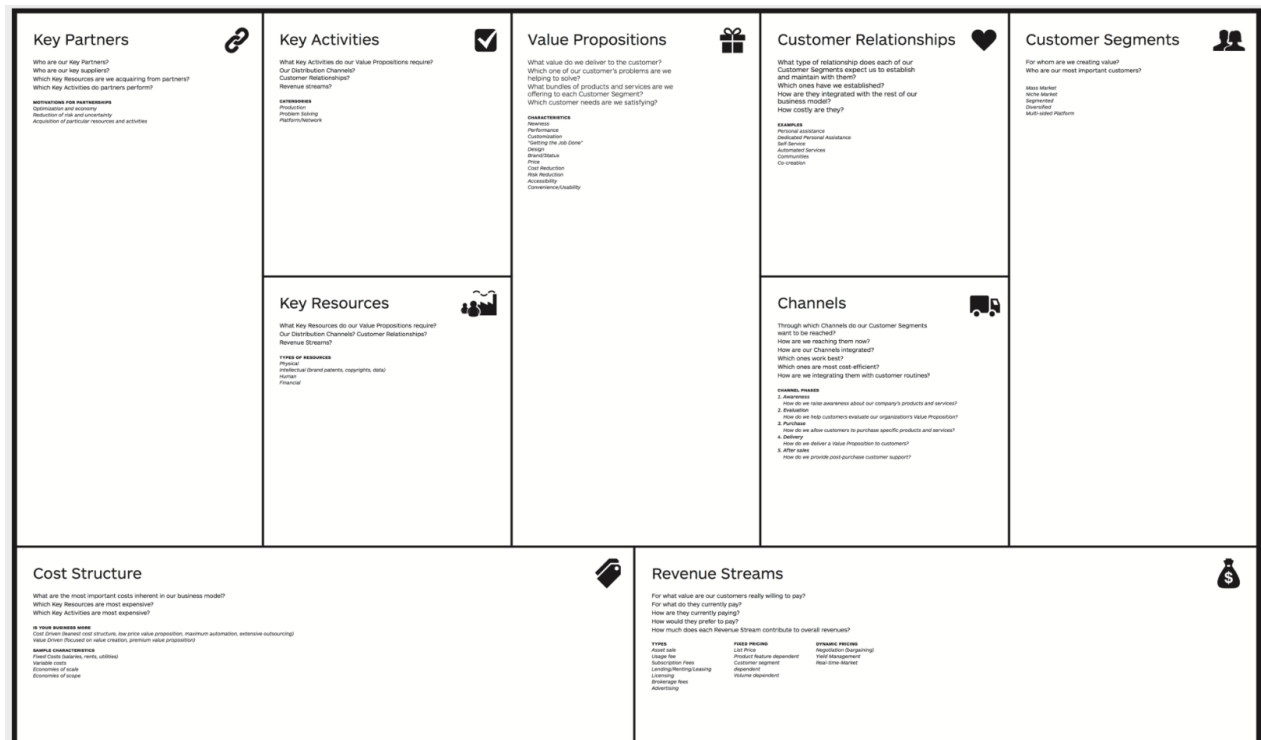
The Business Model Canvas, developed by Österwalder and Pigneur [18] and Österwalder et al. [19], is a conceptual tool that enables a BM to be developed in an easy and creative way. It is therefore suitable for S-m cities who might not have the resources to invest in other methods.

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<sup>22</sup> Institute für Verkehr. Transport Planning and Traffic Engineering

[http://www.verkehr.tu-darmstadt.de/vv/fg\\_verkehrsplanung\\_und\\_verkehrstechnik/forschung\\_7/profil/index.en.jsp](http://www.verkehr.tu-darmstadt.de/vv/fg_verkehrsplanung_und_verkehrstechnik/forschung_7/profil/index.en.jsp)





**Figure 1 – Business Model Canvas elaborated by Österwalder and Pigneur [18]**

The BMC is structured in nine building blocks: 1) customer segments, 2) value proposition, 3) channels, 4) customer relationships, 5) revenue streams, 6) key resources, 7) key activities, 8) key partnerships, and 9) cost structure. Each block includes a set of questions to assess the model and support the user in its creation. To simplify the comprehension and analysis of all the business' pillars, the nine blocks can be grouped by the area of ontology, namely: product, customer, infrastructure and finance. Product (block 2) presents the value proposition of the business, namely, the products and services that company delivers to the market. Blocks 1, 3 and 4 describe customer engagement, identifying the targeted audience, the demands, how customers perceive the value, and what type of relationship the company establishing with each segment of clients. Block 6 and 8 present the infrastructure management describing the functions of logistics and production and define the relationships between key partners and the organisation. Lastly, financial area (blocks 5 and 9) considers information regarding the sustainability of the company, cost structure, and how the company will earn revenues. According to Hulme [11], the use of canvas is essential for the learning cycle of a project. BMC helps:

- Entrepreneurs to exercise constant reflection and develop a BM with the help of a graphical tool where all the elements are linked to each other.
- Understand how the business deals with different components. Moreover, BMC can simplify dialogue between different stakeholders, opening discussion about new business opportunities and how to link the activities.
- Consider each business element individually and in general.

- Enhance business creativity and innovation by using graphical tool. BMC incorporates the design thinking methodology.

## 5.2 Innovative Business Models in mobility sector

Some researchers in the transport and mobility sector argue that traditional organizational structures and BMs are no longer viable [26]. Increasing challenges such as market saturation, environmental issues (bad air conditions etc.), congestion, and accelerated urbanisation are changing customers' demands and needs, forcing mobility organisation to change their BMs in order to address these issues. This applies equally to local authorities [10].

Technological breakthroughs enable enhancements in many areas of transport and mobility, e.g. alternative power trains, digitalization, automotive software and hardware, connectivity and smart devices technologies that are further influencing the growth of innovative BM in the transport sector.

*“Technology innovations and business model innovations are strongly linked to each other. A business model denoted the way in which companies can make money out of a technology. No matter how the technology is innovative and sophisticated, it will fail, if it is not possible for market players to make profits from it”- Abdelkafi et al., [1].*

Following this statement, it can be argued that emerging technological innovation of the transport industry should be accompanied by BM innovation.



**Figure 2 – Urban mobility ecosystem** (source: author's elaboration)

As already mentioned in Chapter 3, the new mobility paradigm is changing the urban mobility sector providing opportunities for new BMs and the way in which transport authorities deliver services. New BMs have been developed for MaaS, Sharing and Integrated mobility services. This Chapter introduces the innovative business models and partnerships representing these trends. The BM examples presented in this chapter can be used as a cognitive model for mobility stakeholders who want to deliver these services. Annex 1 includes the best practice of the services illustrated in the following paragraphs.

### 5.2.1 Car on-demand

#### Brief description

On-demand mobility is the integration of ridesharing and ride-hailing services with transit operations. Car on-demand is an innovative, user-focused approach which leverages emerging mobility services, integrated transit networks and operations, real-time data, connected travellers, and cooperative Intelligent Transportation Systems to allow more traveller-centric transportation system, providing improved mobility options to all travellers and users of the system in an efficient and safe manner.

#### Impact of car on-demand

- *Impact on environment:* decrease GHG emissions and air pollution by reducing vehicles.
- *Impact on society:* an effective mobility alternative to car ownership, lower vehicle congestion in urban areas, may reduce vehicle miles travelled (VMT) through increased ridesharing but if it displaces mass transit usage then it may bring to an increase.
- *Impact on urban land use:* parking space saving.
- *Impact on transportation:* may complement other shared-use modes such as mass transit (trains, subways and buses) by helping to resolve the “last-mile” problem<sup>23</sup>

#### Car on-demand models

Car on-demand offers several models:

- Taxi e-hailing
- Transportation Network Companies (TNC)
- Shuttle busses

Car on-demand BMs regarding these types of modes are described in Annex 1.

#### Business idea

On-demand mobility refers to the use of shared vehicles, accessed on-demand. Travellers typically reserve a vehicle or ride via a smartphone application (app) shortly before the trip is

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<sup>23</sup> Mobility-on-Demand: Understanding Energy Impacts and Adoption Potential -

<https://www.kapsarc.org/wp-content/uploads/2016/10/KS-1658-WB052A-Mobility-on-Demand-Energy-and-Adoption-Potential.pdf>

made. On-demand service requires registration on a platform. Vehicles are normally available 24/7 and can be found with a real-time tracking application within the city. Users book a vehicle or place in the vehicle (car is driven by a driver) through an app. Fares are set by the mobility provider and must be shown to passengers and paid through the online dispatch application.

### Business Models

The recent and on-going exponential growth of on-demand mobility and last-mile delivery services is a global shift from personal vehicle ownership to a shared, on-demand model.

### Taxi e-hailing

E-hail service is a mode of hiring vehicle service using an app to hail a taxi on-demand. To book a trip or hail a taxi electronically the passenger should register on a company's platform and provide his/her desired pick up location, either by entering an address or provide a current GPS location. The payment may be provided directly to the driver or via app.

**Table 3 – Guidelines for Taxi e-hailing project development**

Key aspects for implementation of Taxi e-hailing	
<b>Costs</b>	<ul style="list-style-type: none"> <li>• Software development for dispatching.</li> <li>• Vehicles acquisition (leasing) adapted for the travellers with bags.</li> <li>• Vehicles maintenance (fuel, oil etc.).</li> <li>• Purchase of the insurance for the vehicles.</li> <li>• Marketing activities.</li> <li>• Operational costs.</li> </ul>
<b>Stakeholders involved</b>	Local authorities, private sector, automotive companies, investors, software developers, taxi drivers, insurance companies, telecommunication companies, tourism sector, hotel and restaurant sectors, airports.
<b>Types of investment</b>	<ul style="list-style-type: none"> <li>• Public funding: federal, state, and local funds.</li> <li>• Private funding: grants from private foundations, private gifts and donations, and private sector investment.</li> <li>• PPP.</li> <li>• Sponsorship and advertising.</li> <li>• Crowdfunding.</li> <li>• EU funding.</li> </ul>
<b>Guidelines for implementation</b>	<ul style="list-style-type: none"> <li>• Preliminary studies before developing the business. Search for the best practices in other cities.</li> <li>• Provide the analysis of the different investment schemes.</li> <li>• An important aspect for the taxi e-hailing is to select a technological provider who develops and maintains the dispatch app and has a strong knowledge in IT.</li> <li>• Local authorities may support private sector by providing a consultancy for transportation service providers also by regulating the vehicle numbers, suggesting fares and providing taxi spaces.</li> <li>• Foreseen the marketing activities to reach the target audience.</li> </ul>

### Transportation Network Companies

Companies provide transportation services applying digital technologies that enable to connect passengers to driver who use his/her personal vehicle to pick up a client. This service is also known as ride sourcing or ride hailing.

TNCs develop smartphone apps from which the passengers can book a vehicle from a private driver, who is usually a non-commercially licensed driver. These apps show the passenger's location to the driver via GPS and charge a distance-based fare. The payment is normally applied and occurred by the same app.

**Table 4 – Guidelines for TNC project development**

Key aspects for implementation of TNC	
<b>Costs</b>	<ul style="list-style-type: none"> <li>• Preliminary studies.</li> <li>• Business license.</li> <li>• Software development and maintenance for dispatching.</li> <li>• Operational costs.</li> <li>• Marketing activities.</li> </ul>
<b>Stakeholders involved</b>	Telecommunication companies, IT developers, non-commercially licensed drivers, local authorities, investors, data analysts.
<b>Types of investment</b>	<ul style="list-style-type: none"> <li>• Public funding: federal, state, and local funds.</li> <li>• Private funding: grants from private foundations, private gifts and donations, and private sector investment.</li> <li>• PPP</li> <li>• Sponsorship and advertising.</li> <li>• Crowdfunding.</li> <li>• EU funding.</li> </ul>
<b>Guidelines for implementation</b>	<ul style="list-style-type: none"> <li>• Conduct a preliminary study before starting the business.</li> <li>• LAs should provide the regulatory set up for the TNC requirements for the drivers and vehicles, fees etc.</li> <li>• TNC should carefully choose a reliable technology provider who will develop and maintenance a dispatching app.</li> <li>• Select a suitable investment for the project.</li> <li>• Local authorities may provide training courses for the drivers regarding safety driving.</li> <li>• Ensure that vehicles passed all technical tests and have the insurance. Moreover, the vehicles should have all requisites to provide a safety and comfortable journey.</li> <li>• Drivers should be no younger than 21 years old and have at least 3 years' experience. Moreover, should be the owners of the vehicle.</li> <li>• Prepare an effective marketing campaign to promote the services.</li> </ul>

### Shuttle buses

Shuttle bus services comprise corporate, regional and local shuttles that provide limited stops and only pick up passengers at the certain points. Final destination may vary depending on the customer segmentation. Shuttle buses provide services to transport passengers to regional or hub airports or provide the transportation to customers' business organisations, hospitals, educational centres, hotels etc. For instance, shuttles can be IT-enabled private buses for the employees of the organization.

**Table 5 – Guidelines for Shuttle buses project development**

Key aspects for implementation of Shuttle buses services	
<b>Costs</b>	<ul style="list-style-type: none"> <li>• Preliminary studies.</li> <li>• Acquisition of the required buses, vans or cars for shuttle services.</li> </ul>

	<ul style="list-style-type: none"> <li>• Acquisition of the vehicle insurance.</li> <li>• Software and hardware development for the service operation.</li> <li>• On board equipment.</li> <li>• Wages of employees (drivers etc.).</li> <li>• Refuelling and vehicle cleaning.</li> <li>• Office equipment and expenses.</li> <li>• Costs for parking.</li> <li>• Tolls.</li> <li>• Administrative costs.</li> <li>• Marketing activities.</li> </ul>
<b>Stakeholders involved</b>	Local authorities, private companies, insurance companies, investors, IT companies, automotive companies.
<b>Types of investment</b>	<ul style="list-style-type: none"> <li>• Public funding: federal, state, and local funds.</li> <li>• Private funding: grants from private foundations, private gifts and donations, and private sector investment.</li> <li>• PPP.</li> <li>• Sponsorship and advertising.</li> <li>• Crowdfunding.</li> <li>• EU funding.</li> </ul>
<b>Guidelines for implementation</b>	<ul style="list-style-type: none"> <li>• Conduct the preliminary studies and search for best practices.</li> <li>• Set up the regulations for the requirements for the drivers and vehicles, fees etc.</li> <li>• Arrange the necessary parking agreements.</li> <li>• Obtain the required permits and licenses from the local authorities to start operating the business.</li> <li>• Shuttles can be operated by the private companies and regulated by the local authorities.</li> <li>• Private companies may also provide the investment to start the business.</li> <li>• Design the service facilities.</li> <li>• Organization of the waiting zones based on the type/size of shuttles and adding amenities such as seating and screens announcing the arrivals of shuttles.</li> <li>• Foresee the visibility and safety on board regulations.</li> <li>• It can be taken into the consideration to reduce overall operating costs and/or costs to individual businesses providing shuttles to incentivise private sector participation in a consolidated system.</li> <li>• Prepare a marketing campaign to promote the services.</li> </ul>

## 5.2.2 Micro mobility

### Brief description

The local authorities, especially in urban areas, support the development of the micro mobility devices and micro cars industry. Micro mobility refers to a new category of vehicles that can become an alternative to traditional modes of transportation. Several types of micro mobility vehicles exist as personal transportation solutions, such as scooters/E-scooters etc. and small electric cars with one or two seats, electric vehicle (EV). Micro mobility industry is developing rapidly. Consumer preferences are changing, and BMs are striving to analyse and meet the new needs of the modern customers.

### Impact of micro mobility

- *Impact on environment:* decrease CO<sub>2</sub> emissions and air pollution by the reduction of the transportation and introduction of EVs.
- *Impact on society:* an effective mobility alternative to car ownership, lower vehicle congestion in urban areas.
- *Impact on urban land use:* parking space saving.
- *Impact on transportation:* may complement other shared-use modes such as mass transit (trains, subways and buses) by helping to resolve the “last-mile” problem.

### Micro mobility models

Dedicated micro concepts (small electric cars with one or two seats, EV, electric kick scooters).

Micro mobility BMs regarding these modes are described in Annex 1.

### Business model

#### Dedicated micro mobility (electric kick scooter sharing)

Electric kick scooter sharing offers generally dockless electric kick scooter sharing services, which means that the user may pick up and drop off the scooters anywhere in the provider's service area. The business model consists of providing flexible e-kick-scooters to the users that get an access to a e-kick-scooter service when becoming a member of a scooter sharing program that requires the registration on a platform via a smartphone app. Scooters are normally available 24/24/7 and be found with a real-time tracking application within service provider area. Users find a scooter by using GPS, unblock it by the means of entering a PIN code that he/she receives when booking the scooter or scanning a QR code. The payment occurs when the user terminates the trip and is calculated according to the time spent on the vehicle. The cost is charged to the user credit card. The operating company hires the local organisations that charge the scooters' batteries during the night. The BM is based on the digital technologies and use of the smartphone.

**Table 6 – Guidelines for Dedicated micro mobility project development**

Key aspects for implementation of Dedicated micro mobility – electric kick scooter sharing	
<b>Costs</b>	<ul style="list-style-type: none"> <li>• Preliminary studies</li> <li>• Platform development</li> <li>• Scooters leasing/purchasing</li> <li>• Personnel wages</li> <li>• Selling, General and Administrative Expense</li> <li>• Office equipment and expenses</li> <li>• Payment to the energy charging companies</li> <li>• Insurance</li> <li>• Repairs and Maintenance</li> <li>• Software upgrade</li> <li>• Marketing;</li> <li>• Customer relationship management</li> </ul>
<b>Stakeholders involved</b>	Local and regional authorities, local transport operators, investors, IT companies, scooter manufacturing companies, insurance company, energy charging company, telecommunication companies.



<b>Types of investment</b>	<ul style="list-style-type: none"> <li>• Public funding: federal, state, and local funds.</li> <li>• Private funding: grants from private foundations, private gifts and donations, and private sector investment.</li> <li>• PPP</li> <li>• Crowdfunding.</li> <li>• EU funding.</li> </ul>
<b>Guidelines for implementation</b>	<p>Local governments should foresee the following issues to ensure that the regulations are addressed similarly across communities: operation right; right to revoke permits; permission transfer; state and federal laws; commercial liability; insurance bonds; memorandum of understanding services contract (a city council allows immediate introduction of provider operations by requiring operators enter into a service contract with the city; permit/ license; total permits (regarding the fleet sizes, cities will need to consider how many operating permits in total will grant to operators)</p> <ul style="list-style-type: none"> <li>- No limit on the number of operators in a community.</li> <li>- Specific limit on the number of companies that can operate.</li> <li>- No limit on the number of providers, but city will stop granting new permits once the total number of vehicles in the city has reached a specific number)</li> </ul> <p>Decide the fee structure: permit/license fee, per vehicle charge, per trip fee</p>

### 5.2.3 Scooter sharing

#### Brief description

Scooter sharing service provides commuters with access to the scooters for short-term use. The vehicles are distributed across a network of scooter sharing spaces within a metropolitan area.

#### Impact of car sharing

- *Impact on environment:* decrease GHG emissions and air pollution due to the transport reduction.
- *Impact on society:* cheap and effective mobility alternative for households; lower vehicle congestion in urban areas.
- *Impact on urban land use:* parking space saving.

#### Scooter sharing models

Scooter sharing offers several models, including:

- Round-trip: this type of scooter sharing provides the service where the user must return the scooter to its starting point, at the end of the journey.
- Free floating: scooter sharing enables the users to pick up and leave vehicles at any desired location.
- Station-based: station-based scooter sharing service permits the users to get a vehicle at one station and return it at different one.

Scooter sharing BMs regarding some of these modes are described in Annex 1.

#### Business model

These services offer both roundtrip and one-way scooter sharing, complete with insurance and helmets, and some offer different models of scooter, such as cargo, quad-wheeled, and even motorcycles.



Consumers access the scooter service when becoming a member of a scooter sharing program that requires registration on a platform. Scooters are usually available 24/7 and can be found with a real-time tracking application within the city service area. Users get an access to the scooter by entering a PIN code that he/she receives when booking the scooter. The payment occurs when the user terminates the trip and it is calculated according to the time spent on the vehicle. The cost is charged to the user credit card.

**Table 7 – Guidelines for Scooter sharing project development**

Key aspects for implementation of Scooter sharing	
<b>Costs</b>	<ul style="list-style-type: none"> <li>• Preliminary studies.</li> <li>• Scooter fleet acquisition or leasing.</li> <li>• Helmets' acquisition.</li> <li>• Vehicle insurance and maintenance.</li> <li>• Charging infrastructure (for the electric scooters).</li> <li>• Software development.</li> <li>• Office rent and dedicated expenses.</li> <li>• Operational costs.</li> <li>• Marketing activities.</li> <li>• Administrative costs.</li> </ul>
<b>Stakeholders involved</b>	Local authorities, IT developers, private sector companies, scooter manufacturers, parking space providers, investors, insurance companies, telecommunication companies, CSO.
<b>Types of investment</b>	<ul style="list-style-type: none"> <li>• Public funding: federal, state, and local funds.</li> <li>• Private funding: grants from private foundations, private gifts and donations, and private sector investment.</li> <li>• PPP.</li> <li>• Sponsorship and advertising.</li> <li>• Crowdfunding.</li> <li>• EU funding.</li> </ul>
<b>Guidelines for implementation</b>	<ul style="list-style-type: none"> <li>• Provide the preliminary studies about the business and search for the best practices.</li> <li>• Choose the investment model.</li> <li>• Choose a technology developer that will develop an app to conduct the scooter sharing services.</li> <li>• Choose how to gain the revenue. Is it a subscription or pay-as-you-go model?</li> <li>• Organise a marketing strategy to raise the awareness about the project.</li> <li>• Introduce the scooter sharing to the city plan.</li> <li>• Plan preparation and design of the services providing the set up of the regulation.</li> <li>• LAs should provide the scooter sharing companies with the parking permission.</li> <li>• LAs should reserve the right to limit the number of companies operating.</li> <li>• LAs should reserve the right to revoke permits, licenses, or contracts from specific companies.</li> <li>• LAs should reserve the right to prohibit specific companies from operating in the public-right-of way based on conduct or prior conduct.</li> <li>• LAs should establish operating zones.</li> <li>• Cities should require companies to come with an agreement with the city on: extreme weather, emergencies, special events, and maintenance for vehicle parking zones.</li> </ul>

### 5.2.4 Car sharing

#### Brief description

Car sharing provides commuters with access to cars for short-term use. The vehicles are distributed across a network of car sharing spaces within a metropolitan area. Commuters can access the vehicles 24/7 with a reservation and are charged by time or by mile. Car sharing provides some benefits of a personal vehicle without the costs of owning a private one.

#### Impact of car sharing

- *Impact on environment:* decrease GHG emissions and air pollution due to the transport reduction [21].
- *Impact on society:* cheap and effective mobility alternative for households [17]; lower vehicle congestion in urban areas, encourage residents to use other forms of transportation [4].
- *Impact on urban land use:* parking space saving.

#### Car sharing models

Car sharing offers several models, including:

- Round-trip (membership services, business or institutional fleet, non-membership (e.g. vacation)).
- Free floating.
- Station-based.
- Peer-to-peer (fractional ownership, P2P Hybrid, P2P marketplace).

Car sharing BMs regarding some of these modes are described in Annex 1.

#### Business model

Customer gets an access to a car sharing service when becoming a member of a car sharing program that normally requires registration and a membership fee. Car sharing fee normally includes insurance, fuel, and maintenance and often free of reduced cost parking [21]. Cars are normally available 24/7 and can be found with a real-time tracking app within an urban area. Users get an access to the car by using key, smartcard, or a smartphone app [27].

Car sharing BMs provide advantages in mature markets and can be used as an example for sustainable mobility BMs. Moreover, car sharing enables mobility companies to sell miles, rather than products [14].

The most common car sharing BMs are round-trip that requires traveller to borrow and return a car at the same place and free floating, which permit customers to pick up a vehicle at one location and leave it at another.

Peer-to-peer car sharing is when a car owner makes a profit by enrolling his/her vehicle in car sharing programs.

**Table 8** – Guidelines for Car sharing project development

Key aspects for implementation of Car sharing	
<b>Costs</b>	<ul style="list-style-type: none"> <li>• Preliminary studies</li> <li>• Car fleet acquisition/ leasing.</li> <li>• Vehicle insurance and maintenance.</li> <li>• Software development.</li> <li>• Operational costs.</li> <li>• Marketing costs.</li> </ul>
<b>Stakeholders involved</b>	Local authorities, IT companies, private sector companies, automobile manufacturers, investors, insurance companies, telecommunication companies COS.
<b>Types of investment</b>	<ul style="list-style-type: none"> <li>• Public funding: federal, state, and local funds.</li> <li>• Private funding: grants from private foundations, private gifts and donations, and private sector investment.</li> <li>• Sponsorship and advertising.</li> <li>• Crowdfunding.</li> <li>• PPP.</li> <li>• EU funding.</li> </ul>
<b>Guidelines for implementation</b>	<ul style="list-style-type: none"> <li>• Selection of suitable financing mechanism.</li> <li>• Introducing of the car sharing to the city planning.</li> <li>• City authority may limit the number of car sharing operators, or to choose the operators.</li> <li>• Local authorities should provide the car sharing companies with the parking permission that enables car sharing members to leave the vehicles anywhere within the city or provide car station infrastructure as information posts and ensure a recognisable design for car sharing stations throughout the city.</li> <li>• Local authorities should issue the regulations.</li> <li>• Local authorities may encourage local public transport operators to collaborate with car sharing companies to provide advantages for users of both public transport and car sharing.</li> <li>• Choose suitable software developer that will provide an app to realize the car sharing services.</li> <li>• Choose how to gain the revenue. Is it a subscription or pay-as-you-go model?</li> <li>• Organise a marketing strategy to raise the awareness about the project. For instance, public transport operators can provide information about car sharing.</li> </ul>

## 5.2.5 Ridesharing

### Brief description

Traditionally ridesharing comprises carpooling (travellers share a privately-owned vehicle, for commuting), vanpooling (sharing a van by traveling to/from a work place) and real-time ridesharing services (matching drivers and passengers according to destination they should achieve, through a mobile app before the trip starts and through which the passenger pays a share of the trip cost).

Ridesharing initially has a scope to fill empty seats in car, which enables better use vehicle occupancy potential and reduces the number of vehicles on the roadway.

### Impact of ridesharing

- *Impact on environment:* reduction of GHG emissions.

- *Impact on society:* shared travel costs, travel-time savings from high occupancy vehicle lanes, alternative way of travelling, reduce congestion.
- *Impact on urban land use:* parking space saving.
- *Impact on transportation:* alternative way of travelling

### Ridesharing models

- Carpooling.
- Vanpooling.
- Corporate.

Ridesharing BMs regarding some of these modes are described in Annex 1.

### Business model

The general idea of ridesharing BM consists of sharing the privately-owned car with other passengers that are travelling to the same or similar destination that the vehicle owner. In order to participate to the journey, the passenger should register to the ridesharing platform, chose the driver that is going to the same or similar direction and book his/her sit. The driver charges the passenger the travel fees (that includes but not limited partial fuel cost).

**Table 9 – Guidelines for Ridesharing project development**

Key aspects for implementation of Ridesharing	
<b>Costs</b>	<ul style="list-style-type: none"> <li>• Preliminary studies</li> <li>• Development of software and its maintenance.</li> <li>• Operational costs;</li> <li>• Marketing activities.</li> </ul>
<b>Stakeholders involved</b>	Local municipal organisations, NGOs, private organisations, software developer, CSOs.
<b>Types of investment</b>	<ul style="list-style-type: none"> <li>• Private funding: grants from private foundations, private gifts and donations, and private sector investment.</li> <li>• Crowdfunding.</li> <li>• Sponsorship and advertising.</li> </ul>
<b>Guidelines for implementation</b>	<ul style="list-style-type: none"> <li>• Selection of the most suitable funding opportunities.</li> <li>• Selection of the best contractors including the software developers.</li> <li>• Local authorities may advertise and promote the services.</li> <li>• Local authorities may incentivise people to use carpooling services by providing free parking spaces for carpoolers and permit to use a dedicated lane.</li> <li>• Carpooling schemes may be integrated with public transport systems (e.g. park and ride)</li> <li>• Infrastructure solutions such as high-occupancy vehicle (HOV) lanes may be implemented.</li> </ul>

### 5.2.6 Bike sharing

#### Brief description

A bike sharing system is usually a public service operated by a private company through a public tender. Bike sharing exists in multiple forms, including public, closed community and peer-to-peer systems. Bike sharing enables users to take short point-to-point trips using a fleet of public bikes distributed throughout a community. Bike sharing has the potential to play an important role in bridging some of the gaps in existing transportation networks, as well as encouraging individuals to use multiple transportation modes. The goal of public bike sharing is to expand and integrate cycling into transportation systems, so that it can become a daily transportation mode for commuting.

#### Impact of bike sharing

*Impact on environment: reduction of GHG emissions.*

*Impact on society: increase the mobility and connectivity, health benefits due to physical exercise while riding a bicycle, personal cost saving.*

*Impact on urban land use: save parking spaces.*

*Impact on transportation: reduction of personal vehicle use, lower transportation costs.*

#### Bike sharing models

- Station-based bike sharing.
- Dockless (or free-floating bike sharing).
- Hybrid bike sharing systems.
- P2P.

Bike sharing BMs of some of these modes are described in Annex 1.

#### Business models

In station-based bike sharing BM, riders access bicycles via unattended kiosks providing one-way service (i.e., bicycles can be returned to any kiosk), the bicycle should be return to the station. In a dockless bike sharing BM, commuters may take a bicycle and leave it at any location within a predefined geographic area. In a hybrid bike sharing BM, travellers take a bicycle from a kiosk and may return it to the station or leave it at any place within the predefined area. The bicycles can be found via smartphone app. The bicycle can be unblocked by scanning or typing a code.

**Table 10 – Guidelines for Bike sharing project development**

Key aspects for implementation of Bike sharing	
<b>Costs</b>	<ul style="list-style-type: none"> <li>• Costs for preliminary studies</li> <li>• Purchase of the equipment (bicycles and stations, if station- based).</li> <li>• Replacement parts and station siting.</li> <li>• Development of the software.</li> <li>• Ongoing operating and advertisement.</li> <li>• Costs of equipment insurance and personnel costs.</li> </ul>

<b>Stakeholders involved</b>	Local authorities, private sector as a service provider, app developers, CSOs, bicycle communities, telecommunication companies NGOs, travel agencies.
<b>Types of investment</b>	<ul style="list-style-type: none"> <li>• Public funding: federal, state, and local funds.</li> <li>• Private funding: grants from private foundations, private gifts and donations, and private sector investment.</li> <li>• PPP.</li> <li>• Sponsorship and advertising.</li> <li>• Crowdfunding.</li> <li>• EU funding.</li> </ul>
<b>Guidelines for implementation</b>	<ul style="list-style-type: none"> <li>• Selection of the most suitable funding tool. Local authorities may provide grants for the project realisation.</li> <li>• Local authorities provide the regulation program including establishing bicycle safety, fleet deployment, permitted areas for bicycle parking, and additional measures to efficient and effective deployment of bike sharing project in the city.</li> <li>• Local authorities should provide the infrastructure such as cycling paths.</li> <li>• Provide a policy dialogue between public and private sectors.</li> <li>• Choose an IT developer for bike sharing software production and maintenance.</li> <li>• In order to raise awareness about the services it is important to organise an effective marketing campaign.</li> <li>• Allocate people for the project development.</li> </ul>

### 5.2.7 Smart parking

#### Brief description

In urban areas, parking management impacts drivers search time and cost for parking spaces, parking revenue, and traffic congestion. The use of smart parking system that includes wireless parking meters, sensors allows the parking authority to control the state of each parking lot in real time and improve the parking management. Innovations in this sector may improve the mobility situation regarding parking especially in S-M-sized cities, where due to the lack of several different modes of transport, citizens must take their private cars for transportation.

#### Impact of parking

*Impact on society:* encourage the use of alternative modes of transportation, improve user convenience and safety.

*Impact on urban land use:* efficient citywide parking space utilization.

#### Smart parking models

- Parking Guidance and Information Systems.
- Transit Based Information Systems.
- Parking app.
- Parking smart payment system.
- E-parking systems.
- Automated Parking Systems.

Some smart parking modes' BMs are described in Annex 1.

## Business model

### *Parking Guidance and Information System*

These are new services that help a driver to find a free parking spot. User registers at the platform and download the app that enable the user to see free parking space in the near distance from him/her. The app allows the driver to book the parking space and provide other user with the information of the vehicle that booked it. The parking slots in its turn are provided with sensors that detect the park slot status (free or occupied) and transmit this data to the user in a real time.

Some of the apps also provide drivers with the option to pay for the parking fostering the time and avoiding the cash.

**Table 11 – Guidelines for Parking Guidance and Information System project development**

Key aspects for implementation of Parking Guidance and Information System	
<b>Costs</b>	<ul style="list-style-type: none"> <li>• Preliminary study and system architecture design.</li> <li>• Software development.</li> <li>• Sensors and parking cameras acquisition.</li> <li>• Office rent and equipment.</li> <li>• Operational costs.</li> <li>• Marketing costs.</li> </ul>
<b>Stakeholders involved</b>	Local municipalities, private parking stakeholders, software developers, transport planners, city planners, local business sector, telecommunication companies, sensors suppliers, investors.
<b>Types of investment</b>	<ul style="list-style-type: none"> <li>• Public funding: federal, state, and local funds.</li> <li>• Private funding: grants from private foundations, private gifts and donations, and private sector investment.</li> <li>• PPP.</li> <li>• Sponsorship and advertising.</li> <li>• EU funding.</li> </ul>
<b>Guidelines for implementation</b>	<ul style="list-style-type: none"> <li>• Selection of the suitable financial mechanism.</li> <li>• Establishing the partnership with key players.</li> <li>• Identification of the role of landowners and parking operators.</li> <li>• Local authorities should provide the regulation to the system.</li> <li>• Establishing the baseline parking parameters.</li> <li>• Data collection on parking situation in the city.</li> <li>• Identification of how other departments may benefit from smart parking.</li> <li>• Selection of the appropriate software developer.</li> <li>• Creation of the parking database, development of the real/time parking information.</li> <li>• Implementation of the parking cameras, sensors.</li> <li>• Testing of the app functionality, providing testing with users and gathering the feedback.</li> <li>• Integration with city dashboards.</li> </ul>

## 5.2.8 Public transport

### Brief description

This type of transit is publicly owned and comprises buses, trains, ferries, facilities etc., with fixed local routes and express services. It is a core service of shared urban mobility. There is a huge potential for public transport agencies to integrate or offer shared modes to enhance the access to the transport and decrease costs. The IT companies and emerging app entrepreneurs are collaborating to elaborate the platforms that can integrate these modes.

### Impact of public transport

*Impact on environment:* reduction of GHG emissions.

*Impact on society:* increases the mobility connectivity, reduce the congestion.

*Impact on urban land use:* save parking spaces.

*Impact on transportation:* reduction of private vehicle use.

### Public transport modes

- Metro
- Trams
- Trains
- Bus (Bus Rapid Transit (BRT))
- etc.

The BRT BM is described in Annex1.

### Business model

In order to solve mobility problems and to be aligned with technological and market demands the BM of some public transport modes are facing the changes and transformations.

For instance, a new transport BM arisen – BRT. BRT is a bus-based system that has high capacity, high-performance characteristics. BTR usually has exclusive transit ways, dedicated bus lanes. The high-end BRT services are equipped with Automated Vehicle Location (AVL). According to the BTR development level the passengers can pay with the smart card or more traditional way of payment.

**Table 12 – Guidelines for Bus Rapid Transit project development**

Key aspects for implementation of Bus Rapid Transit	
<b>Costs</b>	<ul style="list-style-type: none"> <li>• Acquisition of the buses, feeder vehicles, and fare collection and verification equipment (vending machines fare readers, fare verifiers, turnstiles).</li> <li>• Software and hardware development.</li> <li>• Fleet insurance.</li> <li>• Operational costs.</li> <li>• Marketing costs.</li> </ul>
<b>Stakeholders involved</b>	Local authorities, transport department, local transport operators, investors, insurance companies.
<b>Types of investment</b>	<ul style="list-style-type: none"> <li>• Public funding: Federal, state, and local funds.</li> <li>• Private funding: grants from private foundations, private gifts and donations, and private sector investment.</li> </ul>



	<ul style="list-style-type: none"> <li>• PPP.</li> <li>• Sponsorship and advertising.</li> <li>• EU funding.</li> </ul>
<b>Guidelines for implementation</b>	<ul style="list-style-type: none"> <li>• Explore BRT planning concepts. Consult with international experiences in the field.</li> <li>• Find the investors. The investments and risks may be allocated together with the private companies.</li> <li>• Local authorities should provide the regulations.</li> <li>• Obtain the local authority permission, license.</li> <li>• Foresee the required infrastructure for the BRT. For instance, dedicated lanes, bus stations etc.</li> <li>• Platform level boarding may be introduced in order to reduce boarding times and permit a better experience for passengers with strollers, wheelchairs, or limited mobility. BRT vehicle thresholds glide open, flush with elevated platforms so all riders board quickly.</li> </ul>

### 5.2.9 Integrated mobility

#### Brief description

Integrated mobility is a technology-enabled strategic service to ensure that travellers have the most convenient possible transportation journey. Integrated mobility aims at connecting people and places.

#### Impact of integrated mobility

*Impact on environment: reduction of GHG emissions.*

*Impact on society: increase the mobility and connectivity by using the multimodal transportation; reduction of the congestion, more satisfied travellers.*

*Impact on urban land use: saving of parking spaces.*

*Impact on transportation: reduction of personal vehicle use, optimal transfers selection.*

#### Integrated mobility models

- Multi-modal journey planning.
- Aggregated booking.
- Smart payment and ticketing.

The BMs of some of these services are described in Annex 1.

#### Business Models

##### Multi-modal journey planning

A multi-modal planned journey is a web and/or app that requires and combines the features of a public transport system, forecasting demand and coordinating services having different alternatives of transport and operators as its main elements. In detail, the system is comprised of multiple data sources that are available at specific locations across the urban network. The user has the option to choose the best suitable alternative combining different ways of transport depending on the goal of transit and availability.

**Table 13** – Guidelines for multi-modal journey planning project development

Key aspects for implementation of multi-modal journey planning	
<b>Costs</b>	<ul style="list-style-type: none"> <li>• Development and maintenance of static data feed of transit data and maintenance of regional feeds by regional transit authorities.</li> <li>• Marketing and sales cost such as events and trips in order to get agreement on data collection with multiple organizations</li> <li>• System cost using Cloud services.</li> <li>• Analytic tools for BIG DATA.</li> <li>• Marketing, Design, IT Systems and software development.</li> </ul>
<b>Stakeholders involved</b>	Regional and local authorities, mobility agency and public transport companies, IT developers, telecommunication companies and investors.
<b>Types of investment</b>	<ul style="list-style-type: none"> <li>• Public funding: federal, state, and local funds.</li> <li>• Private funding: grants from private foundations, private gifts and donations, and private sector investment.</li> <li>• Sponsorship and advertising.</li> <li>• PPP.</li> <li>• EU funding.</li> </ul>
<b>Guidelines for implementation</b>	<ul style="list-style-type: none"> <li>• Create a network of necessary stakeholders to provide a multi-modal transportation solution such as: transportation operators, local authorities, IT developers, traffic managers etc.</li> <li>• Multi-modal transportation planning should integrate institutions, networks, stations, user information, and fare payment systems.</li> <li>• Local authorities should consider the transportation improvement options, including improvements to various modes, and mobility management strategies.</li> <li>• Local authorities should consider the impacts such as long-term and non-monetary that multi-modal journey mode may provide.</li> <li>• Special attention should be given to the quality of mobility options available to people who are physically or economically disadvantaged.</li> </ul>

### Smart payment and e-ticketing

E-ticketing (or Electronic Ticketing, or Automated Fare Collection, or Smart Ticketing) means, in general, new technologies and integration of services that the user may pay by the means of app, smart card. The main issues of e-ticketing are:

- Propose complementary services to users in relation with their mobility when buying e-ticket;
- Modify relationship between public/private transport user and public/private transport operator regarding new way of payment;
- Improve overall efficiency and image of public transport network.

E-ticketing systems could contribute to the overall improvement of the public transport networks' level of services, image, accessibility, with the main aim to facilitate and/or increase the use of public transport and so contribute to the overall political goal of developing a sustainable transport policy.

E-ticketing systems are not necessarily about having one ticket for a journey but having one wallet for several tickets.

There are several potential e-ticketing systems:

- based on dedicated application;

- based on the virtualization of purchased e-tickets on the device;
- based on secure identity and back-office processing.

**Table 14** – Guidelines for smart payment and e-ticketing project development

Key aspects for implementation of smart payment and e-ticketing	
<b>Costs</b>	<ul style="list-style-type: none"> <li>• Software development.</li> <li>• Control system, Back office system, On board system acquisition;</li> <li>• Vending machines and on-line distribution channels acquisition;</li> <li>• Operational staff (vendors, controllers, maintenance teams etc.);</li> <li>• Maintenance and upgrade of hardware and software;</li> <li>• Marketing and customer relationship management.</li> </ul>
<b>Stakeholders involved</b>	Local and regional authorities, public transport operators, financing institutions, IT engineering companies, vendors of integrated systems, e-ticketing components, software solutions etc.
<b>Types of investment</b>	<ul style="list-style-type: none"> <li>• Public funding: federal, state, and local funds.</li> <li>• Private funding: grants from private foundations, private gifts and donations, and private sector investment.</li> <li>• PPP.</li> <li>• Sponsorship and advertising.</li> <li>• EU funding.</li> </ul>
<b>Guidelines for implementation</b>	<ul style="list-style-type: none"> <li>• Selection of the suitable investment mechanism.</li> <li>• Selection of the software developer, better with the knowledge of mobility sector.</li> <li>• Local authorities should assist in project design, customization, testing and deployment of a web-based e-ticketing system.</li> <li>• Provide an Integrated Project Plan for the entire project that covers detailed tasks, which will be performed, by the project.</li> <li>• All the roles and responsibilities of the project team should be clearly identified.</li> <li>• The most important role that governments have to play is to convince the most important players to participate in the process;</li> <li>• Public transport policy developers and contracting authority for public transport services could have a facilitating role in supporting the standardisation and regulation process where appropriate and in coordinating the efficient use of infrastructures.</li> </ul>

## 6. Making a project bankable

Numerous funding mechanisms are now available for urban mobility and transportation project development (national and international funds, grants etc. see [Guidelines to Innovative Financing](#)). However, transportation organisations and national mobility authorities often lack the capacity, knowledge and resources to prepare bankable project proposals. Initially, it is required to verify the project's key components, make sure each of them is properly evaluated and that the plan is effectively managed and that all project requisites are comprehensive. Each aspect has a risk factor, and each risk factor has a price. When a bank or other potential investors study a transport and mobility project, the objective is to know the level of risk through an assessment process. There is no common approach to cover all urban mobility projects. Moreover, consideration of different aspects may change from project to project. For most transportation projects, however, the broad format described in

these Guidelines is of general applicability and has scope to support preparation of the bankable project in mobility management.

### **6.1. Feasibility Studies and Important Aspects of Project Management**

The feasibility analysis is considered as an important step for the project in different development phases in order to gain funding or to make sure it is feasible, gainful for the organization and beneficial for society. After elaborating the business model and choosing the strategic project partners it is crucial to provide a business feasibility analysis, in order to obtain investment. A business feasibility analysis can be defined as a controlled procedure for identifying problems and opportunities, determining objectives, defining the successful outcomes and evaluating the range of benefits associated with alternative scenarios for solving problems.<sup>24</sup> A feasibility study is an analytic tool that supports potential investors in the decision-making process. It is used to analyse the viability of the project, such as ensuring that a project is legally and technically feasible and economically justifiable. Feasibility analysis should provide all necessary information for an investment decision. A bankable project should provide commercial, technical, financial, economic and environmental etc. prerequisites in order to be invested in. The main components are outlined below.

#### **6.1.1 Executive summary**

A feasibility study document starts with an Executive summary. This section summarizes the document. It introduces the project and should include:

- its scope,
- location,
- who is involved,
- the commercial rationale - market opportunity and the benefits of the proposed business idea,
- a brief history of the project, and a timeline of activities undertaken or completed to-date,
- an outline of the amount and type of investment / financing being requested, how the investment will be used,
- possible exit strategies for external investors,
- critical next steps needed to realize the project.

After providing the Executive summary the document outlines the feasibility fields that have a scope to convince the future investor that the project is viable and worthy of investment.

#### **6.1.2 Project feasibility fields**

This section discusses different areas of the project feasibility, which may be considered during its assessment. Feasibility evaluation includes the following areas.

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<sup>24</sup> Thompson, A. (2003). Business Feasibility Studies: Dimensions of Business Viability. Perth, Best Entrepreneur.

### 6.1.2.1 Product/ Service feasibility

This section describes the company's product or service, identifying the product mix and how items relate to each other. It should explain how customers would use and buy the mobility product or service providing enough detail to help investors judge the effectiveness of the project marketing and positioning plans.

It should describe the key vehicles, technologies and services outsourced etc. that will be used for providing project services, how the organisation will source technologies or vehicles or external services and their availability. This section also introduces plans to test the product/service to ensure it works as planned and is sufficiently durable, secure, etc. (i.e. consumer product/service test, beta test with major company, etc.). At the end of this section a description of plans to upgrade product/services or expand product/ service line should be provided.

### 6.1.2.2 Technical/ Technological feasibility

This addresses the technological evaluation and is generally conducted by engineers and IT experts. The technical/technological requirements are considered and compared to the technical/technological capability of the company. The project may be considered technically/technologically feasible if the internal technical/technological capability inside the consortium is sufficient to support the project requirements.

The company should answer the following questions in order to provide this type of analysis:

- How practical is the proposed technology or solution?
- Does the company currently possess the necessary technology?
- Does the company have the required technical expertise?
- Does the company possess enough technical resources to develop a service/product?
- Can resources be upgraded to provide the level of technology required?
- Can the company purchase the technology if it is not available?
- Can the technology be easily applied?

This feasibility analysis foresees the following steps:

1. *Technology and development process*: existent or new technology, basis of selection of technology, competing technologies, details of licensor of technology.
2. *Software and hardware*: list of software, hardware and equipment, details of suppliers, competitive quotations, technical and commercial evaluation of major equipment.
3. *Manpower analysis*: basis of manpower estimation, manpower details, for example, managerial, supervisory, skilled/unskilled, training required.
4. *Contracts*: contractual agreements with contractors addressing know-how, engineering, procurement, development, financial soundness and experience of contractors.
5. *Project control and implementation*: way of implementation, details of monitoring team, detailed schedule of implementation.

This stage of feasibility analysis demonstrates if the project can be realised technically.

### 6.1.2.3 Industry/Market feasibility

This feasibility section provides *market and domain analysis*. It describes the current market for the project product or service. It covers

- The size and scope of the market and/or market segment(s).
- Estimation of the future direction of the industry, market and/or market segment(s).
- Identification of the industry nature, market and/or market segment(s). Is it stable or going through rapid change?
- Analysis of the industry life cycle, market and/or market segment(s). Is it emerging, growing, mature etc.?

This description is provided by an *industry competitiveness study*. The following information should be addressed:

- Identification of the industry concentration. Are there just a few large mobility service providers or many small providers?
- Definition of the main competitors. Are they direct competitors of the project?
- Examination of the barriers to entry of new competitors into the market or industry. Can new competitors enter easily?
- Analysis of the concentration and competitiveness of input suppliers and product/service buyers.
- Analysis of the price competitiveness of the project product/service.

After the description of the domain competitors, the project proceeds with a *market potential analysis*.

In order to provide market potential analysis, the following steps should be taken:

- Identification of whether the product will be sold into a transportation and mobility market or a differentiated product/service market.
- Analysis of the demand and usage trends of the transportation and mobility market or market segment in which the product or service will participate.
- Analysis of the potential emerging, niche or segmented market opportunities.
- Evaluation of the project potential share of the market or market segment.
- Definition of the potential customers and the associated marketing costs.
- Identification of the project output's distribution system and their costs.

*Sales projection analysis:*

- Estimation of the sales or usage of the product/service.
- Assessment of the extent to which the project can meet the underlying assumptions in the sales projection.
- Different scenarios of project sales if these assumptions occur (i.e. selling prices of the mobility service, services provided, etc.).

### 6.1.2.4 Economic feasibility

Economic feasibility analysis assesses the economic conditions, identifies a business plan, and evaluates costs and revenues of foreseen operations. It enables assessment of opportunities and risks and attractors for investors. Conducting an economic feasibility analysis is an important step in evaluating the costs, benefits, risks and rewards of a new venture.

At this stage of analysis, the feasibility study should answer the question: is it worth doing?

Economic feasibility analysis provides the information whether it worth to invest in the project. As soon as specific requirements and solutions have been defined, the analyst can assess the costs and benefits of each alternative solution.

This analysis normally includes a *Cost Benefits Analysis* (CBA) of the project, enabling companies to determine the viability, cost, and benefits associated with a project before the investments are provided. Moreover, this analysis is considered to enhance project credibility, helping decision-makers identify the positive economic benefits of the project. CBA are widely used to analyse transport and mobility projects, especially large-scale infrastructure projects. Since 2000, the EU Cohesion Policy<sup>25</sup> requires projects to provide CBA in order to attract investment. The EC provided funds to CIVITAS projects giving an opportunity to gain experience on CBAs for urban transport projects.

CBA answers the following questions:

- Is the project viable (if benefits overcome costs)?
- Can the project be implemented, within provided cost constraints?
- What is the minimal project cost?
- What are the alternatives, among predefined solutions?

The difficulty of providing CBA is identifying and assessing costs and benefits, which may be intangible, hidden and/or hard to estimate.

Steps to provide a Cost Benefit Analysis:

1. *Identify objectives and criteria.* The project's objectives go along with the appraisal criteria. It is also important to define the system boundaries, for instance, is the assessment limited to local effects? To what extent are outside effects included? Indicate the time period over which costs and benefits are analysed.
2. *Identify project alternatives.* The project costs and benefits are compared to reference scenarios: 'do nothing'/baseline, 'do minimum' or 'do something'.
  - The baseline scenario demonstrates a no-investment approach that involves identified operational and maintenance costs within the present situation.
  - The 'do minimum' scenario describes the conditions when minimum effort and cost are required. This scenario may need some extra investments that go beyond the existing operational and maintenance costs. For instance, the improvement of an existing transportation infrastructure may need the additional funding resources.
  - The 'do something' scenario requires the greater amount of investment that should be defined based on technical, regulatory, compliance, demand opportunities and constraints. However, the reference scenario is usually a 'do-minimum' scenario, rather than a 'do-nothing' scenario.

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<sup>25</sup> An introduction to EU Cohesion Policy 2014-2020

[http://ec.europa.eu/regional\\_policy/sources/docgener/informat/basic/basic\\_2014\\_en.pdf](http://ec.europa.eu/regional_policy/sources/docgener/informat/basic/basic_2014_en.pdf)



3. *Identify project impacts.* All types of costs and benefits regarding the project's implementation should be identified. It is important to understand the relationship between the measure and its various impacts (positive and negative). Also, the CBA's perspective must be defined.
  - A CBA from the perspective of a private organisation usually considers only the company's own costs and benefits.
  - A social CBA, as completed for public investments, will include the impacts on society as a whole.
  - Defining the CBA's geographic scale is another sensitive issue. A too narrow CBA might fail to include adverse effects of a project outside the implementation area (for instance, congestion charge leading to increase traffic levels outside the charging zone). In contrast, a CBA extended across the administrative boundaries will become more complex and data intensive. In general, the geographic scale needs to suit the measure and the municipality's objectives.
4. *Quantification of relevant impacts.* For each impact included in the CBA, a method to measure and quantify is identified. For example, estimating the effect on local air pollution may use average vehicle emission factors with correction factors to account for specific local conditions, if necessary. Some impacts might have been not quantifiable and/or difficult to measure. In a traditional CBA these impacts are often simply excluded.
5. *Monetary valuation of impacts.* Monetary values are defined and applied to non-market effects. Different ways to monetise non-market effects are available. The monetisation of non-monetary effects is difficult. As monetisation is an elaborated process, often guideline values are used. A sensitivity analysis is recommended for those effects whose values are not so reliable. This addresses the factors/combinations of factors that may lead to unfavourable consequences, which are identified in the project framework as "project risks".
6. *Discount rates.* Future costs and benefits are discounted to their present value, allowing comparison of costs or benefits that occur at different times. However, discount rates vary significantly between countries, significantly affecting the results' comparability. High discount rates are likely to overrate current benefits (and costs) and undervalue future benefits.
7. *Presentation of the results according to one or more indicators.* Depending on the purpose of the CBA, different indicators can be used, such as Net Present Value (NPV), the Internal Rate of Return (IRR) and the Benefit Cost Ratio (BCR). NPV (net present value) is used to justify adopting or rejecting a project. BCR used to rank different projects in order of benefits per unit of invested capital as it allows comparisons across different project sizes.
8. *Sensitivity analysis.* Impact-values (e.g. discount rate, project lifetime) may be associated with uncertainties. In this case a sensitivity analysis is normally requested to identify the impact of each parameter on the overall results. Sensitivity analysis assesses the effect of reaching project' objectives if certain assumptions do not, or only partly, occur.

### *Types of benefits*

Benefits may be classified into one of the following categories:

- Monetary - when values can be calculated;
- Tangible (Quantified) - when benefits can be quantified, but values can't be calculated.
- Intangible - when neither of the above applies.

The project can provide long-term non-monetary benefits and have a positive impact on society in terms of mobility (accessibility, reduction of congestion, urban mobility improvement, reduction of vehicle ownership etc.), impact on environment (GHG reduction, less air pollution), impact on urban landscape (better land use, increase parking space availability) etc.

The benefits can be identified by organizational level (operational, lower/middle/higher management) or by department (development, purchasing, sales etc.).

### *Types of costs*

- Direct costs: a direct cost is a price that can be totally allocated to the development of specific goods/services. A direct cost can be identified as a variable cost if it is inconsistent.
- Indirect costs: indirect cost is an expense that is not directly related to producing a product or service. An indirect cost cannot be easily allocated to a product, department, activity or project.
- Fixed cost: is a cost that does not change even if the amount of goods or services produced or sold increase or decrease. A company pays fixed costs, independently from business activity. Fixed cost together with variable costs composes total cost of conducting business.
- Variable costs: Contrary to fixed costs, a variable cost depends on a change at production level output. This type of cost varies according to the number of products a project produces. A variable cost increases as the production volume increases, and contrary decreases if the production volume decreases.

#### 6.1.2.5 Financial feasibility

Financial feasibility provides information about proposed investment and financing structure. The Investment proposal regards funds for a commercial investment which provides a return on capital to the investor and / or which pays a rate of interest to a lender on a debt, which is repayable on agreed terms. The proposal may include grant or subsidised components, but the investment opportunity should be structured as a commercial proposition.

This is a key section of the proposal, which elaborates the nature and amount of investment that the project is requesting. It is important that this section is clear and explicit.

Financial feasibility analysis should provide the details on:

- Total investment amount required from the investor / bank.
- Total amount of investment cost of the entire project;

- Type of investment required: equity or debt (or other instrument); Project proposal may comprise both equity and debt components;
- How much investment the entrepreneur will invest from his own funds (both amounts already invested and amounts to be invested).
- What other sources of investment will be applied and their terms and conditions: e.g. debt finance / banks / development finance/ equity providers / grants / equipment finance / leasing / hire purchase). It is important to specify whether the funds have already been applied / are committed / requested / identified as possible;
- Projected returns for equity holders (as appropriate);
- Projected rates of interest and anticipated repayment schedules for debt holders;
- Identify period of investment and payback periods;
- Estimated project execution timelines and costs during development period including rolled-up interest costs.

Below can be found a further elaboration of key aspects and considerations of this section from the perspective of an Equity Ask and a Debt Ask.

### *Equity request*

- *Investment vehicle*: to whom the investor provides the financing corporate structure/ entity. This information available in the Business Model / Project structure;
- *Investment (Ask) Amount*: how much investments the project asks. How much investment does the project partners provide?
- *Investor share in business*: what share in business will the investor receive for his/her investment? How it was calculated?
- *Financing Leverage*: what is the relation of total equity to total debt? How will the debt be raised? Is it already committed? From which institutions? What is the rate of interest and on what repayment terms?
- *Use of funds*: for what purposes will the investor's investment be used for? Estimation of capital and operational expenditure and assumed timings of financing requirements should be provided. Provision of a source and application of funds table / schedule is recommended.
- *Returns*: what returns can the investor expect and what is the time frame for it? It will be helpful to express these returns as Equity IRRs, Return of Investment (RoI), Return on Capital (RoC) or other similar indicators. Equity cash flows should also be present in the financial scheme to reflect the investment flows from the investor's perspective.
- *Investment terms and expectations*: The project participants' expectations / requirements of investors' obligations, rights and benefits, in terms of board and management representation, burden of time, dividend rights, pay out options, preferential treatment etc. should be clearly identified.
- *Exit strategy*: the proposed timeframe of the investment is important information for investors. The exit strategy for the investor should be clearly outlined. To enhance the flexibility of the proposal, different multiple exit points can be announced and may comprise, industry sale, buy back by developer, etc.

- *Investor*: what type of investor is being selected and why? Institutional investor, private equity, venture capital, industrial investor etc.

### *Debt request*

- *Borrower*: provide the information about the borrower (corporate structure or entity) to whom the investor will lend the money. This information should be described in BM/project structure.
- *Borrowing amount*: provide the information about the amount of debt requested.
- *Financing leverage*: what is the ratio of total debt to total equity? How will the equity be raised? From which investors? Are the equity providers already committed? If yes, what are the conditions of their investment?
- *Funds use*: what the investors' funds will be used for? Provide the schedules of capital expenditure and operational expenditure and assumed timings of financing requirements. It is recommended to provide a table of a source and application of funds.
- *Returns*: provide the information and timeline about the returns that investor can expect. It can be done by expressing these returns as Equity IRRs, RoI, RoC or by other similar indicators. Equity cash flows should also be provided in the financial model to reflect the investment flows from the investor's perspective.
- *Investment terms and expectations*: the project developers' expectations / requirements of potential investors' obligations, rights and benefits, in terms of board and management representation, burden of time, other commitments, dividend rights, pay out options, preferential treatment etc. should be provided.
- *Exit strategy*: it is important to provide the investor with the proposed timeline of the business investment. Moreover, the exit strategy for the investor should be clearly described. To make the proposal more flexible, possible multiple exit solutions can be suggested and may include, industry sale, buy back by developer etc.
- *Investor*: describe the type of investors are being selected and why. Development fund, institutional investor, private equity, venture capital, strategic investor, industrial investor etc.
- *Terms and conditions*: what are the requested / proposed rate of interest and period of borrowing, proposed repayment terms? What security / collateral is being offered? Debt cash flows should also be described in the financial scheme.
- *Financing institution*: what lending institution is being selected and why? Development bank, commercial bank, other.

In order to provide a feasibility appraisal, the following actions should be taken:

*Project' cost*: the project should provide accurate estimates and justified costs that will be assessed with regards to different aspects, for instance, implementation period, inflation, different agreements, quotations etc.

*Means of financing*: this part of financial feasibility study should correspond to proper combination of share capital and debt. This comprises share capital, unsecured loans, internal accruals, term loans, and Government investment. Project contribution in the form of

equity and interest-free unsecured loans, if any, is ascertained in view of commitment to the project.

*Profitability estimation:* the company will be examined regarding the past financial performance. The company is required to submit profitability estimates, cash flow and projected balance sheet for the project and for the organisation in general.

### 6.1.2.6 Operational feasibility

This assessment determines whether and how well the organizations' needs can be met by completing the project.

Operational feasibility assesses the capability of the organization to support the proposed business model. At this point of the feasibility study it is important to determine the management commitment to the proposed project.

To evaluate the operational feasibility the project should take into consideration the following aspects:

- *Performance:* The operational team should provide the adequate performance and response time.
- *Information:* The information provided by operational team to the management and also to end-user should be adequate accurate and useful.
- *Economy:* The project should be sure that current mode of operation provides cost-effective services. Is it possible to increase benefits and/or reduce the costs?
- *Control:* Does current way of operation provide effective controls to protection system and guarantee accuracy and security of data and information?
- *Efficiency:* Does current way of operation ensure maximum use of available resources, including people, time etc.?
- *Services:* Is the provided service reliable? Is it flexible and expandable?

### 6.1.2.7 Organizational feasibility

Organisational feasibility introduces the proposed management / project team, their backgrounds and what they bring to the project. The structure of the management team should also reflect the scale and complexity of the project or business. Important issues to consider:

- *Organisational structure:* the project management and organisational structure must be clearly identified, providing, if possible, the names of team selected and their allocated positions.
- *Management roles and responsibilities:* outline the responsibilities of each senior manager that will be involved in the project development, implementation and operations.
- *Management expertise:* it is important to provide profiles of key management and team contributed to the project development and implementation. It can be presented in form of brief CVs. The CVs may include information on relevant work experience, contributions and skill sets that will be needed for successful project implementation.

- *Manpower distribution scheme*: manpower distribution should be well thought and presented in a comprehensive short form. It is important to ensure that assumptions for this section are realistic and achievable.
- *Partnerships*: provide and describe the roles of each key partners (companies and institutions etc.) involved in the development and implementation of the project. As it was described in Section 4 partners may be of different kinds: public and private companies, NGOs, CSOs, R&D institutions, consortium members, equipment suppliers, technology suppliers, etc. It is crucial that partners' relationships to the project are clearly presented and explained.

### 6.1.2.8 Intellectual property

This section provides a brief description of patents, copyrights, and trademarks obtained and under development. This should detail all the owners that have rights on patents; summarize results of patent searches. If projects operate under a licensing agreement or patent assignment, all the owners of licensor/assignor and key conditions should be provided (i.e. exclusivity, rights, and responsibilities). It is important to provide an intellectual property planning in advance, if possible before the business concept being developed and validated so that the ownership of the results can be assured and identified.

### 6.1.2.9 Legal feasibility

This analyses whether any aspect of the proposed project conflicts with legal national or international requirements. The legal feasibility study assesses if the proposed project corresponds to the legal and ethical requirement of the country and region in particular. It is important that the project conforms the requirements needed to start a business comprising business licenses, certificates, copyrights, business insurance, fiscal norms, health and safety measures etc. Legislation on urban mobility development therefore remains the responsibility of local administrations (towns, cities and regions).

### 6.1.2.10 Risk Analysis

The proposal should include a risk assessment identifying the key risks involved in developing, implementing and operating the project / business. The analysis should identify the nature of the risk, the likelihood of it occurring, the potential impact and possible mitigation measures. Typically, these risks include but are not limited to:

- *Business Specific Risks*: execution and completion risk, counterparty risks, performance risks. These risks will seriously affect the project and if they occur may threaten the its whole development;
- *Financial and Economic Risks*: cost and revenue risks; interest rate risks; currency rate fluctuation these may affect the economics of the project but may be mitigated.
- *Technology Risks*: depending on the project this may impact the project economics and may as well be project threatening.
- *Country Specific (Political and Regulatory Risk)*: it is important to identify and focus on the key risks connected with the particular business model or industry which really imperil the project and threaten to put it out of business rather than more general or less threatening risks.



This section should additionally provide a scenario analysis using graphs or diagrams to show the sensitivities of the financial model.

### 6.1.2.11 Schedule feasibility

A very significant part of feasibility study is scheduling. All the project development phases should be scheduled. For these purposes project managers use different scheduling approaches such as Gantt charts, PERT diagrams etc.

### 6.1.1.12 Non-financial Impacts

It is important to summarise and quantify, if possible, the non-financial impacts and benefits of the project:

- *Environmental Impacts*: assessment of the project's impacts on the environment both negative and positive. Identification and description of possible environmental impacts: waste collection and treatment, water supply and sewage treatment, pollution, emissions reductions, neighbouring eco-systems etc.
- *Development and Social Impacts*: assessment of the project's impact in terms of the sustainable development goals. Identify and describe impacts on technology and skills transfer, employment, health, female empowerment, education, poverty reduction, rural electrification, energy access, water and sanitation. Quantification of the assessment results (for instance, in terms of jobs created, people / households reached).

### Important notes

- These Guidelines provide the sections that investors will examine and expect to receive in order to assess a project feasibility. However, deviations and additional sections are allowed and encouraged if a project developer considers them appropriate and useful.
- There are no restrictions on the document length. Nevertheless, in general a feasibility study includes from 10 to 20 A4 pages plus annexes. This should be enough to summarise the business plan of the project. Generally, shorter documents are more appreciated than longer ones.
- The document organisation that includes font size, spacing, etc. depends on developers' preferences. The important issue is that the document should be reader friendly.



## 7. Recommendations

The mobility and transportation sectors are presented by three main components: the mobility services for end-users, the infrastructure that enables integration and the stakeholders that provide such services. The rapid development of the technologies has changed the way the mobility services are provided in this sector identifying the benefits of integrating, sharing mobility and MaaS. The real value lies in integrating new technological solutions to the mobility ecosystem applying them to the innovative business models.

New mobility services can have an enormous potential for economic development of S-M cities, not just through direct contributions, but also by being a catalyst for innovation in domains beyond transportation, such as technology, communication, procurement, etc. Even if the use of new mobility services is still limited to small and medium urban areas, the concepts that are at the core of new mobility services will serve as an inspiration to improve transportation policy in general and public transit in particular creating new business models and partnerships. New mobility services are an innovative solution for the entire transportation sector and S-M cities in particular. Many transportation and mobility companies applied new modes of providing mobility services to make their services more attractive to customers and consequently to solve nowadays mobility problems by creating more sustainable sector.

Table below illustrates some changes happened in the new mobility business models.

**Table 15** – Changes in the mobility paradigm

Mobility characteristic	Changes in the mobility service development
Consumers mobility needs	Shift from vehicle ownership to mobility access (affordability, flexibility, convenience, time saving)
	Real-time mobility information and planning
	One single payment interface
	Intermodality of transportation
Mobility integration infrastructure	Connectivity (external environment interaction)
	Data management
	Technology and interface system integration
	E-commerce, account management and on-line payment
	Parking management and rapid transit stations
Stakeholders	Infrastructure providers (telecom companies, IT and payment systems, parking operators etc.)
	City administrators (civil transport authorities, urban development boards)
	Transport modes operators (public and private providers)

In order to create bankable projects and introduce new business ideas to S-M cities the local authorities should foresee the following actions:

- Allocate the investment and human resources for R&D activities for searching new mobility services and business opportunities.
- Establishment of new forms of partnerships such as mentioned in the document that includes iPPP. These forms of partnerships may include besides public and private sector R&D institutions, CSOs, NGOs and local communities.
- Allocate the human resources for the research of new investment opportunities.

- Improvement/creation of local infrastructure if needed for new mobility services implementation.
- Consult the national and regional policy documents on transport and mobility services in order to create a sustainable and innovative mobility ecosystem.
- Create a knowledge transfer network between the departments who are providing the research in the mobility sector, local authorities and other mobility and transportation stakeholders. Moreover, participation at the training and workshops in order to develop business modelling and strategy skills.

### 7.1 New forms of partnership

New mobility services also represent an opportunity for public agencies of S-M cities to bring innovation to their transportation systems, in terms of public transit, parking policy, traffic management, etc. Municipalities and transportation agencies may lack experience in establishing suitable forms of partnerships to develop new mobility services. New partnerships such as iPPP are needed in order to maximize the efforts and share and increase the probability to obtain the investment.

In order to overcome the main partnership barriers and create sustainable and successful collaboration the following issues should be considered.

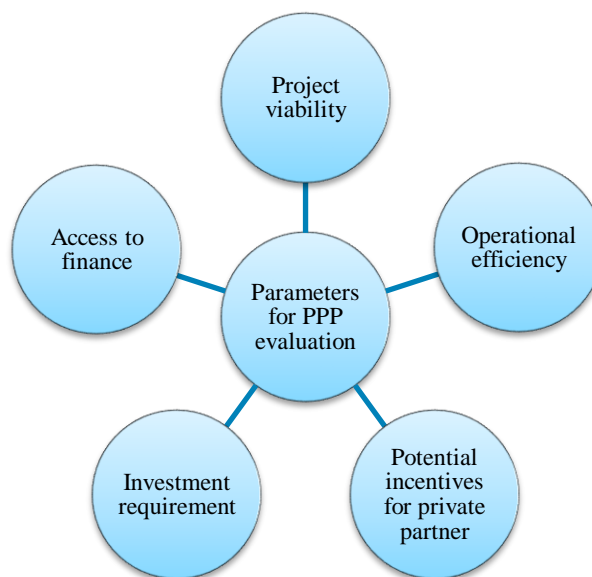
- Creation of solid institutional mechanism addressing specific sector policies.
- Integrated approach of financial, technical and business planning.
- Development of efficient project management regarding the business idea and contractual forms.
- Successful implementation depends on recognition of partner's objectives.
- iPPPs require careful consideration of control and management systems through project agreements.

The suitability of PPP models depends on several factors such as the authority's financial strength, the city-specific context, maturity of private players in the sector and the level of control that the authority wishes to maintain in the system (as shown in Figure 3).

In order to provide a successful partnership both private and public sectors must be transparent about the fundamental principles and objectives that lie in the basis of PPP.

- In a PPP, the private sector partner becomes a long-term service provider rather than simply upfront asset builders, taking responsibility for designing, building, operating and providing investment to deliver the services required by the public sector.
- In this case local government authorities become the regulators that provide their resources for service planning, performance monitoring and contract management rather than on the direct management and services delivery.

Additional value can be provided by including R&D companies as well as the local communities, CSOs, NGOs. The partnership may benefit from their knowledge, reputation and influence on the service consumers.



**Figure 3** – Assessment of the PPP models

## 7.2 Innovative business models

In order to provide sustainable mobility services and innovate the existing mobility ecosystem the local authorities should consider the following actions:

- The business model innovation foresees the top-down approach. The top management should support and provide the resources for new business opportunity research, design and implementation. It should strongly support the team in all stages of new business model development;
- Constant monitoring of the business environment analysing the new business models in the transport and mobility sector and the market tendencies.
- Monitoring of the technological innovation in the sector regarding MaaS, sharing and integrated mobility.
- The development and application of a new business model requires creation of new organizational capabilities and structures. Moreover, it requires the establishment of new relationships with suppliers, customers and new business partners.
- Adoption of the business idea to a local mobility situation considering the national and local legislation.
- Consulting the business model analogies and learning from best practices.
- Searching for new investment opportunities for project development.

## 7.3 Making a project bankable

An important step in order to implement the mobility project is to find the investor who is interested to benefit from it. In this case the financiers will require the “bankable document” to decide if the project is worth to invest.

Local authorities and interested parties should foresee the following actions:

- Provide research on different investment programs and financial opportunities.
- Allocate the human resources to develop bankable documents.
- Prepare the bankable documents that will confirm the project viability. These documents include the feasibility reports (such as market feasibility study, technical feasibility analysis, financial and economic feasibility study etc. See chapter 6)
- Provide risks analysis.

### Conclusions

Local authorities of S-M cities are striving to create a sustainable mobility and transportation system. European S-M cities are looking for new mobility solutions that match reality and needs and can bring sustainable development, enabling time and resource efficiency, reduction in emissions and congestion, promotion of efficient land use, improve safety etc.

Promising urban mobility service innovations that already exist in big cities still need to scale up to their full potential for S-M cities to fully realize the benefits of sustainable urban development. A successful implementation of investment programs requires shifts in traditional business models that bring public and private interests into alignment. New approaches to developing sound project pipelines are needed to smooth and accelerate the early stage investment process where knowledge, capacity and interest gaps can exist.

These Guidelines provide the European S-M cities' local authorities with a useful instrument to establish innovative forms of partnerships as well as to develop new mobility services and create bankable projects. Business Model briefs presented in Annex 1 describe the innovative mobility services that S-M city local authorities may consult in order to implement the similar services in their cities.

Developing new business models to accelerate and scale up investment in sustainable urban mobility will depend on answering following key questions: what to invest in, how to pay for it, how to mobilize investment capital and how to structure implementation. To best answer these questions, the following key stakeholders need to develop sustainable solutions together: city decision makers, mobility service providers and investors should build a shared understanding of the challenges and opportunities of different business model choices.

These Guidelines were developed together with other two [Guidelines: Innovative Procurement](#) and [Innovative Financing](#) that will give to S-M cities an innovative toolset to address the mobility and transport issues and increase the capacity building of local authorities.

## Links

### Urban Mobility Package - European Commission

[https://ec.europa.eu/transport/themes/urban/urban\\_mobility/ump\\_en](https://ec.europa.eu/transport/themes/urban/urban_mobility/ump_en)

### INEA, SUITS - European Commission

<https://ec.europa.eu/inea/en/horizon-2020/projects/H2020-Transport/Urban-Mobility/SUITS>

### Urban mobility. Shifting towards sustainable transport system. In depth analysis.

[http://www.europarl.europa.eu/RegData/etudes/IDAN/2014/538224/EPRS\\_IDA\(2014\)538224\\_REV1\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/IDAN/2014/538224/EPRS_IDA(2014)538224_REV1_EN.pdf)

### EU regional and urban development, The EU's main investment policy - European Commission

[http://ec.europa.eu/regional\\_policy/en/policy/what/investment-policy/](http://ec.europa.eu/regional_policy/en/policy/what/investment-policy/)

### Trans-European Networks (TENs)

[http://ec.europa.eu/regional\\_policy/en/policy/what/glossary/t/trans-european-networks](http://ec.europa.eu/regional_policy/en/policy/what/glossary/t/trans-european-networks)

ELTIS - <http://www.eltis.org/>

CIVITAS - <http://civitas.eu/>

URBACT - <http://urbact.eu/urban-mobility>

### COM (2013) 913 final, 'Together towards competitive and resource-efficient urban mobility'

<http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52013DC0913&from=EN>

### Urban mobility at a tipping point – McKinsey & Company

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# SUITS



Deliverable No.:	D4.2
<b>Guidelines to Developing bankable projects, new business models and partnerships Annex 1</b> <b>New Business Models in mobility sector</b>	
Project Acronym:	SUITS
Full Title:	
Supporting Urban Integrated Transport Systems; Transferable Tools for Authorities	
Grant Agreement No.:	690650
Work Package No.	4
Work Package Denomination:	
Innovative and sustainable financing, procurement and business innovation	
Responsible Author(s):	
Eurokleis s.r.l, Italy	
Francesco Bellini, Iana Dulckaia	
Responsible Co-Author(s):	
Date:	03.12.2019
Status:	V2.0
Dissemination level:	PU



THE CIVITAS INITIATIVE  
IS CO-FINANCED BY THE  
EUROPEAN UNION

## Disclaimer

The present Guidelines represent a research document developed by SUITS (Supporting Urban Integrated Transport Systems; Transferable Tools for Authorities) Project, a four-year research and innovation action, intending to increase the capacity building of Local Authorities and transport stakeholders to implement sustainable transport measures. SUITS is one of the three projects of the EU's CIVITAS 2020 initiative focusing on sustainable urban mobility plans. The SUITS project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement no. 690650 / 2016.

The results of these Guidelines were tested and analysed during a Pilot Application run by Alba Iulia Municipality (Romania) as part of SUITS project.

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The present document should therefore be taken as a supporting decision-making tool for the S-M cities mobility stakeholders. For this reason, the managers of the mobility authorities can consult with the Guidelines adapting the findings and recommendations of this document to their transport reality, if possible. The Guidelines do not represent an instruction manual.

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## Abstract

The annex provides the examples of new mobility business models identified in the Guidelines and aim to support the decision makers in considering new mobility schemes to improve the urban mobility situation in S-M cities. Each mobility service has a brief description and an example of a generic business model of such service.

### Document History

Date	Author	Action	Status	Diss. Level
28.04.19	EUROKLEIS	Completion of Annexes	V1.0	PP
30.04.19	INTECO	Splitting up the Guidelines and the Annexes 1 into separate volumes, similarly for all the three Guidelines	V1.1	PP
31.10.19	EUROKLEIS	Updated version of the document	V1.1	PP
29.11.19	EUROKLEIS	Final version	V2.0	PU

Dissemination Level:

PU - Public

PP - Restricted to other programme participants (including the Commission Services)

RE - Restricted to a group specified by the consortium (including the Commission Services)

CO - Confidential, only for members of the consortium (including the Commission Services)

## Table of content

<b>Abstract .....</b>	<b>66</b>
1. Car on-demand .....	68
2. Micro mobility .....	82
3. Scooter sharing .....	87
4. Car sharing .....	93
5. Ridesharing .....	99
6. Bike sharing .....	104
7. Smart parking .....	110
8. Public transport .....	115
9. Integrated mobility .....	120

## 1. Car on-demand

### Taxi e-hailing

#### Definition

Taxi services represent one of the traditional forms of providing urban mobility. Often the traditional way of delivering taxi services have a strict business model. In the last years, taxi companies have revolutionised their services by applying ICT, providing door-to-door trip, through e-hailing services. E-hailing represents a process of ordering a vehicle (car, taxi or any other form of transport) by using computer or smartphone. In order to hail a taxi electronically, a user should provide a taxi company his/her desired or current position, by providing an address or sending a current GPS position. The development of e-hailing applications in the taxi industry is one of the most important technological innovations recently.



#### Main concepts of Taxi e-hailing

- Use of mobile application to hail the vehicle.
- The payment occurs via application.
- Save user's time by hailing a car electronically and not ordering a car via operator.
- Moreover, information about the type of vehicle, driver, pick-up time and trip cost is provided to user in advance electronically.
- GPS is an important technology of the taxi e-hailing business as it enables the customers to track the taxi in real time.

#### Benefits for the stakeholders by implementing Taxi e-hailing

##### Local and regional authorities:

- Improvement of the integrated mobility service delivery.
- Improvement of the city image.

##### Transport operators:

- Improved allocation of resources.
- Reduction of the overall costs due to the digitalisation of the business.
- Simplification of the business process.
- Increase income by attracting more customers, save waiting time at the taxi stand, save cost of fuel.
- Create better relationship with customers by improving service quality and increasing customers' satisfaction.












**Users:**

- Reduction of the transaction costs. Specifically, platforms remove the cost of dispatchers and eliminate specialised equipment such as purpose-built radios, taximeters and credit card.
- The replacement of advance bookings with real-time adjustments also offers potential efficiencies.
- Faster and more efficient taxi hailing.
- Easier way of payment via e - payment.
- Advanced costing model enables to provide payment information before the trip.

## D4.2 - Guidelines to Developing bankable projects, new business models and partnerships

### Annex 1 - New Business Models in mobility sector

Business Model Canvas of Taxi e-hailing				
Key Partners 	Key Activities 	Value Propositions 	Customer Relationships 	Customer Segments 
<ul style="list-style-type: none"> <li>Local and regional authorities: will provide the authorisation for the business;</li> <li>Private taxi service providers;</li> <li>Automotive companies: will supply with the cars;</li> <li>IT companies: will design the size and the architecture of the system;</li> <li>Insurance companies;</li> <li>Tourism sector</li> <li>Telecommunication companies;</li> <li>Hotel and restaurant sectors;</li> <li>Airports.</li> </ul>	<ul style="list-style-type: none"> <li>Preliminary studies;</li> <li>Obtain permissions and licencing;</li> <li>Vehicles acquisition (leasing);</li> <li>Obtain insurance for the vehicles;</li> <li>Fare and compensation policy planning;</li> <li>App system architecture design;</li> <li>Operation and management of the services;</li> <li>Marketing activities;</li> <li>Hiring the drivers.</li> </ul>	Provide personalised and convenient taxi services with real time tracking system and possibility to hail the taxi and pay for it using unique mobile application.	<ul style="list-style-type: none"> <li>Automated service: users do not interact directly with the company staff.</li> <li>Personal assistance.</li> </ul>	<ul style="list-style-type: none"> <li>Occasional individual commuters.</li> <li>Hotel clients.</li> <li>Restaurant clients.</li> <li>Travellers (airport)</li> <li>Tourists</li> <li>Companies' employees</li> </ul>
	<b>Key Resources</b>  <ul style="list-style-type: none"> <li>Investment</li> <li>Software and Hardware</li> <li>GPS technology</li> <li>Mobile application for taxi e-hailing</li> <li>Human resources: <ul style="list-style-type: none"> <li>customer relationship staff</li> <li>drivers</li> </ul> </li> <li>Car fleet</li> </ul>		<b>Channels</b>  <ul style="list-style-type: none"> <li>Mobile App</li> <li>Taxi website</li> <li>Advertising in the airport, hotels etc.</li> </ul>	
<b>Cost Structure</b>  <p>Costs for System implementation</p> <ul style="list-style-type: none"> <li>Preliminary studies and service architecture design;</li> <li>Vehicle insurance</li> <li>Software development;</li> <li>Cars' acquisition (leasing)</li> </ul> <p>Operational costs</p> <ul style="list-style-type: none"> <li>Operational staff wages;</li> <li>Customer relationship management.</li> <li>Maintenance and upgrade of software;</li> <li>Marketing;</li> </ul>			<b>Revenue Streams</b>  <ul style="list-style-type: none"> <li>Fares collection (company getting a percentage of every taxi journey ordered through)</li> <li>Advertising (on cards, in the web or mobile selling apps etc.).</li> </ul>	

### Case Study of Taxi e-hailing provider: MyTaxi

Mytaxi is a taxi mobile-based application developed by the industrial group Daimler AG and is available in various EU member States. Customers can hail a taxi by using the MyTaxi Mobile App or the MyTaxi Website or by calling the MyTaxi booking number.

Daimler company also owns the Car2Go car sharing service and purchased Mytaxi in September 2014.

In July 2016, Daimler AG has announced the merger with the UK taxi application Hailo, in order to create the largest EU taxi application with 100,000 registered drivers in more than 50 cities across nine EU countries. All the Hailo activities were re-branded Mytaxi. Mytaxi's headquarters is situated in Hamburg, Germany.

The taxi drivers of MyTaxi enable to manage their own customers, providing payments by accepting credit cards through the MyTaxi app. The app enables better transparency and permit to save money through the pay-per-trip model instead of the monthly subscription model that most dispatchers offer [5].

Mytaxi has received a total of \$13M as a funding. Mytaxi's top competitor is Easy Taxi.

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## **Transportation Network Companies**

### **Definition**

A TNC is a corporation, partnership or other type of entity that running the transportation business using only digital network in order to connect TNC passengers with TNC drivers that organise the prearranged journey. TNC provides a 'real-time ridesharing,' by means of mobile application that enables to indicate not only the location of the potential client, but also the density of drivers nearby and the waiting time for the closest driver. Transportation Network Company is offering an app-based peer-to-peer car-for-hire alternative to a regular taxi service [1].



### **Main concepts of TNC**

- The TNC provides the prearranged trips by using the cars that are possessed, leased or authorised for been used by the TNC drivers.
- Use of the mobile application or Internet to arrange a trip.
- The payment occurs via smart payment.
- GPS technology permits to track the driver position and indicates the passenger meeting point.
- TNC operates thanks to the following major technologies: GPS navigation, smartphones, and social networks, each technology has its purpose. GPS navigation system guarantees travel efficiency both distance and time, smartphones enable the accessibility to the mobile app, and social networks provide trust and accountability for both drivers and clients.

### **Benefits for the stakeholders by implementing TNC**

#### **Local and regional authorities:**










- Reduction of household car ownership.
- More parking spaces, reduction of the traffic congestion.
- Introduction of different commuting choices.

#### **Users:**

- Fast way of transportation.
- Smart payment makes this mean of travelling more attractive.
- GPS system permits to track the cars and choose the closest to the rider option.

## D4.2 - Guidelines to Developing bankable projects, new business models and partnerships

### Annex 1 - New Business Models in mobility sector

Business Model Canvas of TNC					
<b>Key Partners</b> 	<b>Key Activities</b> 	<b>Value Propositions</b> 	<b>Customer Relationships</b> 	<b>Customer Segments</b> 	
<ul style="list-style-type: none"><li>• Local and regional authorities: provide the permission and regulate the services;</li><li>• Investors;</li><li>• Lobbyists;</li><li>• IT engineering companies;</li><li>• Drivers who provide their own cars;</li><li>• Data analytics;</li><li>• Telecommunication companies.</li></ul>	<ul style="list-style-type: none"><li>• Preliminary studies;</li><li>• Obtain the permissions;</li><li>• Obtain insurance for the vehicles;</li><li>• Fare and compensation policy planning;</li><li>• App system architecture design;</li><li>• Operation and management of the services;</li><li>• Marketing activities;</li><li>• Hiring the drivers with vehicles.</li></ul>	<p><u>For drivers:</u></p> <ul style="list-style-type: none"><li>• Income generation/ extra income;</li><li>• Self-employment;</li><li>• Flexible work hours;</li><li>• Simple and easy way to enter TNC.</li></ul> <p><u>For costumers:</u></p> <ul style="list-style-type: none"><li>• Easy, accessible and user-friendly service;</li><li>• Highest grade of flexibility, riders can choose the closest drivers to their position;</li><li>• Easier and efficient way of transaction.</li></ul>	<p>The system and the relation to the users is fully automated. Normally interaction occurs only via the web-app, users have no direct contact to the company's staff.</p>	<ul style="list-style-type: none"><li>• <u>Drivers:</u> people who want to earn extra money</li><li>• <u>Riders:</u><ul style="list-style-type: none"><li>- Travellers</li><li>- Random passengers</li></ul></li></ul>	
	<b>Key Resources</b> 		<b>Channels</b> 		
<b>Cost Structure</b> 			<b>Revenue Streams</b> 		
<p><b>Costs for system implementation:</b></p> <ul style="list-style-type: none"><li>• Software development</li><li>• Technology development</li></ul>			<ul style="list-style-type: none"><li>• Car rides charged by km/miles via smart payment</li><li>• Promotional offerings and partnerships involving third parties</li></ul>		
<p><b>Operational costs:</b></p> <ul style="list-style-type: none"><li>• Marketing expenditure</li><li>• Permanent employees (service and support team) salaries</li><li>• Service maintenance</li></ul>					

## Case study: TNC implementation in the US

### Regulatory Landscape

California Public Utilities Commission (CPUC) in September 2013 defined TNCs as a new category of transport provider. According to the CPUC, a TNC is “a company that uses an online-enabled platform to connect passengers with drivers using their personal, non-commercial vehicles.”<sup>26</sup> CPUC provided a new regulation of an emerging mobility services.

The main differences between TNCs and taxis consist in the use of technology and ownership and/or responsibility for vehicles. TNCs use mobile apps, taxis started to use them more recently. In TNC vehicles are owned or leased by private individuals; taxis in general manage the cars as part of a business entity or commercial fleet.

TNCs regulation should foresee such aspects as public safety, consumer protection, market dynamics, and social equity and accessibility. TNC regulatory aspects have been an issue of discussion for jurisdictions of many states. The regulatory concerns regarding TNCs are:

- Driver qualifications, including background and driving record checks;
- Vehicle safety and operation;
- Insurance;
- Data sharing, for purposes of consumer protection and urban planning (e.g. traffic and congestion);
- Pricing, for purposes of consumer fairness/affordability, revenues for cities/states, and competitive advantage;
- Accessibility, primarily focused on individuals with disabilities;
- Violations and enforcement.

US states provided some TNC-related regulation. The regulatory set up is dynamic, for instance, New York City decided to reduce the number of TNC vehicles in August 2018 and introduce a minimum wage for TNC drivers in December 2018.

Regulatory authority over TNCs varies by state. The most common regulator is the Division of Motor Vehicles.

### Driver requirements

*Driving experience.* Driver's minimum age range from 18 to 21 years, some states require a minimum amount of driving experience from up to one year.

*Background checks.* Some states demand a check of the driver's driving history, as well as a local and national criminal background check that can be done by the TNC or a third party.

*Driving time.* Some states set up the limit of working hours for the drivers. Number of hours that driver can operate a vehicle in a day.

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<sup>26</sup> POLICY GUIDE, Regulation of Transportation Network Companies  
[http://leg.wa.gov/JTC/Documents/Final%20Studies/TNC\\_PolicyGuideFinal.pdf](http://leg.wa.gov/JTC/Documents/Final%20Studies/TNC_PolicyGuideFinal.pdf)

#### *Vehicle requirements*

Most states require basic vehicle inspections, only Connecticut permits self-certification. Some states allow the TNC to conduct the inspection, while others require licensed mechanics. Inspection frequency varies by state, with most requiring an annual inspection. Moreover, most states require that TNC-affiliated vehicles meet the state's motor vehicle safety and emissions requirements for private motor vehicles.

Some examples of the fees applied in different states:

Fees may vary from state to state. Some states charge a flat fee to each TNC, while other states established per trip fees. Below some examples [5].

- Arkansas charges each TNC company an annual TNC permit fee of \$15,000.
- Kentucky charges an annual TNC fee of \$250 and a \$30 annual license fee for TNC vehicles.
- New Jersey requests an annual TNC permit fee of \$25,000, plus a \$0.50 per trip surcharge and a \$0.25 per shared trip surcharge.
- Massachusetts charges a TNC per-trip \$0.20, half of which goes to a Transportation Infrastructure Enhancement Fund, the other half is distributed proportionately to each city and town based on number of trips originating there.
- South Carolina requires a local assessment fee of 1% of gross trip fares which is distributed to cities where rides originated, after the state covers expenses associated with collecting the fee.
- Colorado charges each TNC an annual fee of \$111,250 [5].

These kind of charging (per trip or per vehicle fees) allows to increase the revenues and to facilitate the market entry for smaller companies.

#### **Case Study of TNC provider: Uber**

Uber Technologies Inc is an owner and developer of the Uber transportation app, which enables clients to prearrange the trip by booking the drivers with the car. Uber was founded by Travis Kalanick and Garrett Camp in 2009 with the app released in June 2010.

The Business Model of Uber belongs to the category of the Aggregator Business Model or On Demand Delivery Model. Following this kind of Business Model, a company collects and organizes different elements, which form a service and make it available to customers under a single brand.

Uber business model consists of mobile application that matches the drivers to the customers. Uber does not possess the vehicles. It aggregates the collaborators (the drivers) (Uber does not consider the drivers as employees) that possess and drive their own vehicles. More precisely Uber trade the deal under its brand name. Despite the fact that drivers are not the Uber employees they sign a contract with the company agreeing to the terms and conditions of the ridesharing services regarding the quality and price.



### Annex 1 - New Business Models in mobility sector

Uber provides different types of services:

1. Economy. Economy options include UberX (vehicle maximum for 4 people) and UberXL (a trip for up to six people).  
Despite UberSELECT is listed as an economy option on Uber's website, but is also shown as a premium option in the app.
2. Premium. Premium trips are Uber's higher-end luxury transportation options. These kinds of trips cost more than UberX. This service provides a ride in a luxury car such as BMW, Mercedes, or high-end SUV. This service includes
  - UberBLACK,
  - UberSUV,
  - UberLUX.
3. Accessibility. This kind of service enables people with accessibility problems, for instance, wheelchairs and families who need car seats for children to have transportation. The accessibility program includes:
  - UberACCESS,
  - WAV,
  - UberX + Car Seat.

These options normally cost more than a standard ridesharing.
4. Carpool. UberPOOL rides are shared rides with other people who are headed in the same direction. This is the cheapest, but slowest option.
5. UberEATS. An option that offers Uber to their clients to deliver a food for its customers.
6. Uber for Business. Uber for business is a service that enables business people to travel.
7. Uber Freight. Uber Freight is a service that enables to match carriers with shippers.
8. Uber Health. This type of service enables patients to reach the places like hospitals [4].

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## D4.2 - Guidelines to Developing bankable projects, new business models and partnerships

### Annex 1 - New Business Models in mobility sector

- Policy guide, Regulation of Transportation Network Companies [http://leg.wa.gov/JTC/Documents/Final%20Studies/TNC\\_PolicyGuideFinal.pdf](http://leg.wa.gov/JTC/Documents/Final%20Studies/TNC_PolicyGuideFinal.pdf)

## **Shuttle buses**

### **Definition**

On-demand shuttle buses provide services to transport passengers to regional or hub airports or provide the transportation to customers on personal business, hospitals, educational centres, hotels etc. Shuttle businesses provide useful transportation for customers that head to their final destination, and do not want to face driving and parking issues by selecting a trip in a regularly scheduled bus.



### **Main concepts of Shuttle buses**

- The customer may acquire ticket at the selling points or via dedicated website.
- Shuttles provide on-demand service and pick up passengers at the certain points or stops.

### **Benefits for the stakeholders by implementing shuttle buses system**

#### **Local and regional authorities:**

- Improve traffic operations in and around the city.
- Support economic development by leveraging benefits of transit.
- The well-working shuttles services may increase the (business) tourists' flow to the cities.
- Reduction of the traffic congestion.
- Introduction of the alternative ways of commuting.
- Expand transit to underserved or growing areas

#### **Transport operators:**

- Revenue generation by providing shuttle buses' services and attracting new passengers by proving the benefits of using such kind of transport.

#### **Users:**

- Shuttles permit to complete the "last mile" for many commuters getting them to their work sites, airports etc.
- Time saving way of transportation.
- Convenience of traveling and convenient prices.

### **Different shuttle buses models**










Shuttle buses business models may differ according to the customer segmentation:

Annex 1 - New Business Models in mobility sector

- **Tourists and business travellers** that commute to/from the airport. In this case also the type of the vehicle can be adapted to this kind of passengers. For instance, place for the luggage.
- **Employees that commute to their organisations.** For instance, such vehicles may be provided with the wi-fi and front tables for working.

## D4.2 - Guidelines to Developing bankable projects, new business models and partnerships

### Annex 1 - New Business Models in mobility sector

Business Model Canvas of Shuttle bus				
<div>Key Partners</div> <div><ul style="list-style-type: none"><li>Local authorities: public transport policy developers and contracting authority for public transport services;</li><li>Local transport operators: public transport services suppliers;</li><li>Investors: provide the initial funds to start the business</li><li>IT companies: they will develop the service architecture;</li><li>Automotive companies: provide transport operators with vehicles;</li><li>Insurance companies: will provide the insurance of the vehicles.</li></ul></div>	<div>Key Activities</div> <div><ul style="list-style-type: none"><li>Preliminary studies;</li><li>Acquisition of the required permits and license for running the shuttle business from local authorities;</li><li>Acquisition of the required buses, vans or cars for shuttle services;</li><li>Acquisition of the insurance;</li><li>Shuttle fleet management;</li><li>Development of shuttle services website;</li><li>Maintenance of the shuttle fleet;</li><li>Cleaning and refuelling of the shuttle fleet;</li><li>Hiring drivers and administrative personnel</li><li>Marketing activities</li></ul></div>	<div>Value Propositions</div> <div><ul style="list-style-type: none"><li>Comfortable and fast way of transportation from one destination to another;</li><li>No need to use a proper owned vehicle.</li></ul></div>	<div>Customer Relationships</div> <div><ul style="list-style-type: none"><li>The system and the relation to the users may be fully automated. Interaction occurs only via the web;</li><li>Selling points</li></ul></div>	<div>Customer Segments</div> <div><ul style="list-style-type: none"><li>Citizens with a need for comfortable and fast mobility to a certain destination; (e.g. business people, Ad-hoc users);</li><li>Tourists</li></ul></div>
	<div>Key Resources</div> <div><ul style="list-style-type: none"><li>Investments;</li><li>Shuttle busses fleet;</li><li>Software and telematics systems for booking and payment;</li><li>Human resources for customer support, shuttle services (drivers and controllers) and cleaning, administrative personnel.</li></ul></div>		<div>Channels</div> <div><ul style="list-style-type: none"><li>Website;</li><li>Selling points;</li><li>Hotels;</li><li>Promotional materials in the public places;</li><li>Airports.</li></ul></div>	
	<div>Cost Structure</div> <div><div>System implementation costs:</div><ul style="list-style-type: none"><li>Vehicle acquisition;</li><li>Software and hardware development for operation;</li><li>Tolls.</li><li>Vehicle insurance;</li><li>Office equipment and expenses;</li><li>Costs for registration and licencing.</li></ul><div>Operational costs:</div><ul style="list-style-type: none"><li>Vehicles maintenance;</li><li>Wages of employees (drivers etc.);</li><li>Human resources management.</li><li>Refuelling and vehicle cleaning;</li><li>Marketing costs;</li><li>Costs for parking (contracts with local providers);</li><li>Administrative expense.</li></ul></div>		<div>Revenue Streams</div> <div><ul style="list-style-type: none"><li>Fare collection;</li><li>Advertising on the buses.</li></ul></div>	

#### Case Study of shuttles provider: Aerobús shuttles

Aerobús is the official shuttle bus service that connects the airport BCN-El Prat and the centre of Barcelona every 5 minutes, each day, in approximately 35 minutes.

The passengers are able to travel between any of the two airport terminals (T1 or T2) and the centre of Barcelona (Pl. Catalunya) in a fast, comfortable and economic way. The bus makes stops at the most important points of the city: Pl. Catalunya, Sepúlveda-Urgell, Pl. Espanya, Gran Vía-Urgell, and Pl. Universitat. The shuttle buses are adapted for the people with disabilities. The buses provide the spaces for the luggage. Moreover, the passengers may find free wi-fi and USB chargers on the board. Each shuttle bus is provided with video surveillance systems. Nevertheless, the passengers have an opportunity to watch a TV channel with practical information about Barcelona. The fare collection is foreseen by the several ways:

- Online on the Aerobús website <http://www.aerobusbcn.com/en/fares> (payment by credit card)
- Directly to the Aerobús personnel at the bus stops
- At the ticket vending machines (payment by credit cards VISA and MASTERCARD)
- The payment may occur directly to the bus driver (cash only)

A single ticket costs 5,90 euros (including the luggage), both ways ticket costs 10, 20 euros that includes the luggage and the return valid within 15 days after the validation of the outward journey. Children under 4 years do not pay the ticket.

All buses of the Aerobús fleet comply with the most restrictive norms of Euro 5 i EEV (emission of contamination).

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## 2. Micro mobility

### Electric kick scooter sharing

#### Definition

Shared electric micro mobility refers to any small electric-powered transportation solution such as bikes/e-bikes, scooters/e-scooters or any other small, lightweight vehicle that is being used as a shared resource between multiple users.



Electric kick scooter sharing system is a service that makes scooters available for use for short-term rentals. Scooter sharing model is similar to car sharing or bicycle sharing systems. Scooters are normally dockless, which means that they do not have a fixed base location and can be picked up and dropped anywhere in the service area. Such business model makes this type of the transportation a convenient mobility option for first-/last-mile urban mobility.

#### Main concepts of the Electric kick scooter sharing

- The user registers to the platform to start to use the service.
- Vehicles are distributed across a community and commuter can use a smartphone to find and unlock a device.
- The payment occurs via mobile application (smart payment).
- Currently, trip rates incorporate an initial fee plus a per-minute charge.
- The most common way of scooters distribution is dockless. The vehicles can be picked up and dropped off in any service area.
- The entire business model is based on digital technologies. All operations occur via smartphone (registration, vehicle tracking, vehicle unblocking and payment).

#### Benefits for the stakeholders by implementing Electric kick scooter sharing

##### Local and regional authorities:

- Reduction of the traffic.
- Savings of the car parking spaces.
- Additional income for local authorities.
- Air condition's improvement.
- New jobs creation.
- Improvement of the city image and the diversification of the transport offer.

##### Transport operators:

- Economic benefit. Income from scooter sharing operation.
- Cost saving business.












**Users:**

- Solution for the first/last mile mobility.
- Fast way of the transportation with a possibility to enjoy the city view.
- Zero fuel costs.
- Potentially reduce driving stress and more economical way of commuting.

## D4.2 - Guidelines to Developing bankable projects, new business models and partnerships

### Annex 1 - New Business Models in mobility sector

Business Model Canvas of Electric kick scooter sharing				
Key Partners 	Key Activities 	Value Propositions 	Customer Relationships 	Customer Segments 
<ul style="list-style-type: none"> <li>Local and regional authorities;</li> <li>Local transport operators: public transport services suppliers;</li> <li>Investors;</li> <li>IT engineering companies: they will design the size and the architecture of the system;</li> <li>Scooter manufacturing company: they will provide the operators with vehicles;</li> <li>Insurance company;</li> <li>Energy charging companies: these companies will charge the scooter batteries.</li> <li>Telecommunication companies.</li> </ul>	<ul style="list-style-type: none"> <li>Preliminary studies;</li> <li>Introduction of the services to the urban mobility planning;</li> <li>Obtain the permission and licencing for the service operation;</li> <li>Kick scooter fleet leasing/acquisition;</li> <li>Development of the software platform;</li> <li>Maintenance of the platform;</li> <li>Scooter fleet management and maintenance;</li> <li>Charging the e-scooters;</li> <li>Customer care and feedback;</li> <li>Marketing campaign.</li> </ul>	<ul style="list-style-type: none"> <li>Easy, accessible and user-friendly service;</li> <li>Pay as you Go approach;</li> <li>No restriction to stations and dedicated parking areas (pick up and drop the scooter wherever in the service area of the provider);</li> <li>Covering the main central areas with an elevated number of vehicles in the fleet.</li> </ul>	<ul style="list-style-type: none"> <li>The relation with the users is fully automated.</li> <li>Service provider supports the users on online basis.</li> </ul>	<ul style="list-style-type: none"> <li>Occasional commuters;</li> <li>Tourists.</li> </ul>
	<b>Key Resources</b>  <ul style="list-style-type: none"> <li>Software;</li> <li>Scooter fleet;</li> <li>IT infrastructure;</li> <li>Human resources (service administration, marketing personnel etc.)</li> <li>Investments.</li> </ul>		<b>Channels</b>  <ul style="list-style-type: none"> <li>The electric kick scooter sharing platform can be reached by mobile app/ desktop browsers;</li> <li>Website;</li> <li>Advertisement at the public places like metro.</li> </ul>	
Cost Structure 			Revenue Streams 	
<b>Costs for System implementation:</b> <ul style="list-style-type: none"> <li>Preliminary studies;</li> <li>Insurance;</li> <li>Scooters acquisitions or leasing;</li> <li>Software development;</li> <li>Office equipment and expenses.</li> </ul>			<b>Operational costs:</b> <ul style="list-style-type: none"> <li>Selling, General and administrative expense;</li> <li>Employees wages (service and support team);</li> <li>Repairs and Maintenance;</li> <li>Marketing activities;</li> <li>Payment for the energy charging companies</li> </ul>	
			<ul style="list-style-type: none"> <li>Registration fees</li> <li>Rental fees (Pay as you Go)</li> <li>Sponsorship/Commercial (advertisement in the public places)</li> </ul>	

#### **Case Study: city of Brussels**

Several e-scooter sharing providers entered the Brussels' urban mobility sector such as Lime, Troty, Dott. The vehicles are in free circulation in different parts of the Brussels city area. The scooters can be rent by using a mobile phone application, moreover, the scooters can be picked-up and left anywhere on the public pavement within the service operating area.

The Brussels Regional Government have issued regulations regarding the bicycles/e-bicycles, motor and scooters/ e-scooters in free circulation from the 1<sup>st</sup> of February 2019.

New mobility regulatory framework foresees the following aspects:

- All new businesses will have to apply for a licence from the Brussels Region in order to start the business.
- The application has to provide a detailed operational plan regarding the following aspects: such as number, specifications and expected life cycle and measures for recycling the scooters, identification of the specific areas covered by the provider, collection and re-distribution methods for the scooters, description of the data collection and the planning on how the data protection will be guaranteed, pricing specification, integration into existing applications for multimodal itineraries.
- Operators must provide different operational reporting requirements.
- Scooter providers should obtain public liability insurance.
- It is not allowed to provide an advertisement on the scooters but only the name of sponsor/user.
- Re-charging of the scooters must be done with green electricity
- Requirement that all documentation and on-line information be available in French, Dutch and English [6].

#### **Case Study of electric kick scooter sharing: Lime**

Lime is one of the leading companies in micro mobility.

Former LimeBike, Lime is a transportation rental company based in San Francisco, California, United States. LimeBike was founded in January 2017 and raised US \$ 12 million in venture funding in March 2017. The company launched the bicycles in June 2017. LimeBike expanded in July 2017 to the cities of Key Biscayne, Florida, South Bend, Indiana, and South Lake Tahoe, California. In May 2018, LimeBike rebranded as "Lime" and started to partner with Segway to produce new scooters. In August 2018, the company started to work with Uber to provide them with electric bikes for the expansion of their Uber Bikes service.

Lime offers bike sharing, scooter and kick scooter sharing services in different cities all over the world (USA, Australia, Europe, UK etc.). The company offers dock free vehicles that users find and unlock via mobile application. The user has to register to the platform in order to access to the services and find the vehicles using the GPS navigation. The vehicles unlocked by using a QR code. Lime has an initial fee in order to unlock the scooters and then

### Annex 1 - New Business Models in mobility sector

it charges the users per minute of ride. The prices can vary according to the country and the city. The payment occurs via the customers' credit card which number is registered to the users' profile.

The workers of the private contractors who partner with Lime to become "Juicers" charge Lime e-scooters. Lime pays to the Juicers to charge the scooter by using their charging equipment. The charging process happened during the night then the Juicer places the scooters at designated "groves" throughout the company's service area in the morning.

The payment that Lime provides to the independent contractors for charging a particular scooter depends on how long the scooter has been left on the street after being signed for needing a charge and before the Juicer resigned the scooter in an app to claim the reward.

Lime is partnering with local organisations in order to provide benefits to the local economies [3].

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### 3. Scooter sharing

#### Definition

Scooter sharing service provides commuters with access to the scooters for short-term use. The vehicles are distributed across a network of scooter sharing spaces within a metropolitan area. Clients can access the vehicles 24/7 with a reservation and are charged by time or by mile.



#### Main concepts of Scooter sharing

- The user must register on the scooter sharing platform and pass pre-qualification process for verification of identity and driving record and provide the data of credit card for payment. Afterwards, the user is ready to use the services.
- Keyless access to the vehicle is unlocked by using the application.
- Scooter sharing uses a Pay as you Go model, which means that the user is charged by the time spent in the trip or based on distance travelled.
- Scooter sharing provides helmets and disposable hats that are used for hygienic reason.
- Vehicle usage can be spontaneous or reserved in advance.
- The vehicles are normally available throughout the city network.
- The operator provides servicing/cleaning.

#### Benefits for the stakeholders by implementing Scooter sharing system

##### Local and regional authorities:

- Reduction of the household cars/scooters ownership.
- Alleviate parking and traffic congestion.
- Introduction of more commuting choices and reduction of the single-occupant-vehicle.
- Identification of the policies and practices that take advantage of new technologies that can enhance the quality and efficiency of transportation facilities and services.
- City space saving.

##### Transport operators:

- Revenue generation by providing scooter sharing services.
- Reduced costs for employment.

##### Users:

- Scooter sharing permits users to ride the vehicles without owning them.
- Scooter sharing is affordable, prise convenient and flexible way of commuting.
- Improvement of the travel experience.
- Smart payment makes this mean of commuting more attractive.

- More flexible driving in the traffic.

### Different scooter sharing models

Scooter sharing provides different service models:










- **Round-trip:** this type of scooter sharing provides the service where the user must return the scooter to its starting point, at the end of the journey. Round-trip scooter sharing provides the service to the user that demand long-term journey, in this case the transport operator offer daily, or day-to-day, charges.
- **Point-to-point:** (station based) station based scooter sharing service permits the users to get a vehicle at one station and return it at different one. Station based services are considered to be less flexible than a free-floating scooter sharing, however, enables more efficient specific trips.
- **One-way:** (free floating) scooter sharing enables the users to pick up and leave vehicles at any desired location, within a specified operating area.

Scooter sharing fuel types:

- Electric scooters
- Scooters with gasoline fuel

## D4.2 - Guidelines to Developing bankable projects, new business models and partnerships










### Annex 1 - New Business Models in mobility sector

Business Model Canvas of One-way free - floating scooter sharing				
Key Partners 	Key Activities 	Value Propositions 	Customer Relationships 	Customer Segments 
<ul style="list-style-type: none"><li>• Local authorities: public transport policy developers and contracting authority for public transport services;</li><li>• Local transport operators: public transport services suppliers;</li><li>• Investors</li><li>• IT engineering companies: they will develop the application architecture;</li><li>• Scooter providers: provides transport operators with vehicles;</li><li>• Insurance companies: will provide the insurance of the vehicles;</li><li>• Telecommunication companies;</li><li>• CSO.</li></ul>	<ul style="list-style-type: none"><li>• Preliminary studies;</li><li>• Acquisition of the permission and licensing;</li><li>• Introduction of scooter sharing to the city plan;</li><li>• Scooter fleet leasing/acquisition;</li><li>• Scooter fleet management;</li><li>• Development of scooter sharing digital platform;</li><li>• Telematics and web app Management;</li><li>• Maintenance of the scooter fleet;</li><li>• Cleaning and refuelling of the scooter fleet;</li><li>• Marketing activities.</li></ul>	<ul style="list-style-type: none"><li>• Urban mobility without transport ownership;</li><li>• Easy, accessible and user-friendly service;</li><li>• Highest grade on flexibility (pick up and drop the scooter wherever user wants in the area of the provider);</li><li>• Pay as you go approach;</li><li>• No restriction to stations and dedicated parking areas;</li><li>• High availability of vehicles.</li></ul>	<p>The system and the relation with users are fully automated. Normally interaction occurs only via the web-app, users have no direct contact to the company's staff.</p>	<ul style="list-style-type: none"><li>• All citizens with a need for flexible mobility within the city;</li><li>• Tourists.</li></ul>
	<b>Key Resources</b> 		<b>Channels</b> 	
<b>Cost Structure</b> 			<b>Revenue Streams</b> 	
<b>Costs for System implementation:</b> <ul style="list-style-type: none"><li>• Preliminary studies</li><li>• Office equipment and expenses</li><li>• Scooters acquisitions or leasing;</li><li>• Software development;</li><li>• Charging infrastructure (for the electric scooters);</li><li>• Insurance;</li></ul>			<b>Operational costs:</b> <ul style="list-style-type: none"><li>• General and administrative expense;</li><li>• Employees wages (service and support team);</li><li>• Repairs and Maintenance;</li><li>• Marketing activities;</li><li>• Refuelling and cleaning;</li><li>• Customer Bonus.</li></ul>	
			<ul style="list-style-type: none"><li>• Rental fees (Pay as you Go);</li><li>• Sponsorship/Commercial.</li></ul>	



## D4.2 - Guidelines to Developing bankable projects, new business models and partnerships

### Annex 1 - New Business Models in mobility sector

Business Model Canvas of Round trip scooter sharing				
<b>Key Partners</b>  <ul style="list-style-type: none"> <li>• Local authorities: public transport policy developers and contracting authority for public transport services;</li> <li>• Local transport operators: public transport services suppliers;</li> <li>• Investors</li> <li>• IT engineering companies: they will develop the application architecture;</li> <li>• Scooter providers: provides transport operators with vehicles;</li> <li>• Insurance companies: will provide the insurance of the vehicles;</li> <li>• CSO.</li> </ul>	<b>Key Activities</b>  <ul style="list-style-type: none"> <li>• Local authority permission;</li> <li>• Introduction of scooter sharing to the city plan;</li> <li>• Scooter fleet leasing/acquisition;</li> <li>• Scooter fleet management;</li> <li>• Development of scooter sharing digital platform;</li> <li>• Telematics and web app Management;</li> <li>• Maintenance of the scooter fleet;</li> <li>• Cleaning and refuelling of the scooter fleet;</li> <li>• Creation of scooter sharing stations;</li> <li>• Marketing activities</li> </ul>	<b>Value Propositions</b>  <ul style="list-style-type: none"> <li>• Urban mobility without transport ownership</li> <li>• Easy, accessible and user-friendly service</li> <li>• Dedicated parking areas</li> <li>• High availability of vehicles</li> </ul>	<b>Customer Relationships</b>  <p>The system and the relation with the users are fully automated. Normally interaction occurs only via the web-app.</p>	<b>Customer Segments</b>  <ul style="list-style-type: none"> <li>• All citizens with a need for mobility within the city;</li> <li>• Tourists</li> </ul>
	<b>Key Resources</b>  <ul style="list-style-type: none"> <li>• Scooter fleet</li> <li>• Helmets</li> <li>• Charging stations</li> <li>• Software &amp; Telematics Systems</li> <li>• Human resources for customer support, scooter services and cleaning</li> <li>• Stations or dedicated parking lots.</li> </ul>		<b>Channels</b>  <ul style="list-style-type: none"> <li>• Web App;</li> <li>• Web page;</li> <li>• Shops;</li> <li>• Promotional materials in the public places;</li> <li>• At the charging points.</li> </ul>	
<b>Cost Structure</b>  <p><b>Costs for System implementation:</b></p> <ul style="list-style-type: none"> <li>• Preliminary studies</li> <li>• Scooter stations</li> <li>• Scooters acquisitions or leasing;</li> <li>• Software development;</li> <li>• Charging infrastructure (for the electric scooters);</li> <li>• Insurance;</li> </ul> <p><b>Operational costs:</b></p> <ul style="list-style-type: none"> <li>• Office equipment and expenses.</li> <li>• General and administrative expense;</li> <li>• Employees wages (service and support team);</li> <li>• Repairs and Maintenance;</li> <li>• Marketing activities;</li> <li>• Refuelling and cleaning;</li> <li>• Customer Bonus.</li> </ul>			<b>Revenue Streams</b>  <ul style="list-style-type: none"> <li>• Rental fees;</li> <li>• Sponsorship/Commercial.</li> </ul>	

#### **Case Study: MiMoto city of Turin**

MiMoto is the first scooter sharing “Made in Italy” that launched its services in Turin at the beginning of September in 2018. MiMoto is an e-scooter sharing with a free-floating mode of services. It counts more than 150 e-scooters with 2 sites distributed in the operative area of the city of Turin. MiMoto is an innovative start up suited in Milan started by 3 young men under 35 in collaboration with IrenGo a company dedicated to eco sustainable mobility.

The cost of the service is 26 cents for a minute of ride and 19,90 euro for a day rent (0,01 euro). There different offers depending on the necessity of the clients such as day rental and special tariff for the students. For a moment MiMoto is operating in Turin and Milan and Genova [6].

#### **Case Study of scooter sharing provider: Cooltra**

The company was found in 2006 in Barcelona by Timo Buetefisch and other co-founders as a new concept of mobility. More than 200000 users use the service of Cooltra. Cooltra provides the scooter rental per hour, days, month both private and B2B. Cooltra counts almost 600 employees and a fleet of 15000 scooters, 5000 of which are electric. The company operates in 4 European countries: Spain, Italy, France and Portugal and have more than 100 rental points in Southern Europe. Cooltra manages a fleet of 2.500 scooters for businesses and companies in the sectors of food delivery, courier services, security and assurance, installation services etc. In case of individual scooter renting the company has two types of offer daily and monthly scooter rental. The organisation has agreements with the main manufacturers of gasoline motorcycles such as Peugeot, Yamaha, Honda and with manufacturers of electric motorcycles such as Govecs, Scutum, Zero and Askoll.

How the Cooltra scooter sharing works:

- The potential user downloads the application that enables him/her to find, book and pay for the vehicle. The application also works as a key to unlock the scooter.
- The scooter is equipped with two helmets and disposal hats. The insurance, battery charge, helmets and the maintenance are included in service.
- After the user booked the scooter, he/she has 15 minutes free of charge to reach the scooter.
- The user is charged by the minutes he/she spent in journey. The fee for a minute is 0,24 euros.
- Cooltra uses the free-floating business model for its business, which means that user may pick up and leave the scooter whenever he/she wants within the authorised by the company area [3, 4].

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## 4. Car sharing

### Definition

Car sharing provides commuters with an access to the cars for short-term use. The vehicles are distributed across a network of car sharing spaces within a metropolitan area. Commuters have a possibility to access the vehicles 24/7 and are charged by time or by mile.



### Main concepts of Car sharing

- The user must register on the car sharing platform and pass pre-qualification process of verification of identity and driving record and provide the data of credit card for payment. Afterwards, the user is ready to use the services.
- Keyless access to the vehicle.
- The end user drives the vehicle.
- Usage fee is provided on the Pay as you Go model, which means that the user is billed in time increments of minutes or hours or on the basis of distance travelled.
- The user may also pay a one-time sign-up fee or an annual subscription fee, in addition to time-based and/or distance-based charges.
- Vehicle usage can be spontaneous or booked in advance.
- The vehicles are normally available throughout the city network.
- The operator on an occasional basis provides Servicing/cleaning.

### Benefits for the stakeholders by implementing Car sharing system

#### Local and regional authorities:

- Reduction of household car ownership.
- Alleviate parking and traffic congestion.
- Enhancement of public transportation use.
- Introduction of different commuting choices and reduction of the single-occupant-vehicle.
- Identify the policies and practices that take advantage of new technologies that can enhance the quality and efficiency of transportation facilities and services.
- City space saving.

#### Transport operators:

- Revenue generation by providing car sharing services.
- Low labour costs.

#### Users:

### Annex 1 - New Business Models in mobility sector

- Car sharing provides the benefits of vehicle use without the capital costs and responsibilities of ownership.
- Car sharing system is affordable, prise convenient and flexible way of commuting.
- Improvement of the travel experience.
- Smart payment makes this mean of travelling more attractive.









#### Different car sharing models

Car sharing provides different service models:

- **Round-trip** (membership services, business or institutional fleet, non-membership (e.g. vacation)): This type of car sharing represents the system where the user must return the vehicle to its starting point, at the end of the journey. Round-trip car sharing target users that have a long-term demand, in this case the operator is required to offer daily, or day-to-day, charges.
- **Free-floating car sharing** enables members of a car sharing program to pick up and park vehicles at any desired location, within a specified operating area.
- **Station based car sharing** permits the users to get a vehicle at one station and return it at different station. Station based services are considered to be less flexible than a free-floating car sharing.
- **Peer-to-peer** (fractional ownership, P2P Hybrid, P2P marketplace): Individuals provide their private vehicles to other users for rent. In some cases, the vehicles are equipped with telematics devices to provide vehicle-renters with remote access via smartcard, while in other systems the car-owner must physically transfer the car's keys to the vehicle-renter. This type of car sharing foresees more diverse selection of vehicles. Main goal of the peer-to-peer car sharing operator is to organise an online marketplace to connect car-owners with possible car-renters. By providing this service the operator typically collects a percentage of each rental operation through their online marketplace.










## D4.2 - Guidelines to Developing bankable projects, new business models and partnerships

### Annex 1 - New Business Models in mobility sector

Business Model Canvas of Free - floating car sharing				
Key Partners 	Key Activities 	Value Propositions 	Customer Relationships 	Customer Segments 
<ul style="list-style-type: none"> <li>Local and regional authorities: public transport policy developers and contracting authority for public transport services;</li> <li>Local transport operators: public transport services suppliers;</li> <li>Investors;</li> <li>Insurance companies;</li> <li>IT engineering companies: they will design the size and the architecture of the system;</li> <li>Automotive manufacturers: provides transport operators with vehicles</li> <li>Telecommunication companies;</li> <li>CSO.</li> </ul>	<ul style="list-style-type: none"> <li>Preliminary studies;</li> <li>Acquisition of the permission/licensing;</li> <li>Insurance acquisition;</li> <li>Parking permission from local authorities and</li> <li>Introduction of car sharing to the city plan;</li> <li>Car fleet leasing/acquisition;</li> <li>Car fleet management;</li> <li>Development of car sharing software;</li> <li>Telematics and web app Management;</li> <li>Cleaning and refuelling of the car fleet;</li> <li>Customer care and feedback;</li> <li>Marketing activities.</li> </ul>	<ul style="list-style-type: none"> <li>Urban mobility without car ownership;</li> <li>Easy, accessible and user-friendly service;</li> <li>Highest grade on flexibility (pick up and drop the car wherever user wants in the commercial area of the provider);</li> <li>Charge by minute with discounts for hourly and daily use;</li> <li>No restriction to stations and dedicated parking areas;</li> <li>Covering the main central areas with an elevated number of vehicles in the fleet.</li> </ul>	<p>The system and the relation to the users is fully automated. Normally interaction occurs only via the web-app, users have no direct contact to the company's staff.</p>	<ul style="list-style-type: none"> <li>All citizens with a need for flexible mobility within the city;</li> <li>Tourists.</li> </ul>
			Channels 	
			<ul style="list-style-type: none"> <li>Web App</li> <li>Webpage</li> <li>Shops</li> <li>Pick-up/Drop-off anywhere</li> <li>Promotional materials in the cars</li> <li>At the charging points</li> </ul>	
Cost Structure 			Revenue Streams 	
<b>Costs for System implementation:</b> <ul style="list-style-type: none"> <li>Preliminary studies;</li> <li>Office equipment and expenses;</li> <li>Cars acquisitions or leasing;</li> <li>Software development;</li> <li>Insurance.</li> </ul>		<b>Operational costs:</b> <ul style="list-style-type: none"> <li>Selling, General and administrative expense;</li> <li>Employees wages (service and support team);</li> <li>Repairs and Maintenance;</li> <li>Marketing activities;</li> <li>Payment to the energy charging companies;</li> <li>Customer Bonus.</li> </ul>	<ul style="list-style-type: none"> <li>Registration fees</li> <li>Rental fees (Pay as you Go)</li> <li>Sponsorship/Commercial (advertisement on the car fleet, Promotion material in the cars)</li> </ul>	

## D4.2 - Guidelines to Developing bankable projects, new business models and partnerships

### Annex 1 - New Business Models in mobility sector

Business Model Canvas of Station-based car sharing				
Key Partners 	Key Activities 	Value Propositions 	Customer Relationships 	Customer Segments 
<ul style="list-style-type: none"> <li>Local and regional authorities: public transport policy developers and contracting authority for public transport services;</li> <li>Local transport operators: public transport services suppliers;</li> <li>Investors;</li> <li>Insurance companies;</li> <li>IT engineering companies: they will design the size and the architecture of the system;</li> <li>Automotive manufacturers: provides transport operators with vehicles</li> <li>CSO.</li> </ul>	<ul style="list-style-type: none"> <li>Preliminary studies;</li> <li>Acquisition of the permission/licensing;</li> <li>Insurance acquisition;</li> <li>Parking permission from local authorities and</li> <li>Introduction of car sharing to the city plan;</li> <li>Car fleet leasing/acquisition;</li> <li>Car fleet management;</li> <li>Development of car sharing software;</li> <li>Telematics and web app Management;</li> <li>Cleaning and refuelling of the car fleet;</li> <li>Customer care and feedback;</li> <li>Marketing activities.</li> <li>Location of stations of operations</li> </ul>	<p>Urban mobility without car ownership</p> <ul style="list-style-type: none"> <li>Easy, accessible and user-friendly service</li> <li>Possibility to leave a car at the station different from the starting point station</li> <li>Charge by minute</li> <li>Covering the main central areas with an elevated number of vehicles in the fleet</li> <li>Better range and access to the vehicles than free-floating or P2P car sharing</li> </ul>	<p>The system and the relation to the users are fully automated. Normally interaction occurs only via the web-app, users have no direct contact to the company's staff.</p>	<p>Based on user requirements, location and area of operation</p> <ul style="list-style-type: none"> <li>University</li> <li>Intermodal transport connection (universities, airports, business fleets)</li> </ul>
	<b>Key Resources</b>  <ul style="list-style-type: none"> <li>Investment;</li> <li>Car fleet;</li> <li>Charging stations (if the vehicles are electric);</li> <li>Software &amp; Telematics Systems;</li> <li>Human resources for customer support, car services and cleaning.</li> </ul>		<b>Channels</b>  <ul style="list-style-type: none"> <li>Web App</li> <li>Webpage</li> <li>Shops</li> <li>Promotion in the airport, commercial centres</li> </ul>	
<b>Cost Structure</b> 			<b>Revenue Streams</b> 	
<p><b>Costs for System implementation:</b></p> <ul style="list-style-type: none"> <li>Preliminary studies</li> <li>Costs for the stations development;</li> <li>Cars acquisitions or leasing;</li> <li>Software development;</li> <li>Office equipment and expenses;</li> <li>Insurance</li> </ul>			<ul style="list-style-type: none"> <li>Registration fees</li> <li>Rental fees</li> <li>Sponsorship/Commercial (advertisement on the car fleet, Promotion material in the cars)</li> </ul>	
<p><b>Operational costs:</b></p> <ul style="list-style-type: none"> <li>Selling, General and administrative expense;</li> <li>Employees wages (service and support team);</li> <li>Repairs and Maintenance;</li> <li>Marketing activities;</li> <li>Payment for the energy charging companies (if the vehicles are electric)</li> <li>Customer Bonus</li> </ul>				



#### Case Study: City of Bremen

In 2009, the City Council of Bremen adopted *Car Sharing Action Plan*. The objectives in 2009 were to reach 20,000 car sharing users and to replace at least 6,000 cars to save street space by 2020 [10]. In Bremen, car sharing market is represented by following commercial operators Cambio and Move About, integrated in some activities of the City Council.

Starting from 2013, the Bremen regulations permit the integration of car sharing as a measure to reduce the parking demand. Bremen transport committee sees the importance of car sharing to develop sustainable urban transport. There are different innovations that integrate car sharing to the city transport plan, for instance, new station networks in public street space will be further developed and improved. Any operator that would like to use parking spaces in public street space must apply the standards of the German Blue Angel environmental label and prove that they are improving in public space use.

In 2017 City Council reported that more than 14,000 users were registered to car sharing, but the survey carried out demonstrated that approximately 5,000 cars were taken off the roads thanks to car sharing in Bremen. It was stated that approximately one third of the car sharing clients do not use their private car after joining the car sharing service [11]. Moreover, it is stated that about 79% of the Bremen citizens that use car sharing users do not possess a car. According to the survey carried out by the Bremen city in 2017 the users highlighted that the nearness of the station are the top priority for them (60% of the users) regarding the car sharing services, moreover 84% of the users were satisfied or very satisfied with car sharing services providing on-street car sharing stations, called mobil.puenktchenv. This kind of the car sharing stations was situated in the neighbourhoods that were appreciated by the users [11]. Taking into the consideration the characteristics of some well-connected car sharing neighbourhoods in Bremen such as high resident density and low car density some neighbourhoods were considered potential for car sharing stations. In such areas the potential stations should be oriented toward such destinations as neighbourhood centres or full-service grocery stores and should be combined with public transport accessibility [10].

#### Case Study of car sharing provider: Car2go

Car2go is a German car rental company and a subsidiary of the Daimler AG that offers free-floating car sharing service and has 2,5 Million registered members. Car2go owns a fleet of nearly 14.000 vehicles in 26 locations in Europe, North America and Asia. Its fleet consists exclusively of Smart ForTwo and Mercedes Benz vehicles. Besides *DriveNow*, *ZIPCAR* and *Multicity Citroen Berlin* Car2go is one of the few suppliers that feature one-way rentals. Users are charged by minute, with hourly and daily discounts. Booking and payment can be done by a smartphone app. A service team provides technical maintenance of the cars, like repairs, cleaning the car, refilling the fuel tank and rearrangement of cars. Users can also care about refilling and recharging using a prepaid fuel card and in return for they will receive free minutes for the next trip. Car2go demonstrated that the rental costs for the user or better

the marginal costs per kilometre are at least 30 % lower compared to the costs that arise from individual car ownership [6].

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## 5. Ridesharing

### Carpooling

#### Definition

Ridesharing systems operating in modern mobility sector enable the passengers and drivers to create travel arrangements by means of Internet, namely carpooling platforms, the platform enables to establish trust relationship between the users and to implement the charging systems [4].



Carpooling is considered as an alternative commuting way to reduce congestion and pollution on the roads. Carpooling is a way of sharing the rides in a private vehicle among two or more individuals. It involves the use of the driver's private vehicle to carry one or more passengers [2]. The carpooling platform/App permits quick and easy matching of carpooling users' needs, moreover it helps planning itineraries, establishing prices and payment methods [5].

#### Main concepts of Carpooling

- Use of private vehicle to share the trip.
- Dedicated carpooling application or platform enable to match drivers and passengers.
- Both drivers and passengers create their profiles on the platform.
- The payment for the trip occurs online by means of user's credit card that is linked to the carpooling platform/app.
- The carpoolers posting the ridesharing requests indicating the date and time of departure. The shared vehicle should be arranged before the trip starts.

#### Benefits for the stakeholders by implementing Carpooling

##### Local and regional authorities:

- Reduction of the traffic.
- Reduction of car parking problems.
- Decision-makers save costs related to maintenance of, and investments in, infrastructure and services.

##### Users:

In this case by users are considered both passengers and drivers.

- Reduction of the fuel costs.
- Reduction of the toll costs.
- Reduction of the time spent in the commute.
- Potentially reduced driving stress for the passengers in the vehicle [3].
- Economic way to travel.

#### Different carpooling models

**Dynamic model:** This type of ridesharing model is relatively new [6]. Dynamic carpooling is a model where an automated process embedded by a ridesharing provider that matches up drivers and passengers on a short notice [7], which can be organised from a few minutes to a few hours before departure time. Moreover, dynamic carpooling systems establish a procedure that enables users to organise ridesharing instantaneously, for instance, by applying communication technologies [8]. The dynamic carpooling model applies such technologies as: GPS navigation devices to plan the drivers' routes and organise the shared journey, mobile application for passengers to request and book a ride from wherever they are and social networks to enhance the transparency and establish trust relationship between drivers and passengers. The ridesharing provider manages these elements.

**Real-Time carpooling:** This type of carpooling represents a dynamic system that makes use of two types of information: quick and easy route announcement by the carpooling platform users and flexible and smart route matching by the system. Route announcement methods embed automatic search engine and route changing systems, chat system, useful user profile [9].

#### Different types of carpooling

By the travel distance:










- Long-distance carpooling
- Urban carpooling

By the type of vehicle:

- Vanpooling
- Carpooling

## D4.2 - Guidelines to Developing bankable projects, new business models and partnerships

### Annex 1 - New Business Models in mobility sector

Business Model Canvas of Carpooling				
<div>Key Partners</div> <div>• Local and regional authorities: public transport policy</div> <div>• Private companies</div> <div>• Universities;</div> <div>• Investors;</div> <div>• Telecommunications operators;</div> <div>• IT Engineering companies: they will design the size and the architecture of the system.</div>	<div>Key Activities</div> <div>• Preliminary studies;</div> <div>• Development of the software platform;</div> <div>• Establishment of the relationships with different partners;</div> <div>• Maintenance of the platform;</div> <div>• Marketing campaign.</div>	<div>Value Propositions</div> <div>For passengers:</div> <div>• Carpooling enables to save money on commute by sharing the costs with other passengers</div> <div>• Provide more social experience of traveling</div> <div>For drivers:</div> <div>• Additional source of income</div> <div>• Easy payment procedure</div>	<div>Customer Relationships</div> <div>• Self-service platform,</div> <div>• Service provider support the users on online basis.</div>	<div>Customer Segments</div> <div>Users</div> <div>• Occasional commuters;</div> <div>• Tourists;</div> <div>• Companies employees;</div> <div>Drivers</div> <div>People that own a car and want to share the travel costs</div>
	<div>Key Resources</div> <div>• Software and Hardware</div> <div>• IT infrastructure</div> <div>• Human recourses</div> <div>• Investment</div>		<div>Channels</div> <div>• The carpooling platform can be reached by mobile app/ desktop browsers;</div> <div>• Website.</div>	
	<div>Cost Structure</div> <div>Costs for System implementation:</div> <div>• Preliminary studies</div> <div>• Development of platform</div> <div>• </div> <div>Operational costs:</div> <div>• Customer relationship management.</div> <div>• Marketing;</div> <div>• Maintenance and upgrade of software;</div>		<div>Revenue Streams</div> <div>• Transaction fee (a percentage from the total cost of the ride);</div> <div>• Advertisement on a company's website.</div>	

#### Case study: city of London

Liftshare is the biggest carpooling network in the UK. It offers services both for individuals and organisations. The system matches the drivers with other travellers who are willing to share the journey and the costs. Users must register their destination and the system automatically provides all potential matches. Afterwards, the potential matches arrange the shared journey. Moreover, the platform provides the calculation on the financial and CO2 savings that each traveller makes when sharing the journey. The platform protects the data of its users, the data is collected and stored but are not visible to other people. Liftshare has different customers, for instance, local authorities, hospitals, universities, organisations, festivals etc. [10].

Liftshare provides the following services:

- CarBUDi: arrangement of the carpooling services between the driver and the travellers;
- BikeBUDi: matches cyclists that are willing to cycle together in the same direction. People can also share their cycling experience there.
- WalkBUDi: matches people that are walking the same directions, for instance, to the office, train station or to the same events.
- TaxiBUDi: permits to find people that are going the same direction and that want to share taxi people to find others travelling the same way who can then share a taxi. It helps to reduce commuting costs [10].

The local government body of London namely Transport for London integrated a system provided by Liftshare to improve the mobility situation in the city providing organisations and community with the alternative way of commuting. 6 London regions and 33 boroughs agreed to set up of [www.londonliftshare.com](http://www.londonliftshare.com) - a carpooling service that would cover London area. Carpooling service was well accepted both by individuals and organisations. Nowadays many companies integrated the carpooling scheme in their traveling and provided this service for their employees. London transport sub regions supported the liftshare.com. carpooling schemes. Moreover, these schemes have been set up in the website, [www.londonliftshare.com](http://www.londonliftshare.com). liftshare.com is a successful UK's carpooling company, with approximately 2000 new members entering the platform every month with over 400 organisations using its services.<sup>27</sup>

#### Case Study of carpooling provider: BlaBlaCar

BlaBlaCar Comuto S.A., operates a website for (carpooling BlaBlaCar) ridesharing in Europe. The company connects drivers with people looking for a ride. The company was incorporated in 2006 and is based in Paris, France. According to the information provided by the company, BlaBlaCar is the world's largest long-distance ridesharing community, connecting people seeking to travel with drivers going the same way. They travel together and share the cost of the journey. The average journey is about 340 kilometres.

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<sup>27</sup> London liftshare - car share and mobility scheme for London <https://www.eltis.org/discover/case-studies/london-liftshare-car-share-and-mobility-scheme-london>

BlaBlaCar provides its service on iPhone and Android mobile apps, mobile websites and desktop websites. BlaBlaCar drivers are only splitting the costs of a journey; they do not make a profit. The average cost-contribution suggested on BlaBlaCar is around EUR6 cents/km /passenger, which is at least 20 times less than the price paid for on-demand taxi-like service. Cost-sharing is strictly enforced by the BlaBlaCar platform through “terms & conditions”, recommended fares, maximum fare capped, limited number of seats that can be offered, and a Member Relations Team monitoring member interactions and ensuring that cost-sharing is enforced. The platform has introduced a small booking fee in order to be remunerated for the service. Currently, BlaBlaCar operates in Benelux, Croatia, France, Germany, Hungary, India, Italy, Mexico, Poland, Portugal, Romania, Russia, Serbia, Spain, Turkey, the Ukraine and the United Kingdom.

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## 6. Bike sharing

### Definition

A bike sharing system combines the features of a public transport system, while having bicycle as its main elements. Bike sharing is a service that makes the bicycles available for individuals for shared use applying short-term basis and charging the usage fee according to the type of bike sharing. The goal of public bike sharing is to expand and integrate cycling into transportation systems, so that it can become a daily transportation mode for commuting.



### Main concepts of Bike sharing

- The system is comprised of bicycles that are available across the urban network.
- The user has an option to rent a bicycle for some period via mobile application for pre-defined fee or rent a bicycle directly from the dock.
- Bike sharing plays an important role in bridging some of the gaps in existing transportation networks, as well as encouraging individuals to use multiple transportation modes.
- Wireless communication technology, for instance GPRS enables real-time monitoring of occupancy rates at each station and the global positioning system (GPS) enables to find the bicycle if the bike sharing system is using dockless model.
- The bike sharing service is paid using smart payment.
- The bicycle can be rent 24/7.

### Benefits for the stakeholders by implementing bike sharing system

#### Local and regional authorities:

- Bike sharing programs promote a clean and carbon free transportation in the city.
- Bike sharing systems normally are more cost-effective rather than making investments in urban planning such as building new roads, creating parking lots etc.
- Preservation of the city space.

#### Transport operators:

- Implementation and operational costs are much lower in comparison to other motorised systems such as bus and shuttle services.

#### Users:

- Improvement of personal health.
- Reduction of traffic congestion, air and noise pollution, fuel usage.
- Greater variety of payment modes.

- Last mile solution.

### **Different bike sharing models**

Bike sharing system identifies different forms of services such as:

- Station-based bike sharing: bicycles are picked up from the bike sharing station and returned to the station.
- Dockless (or free-floating bike sharing): bicycles are spread all over the urban network and can be left elsewhere.
- Hybrid bike sharing systems: this type of system foresees the mix of station-based and free-floating models
- P2P: marginal system when the bicycle is rented from one individual to another.










Bike sharing systems may also vary according to who is delivering the services. The leading organisations could be:

- PPP: provides and operates the system in exchange of advertising rights.
- Local authority: either establishes the contracts with providers or designs, owns and run the system.
- Public transport operator provides and operates the system in order to enhance public transport services.
- For profit organisation: private sector company that operates with low government involvement.
- Not-for-profit company: can be an association that operates with the support of local authorities.

Despite different possible partnerships, in all three combinations, the local/regional/national authority oversees the implementation and operation of the system.










## D4.2 - Guidelines to Developing bankable projects, new business models and partnerships

### Annex 1 - New Business Models in mobility sector

Business Model Canvas of Station-based bike sharing				
<div>Key Partners</div> <div><ul style="list-style-type: none"><li>Local and regional authorities: public transport policy developers and contracting authority for public transport services; support bike sharing via politics and policies</li><li>Operating companies: operate the bike sharing business along the entire value chain for profit.</li><li>Sponsors and Investors: invest money to bike sharing system. Become advertised on bike equipment.</li><li>Bicycle and component manufacturers: sell the bicycles and their components.</li><li>Telecommunications operators. NFC-enabled smart payment may result in additional GSM/UMTS transactions.</li><li>IT engineering companies: they will design the size and the architecture of the system.</li><li>Suppliers: provide the technology and infrastructure.</li><li>Insurance companies.</li></ul></div>	<div>Key Activities</div> <div><ul style="list-style-type: none"><li>Implementation of a preliminary study, required for the definition of the system's structure, stations' location etc.</li><li>Acquisition of the permission for the operation.</li><li>Supply of bicycles fleet.</li><li>Design and installation of bicycle kiosks.</li><li>Development of the IT technology required for the operation of the system (e.g.: user interface, compatibility with credit cards, mobile device application, etc.).</li><li>Marketing activities.</li></ul></div>	<div>Value Propositions</div> <div><ul style="list-style-type: none"><li>An alternative way of commuting that avoids congestion, it's easy to park and does not require special license in order to use.</li><li>An easier, in relation to walking, way of sightseeing.</li><li>A way for people to exercise without investing in cycling equipment.</li><li>Personal cost savings.</li></ul></div>	<div>Customer Relationships</div> <div><p>The system can operate both through the employment of staff at the bike renting kiosks, or through an IT system that will give the users the ability to perform the necessary activities individually. In the first case, a personal relationship between employees and customers is achieved. In the second case, an automated interaction between the system interface and the user is achieved.</p></div>	<div>Customer Segments</div> <div><ul style="list-style-type: none"><li>Commuters: users that choose cycling from/to their working or education destinations, etc.</li><li>Recreational/ errand riders: users that wish to exercise or users that rent a bicycle in order to run errands.</li><li>Tourists that want to move around and explore the city.</li></ul></div>
	<div>Key Resources</div> <div><ul style="list-style-type: none"><li>Bicycles</li><li>Renting kiosks</li><li>Parking infrastructure</li><li>Infrastructure construction personnel</li><li>Software development personnel</li><li>Components of electrical supply and communications system</li><li>Initial capital</li></ul></div>		<div>Channels</div> <div><ul style="list-style-type: none"><li>System users can be served through bicycle renting kiosks/ stations that are located in specific spots around the city's network.</li><li>Advertisement in the public places.</li></ul></div>	
<div>Cost Structure</div> <div><div>System implementation cost<ul style="list-style-type: none"><li>Preliminary study</li><li>Bicycle supply</li><li>System station design and construction/installation</li><li>System software development</li></ul></div><div>Operational cost<ul style="list-style-type: none"><li>Maintenance cost</li><li>Staff costs</li><li>Electrical supply</li><li>Bicycle redistribution cost</li><li>Control and customer system cost</li><li>Marketing cost</li><li>System insurance fee</li></ul></div></div>			<div>Revenue Streams</div> <div><ul style="list-style-type: none"><li>Sponsorships from private companies</li><li>Cycling equipment renting fee</li></ul></div>	

## D4.2 - Guidelines to Developing bankable projects, new business models and partnerships

### Annex 1 - New Business Models in mobility sector

Business Model Canvas of Dockless bike sharing				
Key Partners 	Key Activities 	Value Propositions 	Customer Relationships 	Customer Segments 
<ul style="list-style-type: none"> <li>Local and regional authorities: public transport policy developers and contracting authority for public transport services; support bike sharing via politics and policies</li> <li>Operating companies: operate the bike sharing business along the entire value chain for profit.</li> <li>Sponsors and Investors: invest money to bike sharing system. Become advertised on bike equipment.</li> <li>Bicycle and component manufacturers: sell the bicycles and their components.</li> <li>Telecommunications operators. NFC-enabled smart payment may result in additional GSM/UMTS transactions,</li> <li>IT engineering companies: they will design the size and the architecture of the system;</li> <li>Suppliers: provide the technology and infrastructure.</li> <li>Insurance companies.</li> </ul>	<ul style="list-style-type: none"> <li>Preliminary studies</li> <li>Permission for service operating</li> <li>Transport planning</li> <li>Supply of bicycles fleet</li> <li>Development of the IT technology required for the operation of the system (e.g.: user interface, compatibility with credit cards, mobile device application, etc.)</li> <li>Marketing activities</li> </ul>	<ul style="list-style-type: none"> <li>An alternative means of commuting, that avoids congestion, it's easy to park and does not require special license in order to use.</li> <li>An easier, in relation to walking, way of sightseeing</li> <li>A way for people to exercise without investing in cycling equipment.</li> <li>Flexible way of commuting the bicycles can be picked up and dropped of anywhere in the commercial area.</li> </ul>	<ul style="list-style-type: none"> <li>IT system that will give the users the ability to perform the necessary activities individually.</li> <li>An automated interaction between the system interface and the user is achieved.</li> </ul>	<ul style="list-style-type: none"> <li>Commuters: users that choose cycling from/to their working or education destinations.</li> <li>Recreational/ errand riders: users that wish to exercise or users that rent a bicycle in order to run errands.</li> <li>Tourists that want to move around and explore the city</li> </ul>
Key Resources 		Channels 		
<ul style="list-style-type: none"> <li>Bicycles</li> <li>Software</li> <li>Human resources (software development personnel, marketing personnel etc.)</li> <li>Investments</li> </ul>		<ul style="list-style-type: none"> <li>Mobile applications that enable to find, rent and pay for bike renting.</li> <li>Website</li> </ul>		
Cost Structure 		Revenue Streams 		
<b>System implementation cost</b> <ul style="list-style-type: none"> <li>Preliminary study</li> <li>Bicycle supply</li> <li>System software development</li> </ul>		<ul style="list-style-type: none"> <li>Cycling equipment renting fee</li> </ul>		
<b>Operational cost</b> <ul style="list-style-type: none"> <li>Maintenance cost</li> <li>Staff costs (if applicable)</li> <li>Bicycle redistribution cost</li> <li>Control and customer system cost</li> <li>Marketing cost</li> <li>System insurance fee</li> </ul>				

#### Case study: TOBikesharing Turin

TOBike is the bike sharing service managed by the City of Turin. By subscribing on the TOBike platform, it is possible to pick up and deposit the bicycle, 24/7, at one of the 140 stations in the city. How does the service work? The customer should register on the website and buy the TOBike membership. The activation of the card is occurred online by accessing the reserved area. Afterwards, a user can rent a bicycle at the nearest TOBike station. Each station consists of a series of docking points. After the user reaches his/her destination, he/she returns the bicycle to a TOBike station: dock it to a free docking point. TOBike foresees certain rules of service use:

- The card cannot be transferred to the third parties.
- It is not possible to use the bicycle for more than 4 hours otherwise the card will be deactivated.
- A user should have more than 16 year old.
- The bicycle must be used within the urban area of the service.

Subscription and fees.

Registration occurs at [www.tobike.it](http://www.tobike.it). The activation of the card and its consignment happen within few days. Moreover, this bike sharing service has its own official application called Bicincittà. The Bicincittà app also allows the bike release without a card, shows the real time status of the stations etc.

There are two types of fees depends if the customer uses the mobile app or card.

By card:

- Annual "pay-as-you-go" - €25 including first compulsory credit of €5
- Weekly "pay-as-you-go" - € 8 including first compulsory credit of €3
- Daily "pay-as-you-go" - €5 including first compulsory credit of €3
- 4FORYOU "flat" - €8 valid for 24 hours, including 4 hours of riding (also not consecutively)
- 8FORYOU "flat" - €13 valid for 48 hours, 4 hours of riding included every 24 (also not consecutively)

Mobile subscriptions:

- Annual Mobile "pay-as-you-go" - €25 including first compulsory credit of €5
- One Day Mobile "flat" - €8 valid for 24 hours, including 4 hours of riding, also nonconsecutively
- 2 Days Mobile "flat" - €13 valid for 48 hours, including 4 hours of riding, also nonconsecutively

In case the user chooses to use mobile card no physical card is released. The subscription is managed entirely with the Bicincittà app.

The annual TOBike subscription can be activated by using the following cards:

### Annex 1 - New Business Models in mobility sector

- University Smartcard, distributed by Turin's PolitechnicTurin's University and Eastern Piedmont's University
- BIP card, the regional transport card
- PYOU card, the Regional card reserved to people between 15 and 29 years

TOBike is available to plan and develop new sponsorship activities in synergy with private entities interested in investing in the service, thus contributing to the expansion of the network of stations [3].

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## 7. Smart parking

### Definition

Smart parking is a vehicle parking system that consists of in-ground smart parking sensors, cameras or other type of sensors. Such technologies are generally applied to the parking spots or placed next to them to sign whether the parking space is free or not. This data collection from the parking slots occurs in real-time and then transmitted to a user parking mobile application or website, which communicates the parking status.



### Main concepts of Smart parking

- Smart parking is a part of the smart city programme. Smart cities are driven by an IT infrastructure, by applying this infrastructure cities can enhance the quality of life and improve economic development for its citizens.
- Smart parking uses the sensors to detect the whether the parking slot is free or occupied.
- The system uses the real time data collection that is further processed and provided to the user.
- Some companies also offer other in-app information, such as parking prices and locations.

### Benefits for the stakeholders by implementing Smart parking

#### Local and regional authorities:

- Reduction of the traffic congestion.
- Reduction of illegal parking.
- Improvements in general mobility and future development of smart city mobility solutions.
- Improvement of the city image.

#### Transport operators:

- Full utilization of parking space.
- Parking pricing strategies diversification considering (real-time) demand

#### Users:

- Significant reduction of search time for free parking spots.
- Reduction of the illegal parking.










### Different Smart parking models:



- **Parking guidance and information system:** assists to identify free parking spots and helps driver in decision-making process. Occupancy detection of parking spaces is based on vehicle detection technology, and divides in intrusive sensors and non-intrusive sensors [5]. Intrusive sensors are applied to the road or parking surface, and consist of such technologies as active infrared sensors, inductive loop detectors, induction or search coil magnetometers, piezoelectric sensors, pneumatic road tube sensors, and weigh-in-motion sensors. Non-intrusive sensors use non-invasive procedures basing on modern technologies such as acoustic sensors like passive acoustic arrays, microwave continuous-wave radar sensors, passive infrared sensors, RFID, ultrasonic sensors, and cameras with video image processing.
- **Transit based information system:** helps to guide users to park-and-ride facilities.
- **Smart payment system:** permits users to provide the payment in unconventional manner by applying RFID and similar technologies.
- **E-parking system:** shows the availability and helps to reserv of free car space in advance.
- **Automated parking system:** uses computer-controlled mechanisms that helps drivers to place a car in automatically allocated spaces [6].

## D4.2 - Guidelines to Developing bankable projects, new business models and partnerships

### Annex 1 - New Business Models in mobility sector

Business Model Canvas of Parking guidance and information system				
Key Partners 	Key Activities 	Value Propositions 	Customer Relationships 	Customer Segments 
<ul style="list-style-type: none"> <li>Local and regional authorities: will provide the authorisation.</li> <li>IT engineering companies: will design the size and the architecture of the system.</li> <li>Suppliers: will provide the sensors.</li> <li>Telecommunication companies.</li> <li>Private companies: owns the private parking.</li> <li>Investors.</li> </ul>	<ul style="list-style-type: none"> <li>Provide the preliminary studies.</li> <li>Obtain the permissions from the local authorities.</li> <li>Create the partnership with all the required partners.</li> <li>App system architecture design.</li> <li>Acquisition of the equipment.</li> <li>Operation and management of the services.</li> <li>Marketing activities.</li> </ul>	<ul style="list-style-type: none"> <li>Solving the parking searching process problems by making it faster and more efficient by using innovative technologies.</li> <li>Reduction of illegal parking.</li> <li>Better parking management.</li> </ul>	<p>An automated interaction between the system interface and the user</p>	<ul style="list-style-type: none"> <li>Citizens with the need of car parking</li> <li>Tourists</li> <li>Companies' employees</li> </ul>
	<b>Key Resources</b>  <ul style="list-style-type: none"> <li>Investment</li> <li>Software and Hardware</li> <li>GPS technology</li> <li>Human resources: <ul style="list-style-type: none"> <li>customer relationship staff</li> <li>marketing personnel</li> <li>administration and operation personnel</li> </ul> </li> <li>Equipment (sensors, readers)</li> <li>Office rental and equipment</li> </ul>		<b>Channels</b>  <ul style="list-style-type: none"> <li>Mobile App</li> <li>Service website</li> <li>Service promotion in public places</li> </ul>	
<b>Cost Structure</b>  <p><b>System implementation:</b></p> <ul style="list-style-type: none"> <li>Preliminary studies and system architecture design;</li> <li>Office rental and office equipment;</li> <li>Software development;</li> <li>Sensor acquisition and installation.</li> </ul> <p><b>Operational costs</b></p> <ul style="list-style-type: none"> <li>Operational staff wages;</li> <li>Customer relationship management.</li> <li>Maintenance and upgrade of software and sensors;</li> <li>Marketing;</li> <li>Administrative costs</li> </ul>			<b>Revenue Streams</b>  <ul style="list-style-type: none"> <li>Fare collection for the parking</li> <li>Advertising (on cards, in the web or mobile selling apps etc.).</li> </ul>	

#### Case Study: Smart parking system in Dubrovnik

Smart parking system project is one of the smart city subsystems and it started its implementation in the city of Dubrovnik in 2015 when the city adopted a general smart city strategy and started the development of actions to implement smart city subsystems which was integrated into already existing municipal services. Starting from 2015 the city of Dubrovnik adopted different smart city subsystems which are under development such as action plans concerned mobility, including vehicles transit, transportation, and walkability of urban areas in the city.

Dubrovnik adopted a smart parking system that enclose a parking guidance and information system that detects free parking spaces and provide the information to the drivers that facilitate the decision-making process for the users. The sensors that were embedded to the system to detect the parked vehicle are infrared sensors, which are the non-intrusive sensor technology that are easy to install and maintain. Moreover, they are easy to install and can be easily upgradeable without additional procedures. The system uses the over-the-air software that connects the devices to the Internet.

Smart parking system embedded in Dubrovnik smart city platform followed next regulation to complete the requirements for the integration:

- All devices adopted the same scheme in order to map their controls, sensors, and readings devices.
- The framework and reading schemes were the same to read data from devices and control.
- REST service permitted to connect and transfer the data to the smart city platform.

By embedding smart parking into the smart city platform, the city of Dubrovnik received important information about the current transport and parking situation in the city and could manage it as well [6].

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## 8. Public transport

### Bus Rapid Transit

#### Definition

Bus Rapid Transit is described as public transport on the wheels, fast and flexible that combines stations, vehicles, services, bus lanes and the elements of the Intelligent Transport System in one system [6].

BRT has different purposes: it enables to pass through congested road areas and also to connect different districts or suburban areas among them.

It represents a high-capacity urban public-transit system that includes right of way, multiple-car vehicles at short headways, and longer stop spacing than traditional streetcars and buses.

#### Main concepts of Bus Rapid Transit

- The BRT completely operates on the protected and reserved to BRT lines.
- The high occupancy vehicles that maybe compared with metropolitan system, because it represents the system of public transport that combines the quality of the metropolitan system (Light Rapid Transit) but have the flexibility of the buses [3].
- BRT uses buses on a wide variety of rights-of-way, including mixed traffic, dedicated lanes on surface streets, and bus ways separated from traffic.
- **Dedicated corridors:** the main concept of BRT consist of lanes fully dedicated to rapid transit vehicles, off-limits to other traffic to allow them to travel much like rail lines. This can be accomplished through physical separation and/or enforcement.
- **Busway coordination:** the objective is to align the transport flow in order to avoid the conflict with other traffic, minimizing delays. Ideal configurations include median-aligned bus ways that sit in the centre of a two-way road, that permit to board passenger free from mixed traffic, bike traffic, and other urban activity.
- **In advance fare collection:** the fares are played in advance. It helps to eliminate the stress of paying to the driver and speed up the boarding process [8].

#### Benefits for the stakeholders by implementing BRT system

##### Local and regional authorities:

- Use high capacity vehicles.
- Increase the traffic safety.
- Alleviate parking and traffic congestion.
- City parking space saving.
- BRT may represent the alternative system of transport that provides high quality performance.

##### Users:












Annex 1 - New Business Models in mobility sector

- Reduction of travel time
- Enable users to travel with more comfort
- Avoid city traffic

## D4.2 - Guidelines to Developing bankable projects, new business models and partnerships

### Annex 1 - New Business Models in mobility sector

Business Model Canvas of BRT				
<div>Key Partners</div> <div><ul style="list-style-type: none"><li>• Transport department: large entity with a wide range of regulatory and management responsibilities; typically reports directly to city political officials.</li><li>• Transport authority: organisation with wide oversight on all public transport activities.</li><li>• Local transport operators: public transport services suppliers.</li><li>• Insurance companies: will provide the insurance of the vehicles.</li><li>• Investors.</li></ul></div>	<div>Key Activities</div> <div><ul style="list-style-type: none"><li>• Local authority permission</li><li>• Policy-making and setting standards and regulation</li><li>• Planning and design</li><li>• Creation of the infrastructure</li><li>• Project implementation</li><li>• Procurement of the vehicles</li><li>• Operational management</li><li>• Procure fare equipment</li><li>• Financial management</li><li>• Contracting and concessions</li><li>• Administration and marketing activities</li></ul></div> <div>Key Resources</div> <div><ul style="list-style-type: none"><li>• Investments</li><li>• Bus fleet</li><li>• Software and hardware systems for fare collection</li><li>• Human resources (administrative personnel, drivers, mechanics etc.)</li><li>• Bus dedicated lanes and stations</li><li>• The infrastructure</li></ul></div>	<div>Value Propositions</div> <div><ul style="list-style-type: none"><li>• Faster and time saving way of transportation due to the dedicated lanes.</li><li>• More economic way of commuting in respect to other transport modes (trains, taxis)</li></ul></div>	<div>Customer Relationships</div> <div>The system and the relation to the customers are fully automated.</div> <div>Channels</div> <div><ul style="list-style-type: none"><li>• Web App</li><li>• Webpage</li><li>• Promotional materials in the public places</li><li>• Airports</li><li>• Hotels</li></ul></div>	<div>Customer Segments</div> <div><ul style="list-style-type: none"><li>• All citizens with a need for mobility within the city</li><li>• Employees</li><li>• Tourists</li></ul></div>
<div>Cost Structure</div> <div><div>System implementation costs:</div><ul style="list-style-type: none"><li>• Acquisition of the buses, feeder vehicles, and fare collection and verification equipment ( vending machines fare readers, fare verifiers, turnstiles,)</li><li>• Software and hardware development</li><li>• Fleet insurance</li></ul></div> <div><div>Operational costs:</div><ul style="list-style-type: none"><li>• Fixed operating costs (salaries: drivers, mechanics, administration)</li><li>• Variable operating costs (fuel, tires, lubricants, maintenance)</li><li>• Station services</li><li>• Payment to fare collection operator</li><li>• Payment to trust fund manager</li><li>• Marketing activities</li></ul></div>			<div>Revenue Streams</div> <div><ul style="list-style-type: none"><li>• Fare payment</li><li>• Advertising on the buses</li></ul></div>	

#### Case Study: CTfastrak

CTfastrak is a Connecticut's first Bus Rapid Transit system. It is a system of bus routes that utilize a bus-only roadway for all or a portion of the trip. CTfastrak takes part of the CTtransit. CTtransit is the Connecticut Department of Transportation (CTDOT)-owned bus service. Several companies under contract with CTDOT operate services in metropolitan areas throughout Connecticut, US.

CTfastrak routes are integrated with the CTtransit system that makes it easy to connect, transfer and pay the fare. The CTfastrak system provides direct service to and from Waterbury, Cheshire, Southington, Bristol, Plainville, New Britain, Newington, West Hartford, Hartford and Manchester with routes that take advantage of the bus only CTfastrak roadway. The CTfastrak BRT system provides a one-seat ride to many regional employment, shopping and healthcare destinations as well as connections to the New Haven Line-Waterbury branch rail in Waterbury and CTrail Hartford Line service in Hartford. Moreover, through partnerships with local businesses, transit riders are offered discounts and incentives. Most CTfastrak bus routes operate weekdays from 5:00am to midnight; Saturdays from 6:00am to Midnight and Sundays and major holidays from 8:00am to 8:00pm.

CTfastrak is the showpiece of the Hartford regional system, with a fleet of specially branded diesel-electric hybrid buses serving ten stations along a 9.2mile exclusive bus-only guideway between downtown Hartford and New Britain.

Construction of the busway stations and guideway began in 2012. In preparation of the opening of CTfastrak, 120 additional full-time bus operators were hired, as well as additional supervisory staff for the Busway Operations Command Centre, fare inspectors and maintenance personnel. Because CTfastrak is operated as an integral part of the Hartford Division system, all operators needed special training on the busway, including specific training on docking buses safely at high platform stations. Safety protocols for busway operations and for training of operators, supervisors, dispatchers, and other staff was developed and implemented.

Key features of CTfastrak includes a suite of Intelligent Transportation System (ITS) technology on buses and at stations and a new fare technology system that introduces mobile fare payment and account-based smart cards system wide. Other features of CTfastrak include wi-fi on buses, off-board fare payment with proof-of-purchase verification, variable message signage with next-bus information at stations, and state-of-the-art security measures. The premium transit service offers convenience, speed and comfort for its passengers and has significantly improved the travel times through heavily-congested areas throughout Connecticut [8, 9].

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Annex 1 - New Business Models in mobility sector

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## 9. Integrated mobility

### E-ticketing and Smart payment

#### Definition

E-ticketing (or Electronic Ticketing, or Automated Fare Collection, or Smart Ticketing) means, in general, new technologies and integration of services that user may pay by means of app, smart card etc.

E-ticketing is a new mobility trend that permits to personalise the payment. E-ticketing system faces the issues of public transport systems interoperability, because the cities and public transport operator in general looks for developing their own systems. To avoid this problem European and regional alliances have been established in the last years e.g. Smart Ticketing Alliance (the largest European association in this business area while).

Different e-ticketing systems and technical specifications exist. The most popular are smart cards and mobile ticketing. Smart cards are still the most preferred form of e-ticketing for public transport (making use of Radio Frequency Identification technology).

#### Main concepts of E-ticketing

- Application of smart technology to access public transport in easier and faster way may provide the advantages for public transport operator as well as for travellers.
- Use of Internet enables to create and manage a personal transport account, to buy tickets that simplify the preparation of the journey in advance.
- Save travelling time: the travellers have no need to pass by vending machines. This enables public transport operators to reduce the number of the selling points.
- E-ticketing system permits to simplify the use of public transport by using pre-payment system, electronic wallet or bank account to access public transport services.
- Smart payment as Post-payment process and Pay-as-you-Go provide an automatic calculation in order to estimate the price after the journey is over.

#### Benefits for the stakeholders by implementing e-ticketing system

##### Local and regional authorities:

- Transfer of knowledge and technical expertise regarding smart payment system to other sectors.
- E-ticketing can provide a positive economic climate for organisations.
- E-ticketing can provide a positive effect on the environment due to increase of public transport usage.
- E-ticketing enables to create a strong identity brand for the city or region in general.



#### Transport operators:

- Reduction of the administrative costs as fewer sales point are required.
- Reduction of the fare processing time and faster passengers flow.
- Reduction of the fare evasion and fraud due to elimination of cash handling.
- E-ticketing enables to integrate the alternative services, enhancing the attractiveness of the services.
- E-ticketing enables to analyse the passenger's flow that in its turn permit to better exploit the network's capacities and to improve the travellers experience by providing the personalised services.
- E-ticketing may also help to understand passengers traveling habits, their payment preferences in order to provide more targeted advertising and loyalty programmes.
- Easier costs' quantification, e.g., investment and operation costs such as readers, software etc. Costs for personnel training or passengers' problem solving.

#### Tourism stakeholders:

- Some smart cards are foreseen for tourism reasons and permit passengers to save money and attend some touristic sightseen using smart cards.
- Increase the tourist flow due to strong city brand identity.

#### Users:

- Improvement of the quality of public transport usage due to fast payment and time saving.
- Improvement of the travel experience.
- Greater variety of payment modes.

#### Different e-ticketing models

Huomo (2009) identifies five different e-ticketing business models:

- **Prepaid-value model:** This is the most common form of smart ticketing. The ticket is provided by a transport company and based on the value generated on a card (it may be in form of eCash, number of journeys or time-based).
- **Enhanced payment card:** It can be a contactless credit or debit card or a payment application on an NFC telephone base, which is used to pay the journey. Normally a financial institution provides this application. The payment occurs when a traveller put the card to a reader and the transaction proceeds based on the public transport operator's fare.
- **Post-paid model:** This model is based on smart cards or NFC enabled phones. The payment occurred afterwards, according to the recorded usage. Moreover, user identification and location data is required.
- **Combined/ enhanced collaborative models:** This type of business model foresees incorporation of multiple applications (e.g. transit and payment) into a smart card or








### Annex 1 - New Business Models in mobility sector

phone. The transit application can be prepaid or post-paid, whereas the payment function as a credit or debit card.

- **Embedded secure element:** This model foresees that, an intermediary, e.g. a financial institution or a mobile network operator, or a handset manufacturer dictate the business rules. In this case all business models mentioned before can be used.

## D4.2 - Guidelines to Developing bankable projects, new business models and partnerships

### Annex 1 - New Business Models in mobility sector

Business Model Canvas of E-ticketing system				
Key Partners 	Key Activities 	Value Propositions 	Customer Relationships 	Customer Segments 
<ul style="list-style-type: none"> <li>Local and regional authorities: public transport policy developers and contracting authority for public transport services; they are interested to make the direct revenues and the real number of users more transparent to calculate properly the compensations schemes established inside the Public Service Contracts and to define better the size of the Public Service Obligations.</li> <li>Public transport operators: public transport services suppliers; they are interested to increase the level of client's satisfaction to increase the level of revenues and to determine the real needs for vehicles;</li> <li>Financing institutions. They can replace small cash transactions with e-payment.</li> <li>Telecommunications operators. NFC-enabled e-ticketing could result in additional GSM/UMTS transactions, and the additional services generated by NFC technology.</li> <li>Engineering companies: they will design the size and the architecture of the system.</li> <li>Suppliers: vendors of integrated systems of e-ticketing components, of software solutions etc.</li> <li>Tourism sector.</li> <li>Investors</li> </ul>	<ul style="list-style-type: none"> <li>Public transport planning;</li> <li>Fare and compensation policy planning;</li> <li>E-ticketing system architecture design;</li> <li>Implementation of the e-ticketing system's components at the level of public authority and public transport operator;</li> <li>Operation of the e-ticketing system;</li> <li>Selling of electronic fares;</li> <li>Control of e-ticket validity;</li> <li>Monitoring and data mining.</li> <li>Marketing activities</li> </ul>	<p>The introduction of an e-ticketing system in an urban public transport network will help the Local and Regional Public Authority to deliver following strategic objectives:</p> <ul style="list-style-type: none"> <li>reduce its subsidy to the Public Transport Operator,</li> <li>increase the quality of urban transport service provided to taxpayers</li> <li>reduce the use of cash in the provision of urban transport services.</li> </ul>	<ul style="list-style-type: none"> <li>self-service,</li> <li>automated service or</li> <li>personal assistance regarding prepaid-value model.</li> </ul>	<ol style="list-style-type: none"> <li>Public transport users: <ul style="list-style-type: none"> <li>Occasional users;</li> <li>Subscription based users;</li> <li>Beneficiary of special tariffs.</li> </ul> </li> <li>Non-public transport users: <ul style="list-style-type: none"> <li>Companies paying for their employees;</li> <li>Public authorities paying for beneficiaries of special tariffs.</li> </ul> </li> </ol>
	<b>Key Resources</b>  <p>The e-ticketing system comprises:</p> <ol style="list-style-type: none"> <li>Distribution channels, comprising of: <ul style="list-style-type: none"> <li>online shops for ticket sales and distribution,</li> <li>mobile application for ticket distribution and emulation,</li> <li>third party retail network,</li> <li>public transport operator POS equipment,</li> <li>off-board ticket dispensers and</li> <li>ticket vending machines.</li> </ul> </li> <li>Fare media, comprising of: <ul style="list-style-type: none"> <li>printed barcodes for single tickets and</li> <li>contactless smartcard for season and concession fares.</li> </ul> </li> <li>On-board validation equipment</li> </ol>		<b>Channels</b>  <ul style="list-style-type: none"> <li>The transport operator's websites for e-ticketing.</li> <li>The transport operators selling points regarding smart cards.</li> <li>The e-ticketing system must allow passengers to receive Travel Information, plan their Journey and book their travel through a range of distribution and retail channels.</li> <li>Users should be able to pay for the journey by using contactless payment and pre-loaded value.</li> </ul>	

## D4.2 - Guidelines to Developing bankable projects, new business models and partnerships

### Annex 1 - New Business Models in mobility sector

	for vehicles. 4. Inspection equipment. 5. Core-ticketing system in back-office: • operator clearing and settlement, • account-based ticketing management, and • revenue control, reporting and monitoring.			
<b>Cost Structure</b> <b>System implementation costs:</b> <ul style="list-style-type: none"> <li>• Preliminary studies and engineering design; etc.);</li> <li>• Back office system acquisition;</li> <li>• On board system acquisition;</li> <li>• Vending machines and on-line distribution channels acquisition;</li> <li>• Control system acquisition.</li> </ul>		<b>Revenue Streams</b> <ul style="list-style-type: none"> <li>• Public transport fares selling;</li> <li>• Advertising (on cards, in the web or mobile selling apps etc.).</li> </ul>		
<b>Operational costs:</b> <ul style="list-style-type: none"> <li>• Operational staff (vendors, controllers, maintenance teams</li> <li>• Maintenance and upgrade of hardware;</li> <li>• Maintenance and upgrade of software;</li> <li>• Marketing;</li> <li>• Customer relationship management.</li> </ul>				

#### **Case Study: Alba Iulia (STP Alba Iulia S.A.)**

Electronic ticketing systems have been implemented in several cities in Romania, the largest part using European funds. Such systems are typically coordinated with a GPS fleet monitoring, providing information about the boarding station where a card has been validated and possibly about the disembark station if necessary. GPS tracking system underlies real-time information about the movement of vehicles.

The city of Alba Iulia together with the neighbouring communes and towns have established the Alba Iulia Metropolitan Area (AIDA –TL), which benefits of integrated public passenger transport (single information service, single ticketing scheme and single timetable) and public service obligation (PSO) in accordance with the Regulation (EC) 1370/2007 on public passenger transport services by rail and by road.

AIDA-TL principle: giving up traditional urban transport planning by focusing on large and expensive projects and the transition to sustainable urban mobility planning by focussing on effective and gradual improvements.

The main advantage of the Metropolitan Transport: provides integrated public passenger transport - interconnected transport services in a geographic area with a unique service information charge, a single ticketing scheme and single timetable.

In Alba Iulia, a card-based ticketing system has been since 2007. The project was realized with the operator's own funds, STP Alba, which owns 120 buses. It operates in the AIDA -TL and applies an integrated tariff, based on charging zones.

At that time, STP was the only company in Romania using GPS validation systems based on position of the passenger in relation to charging zones. Electronic boards are also installed in Alba Iulia's public transport stations, announcing the arrival of buses in real time.

Each member of AIDA-TL approves its rates for their own routes, in connection with the conditions of transport, which they request; each community and local authority can monitor and sanction the service provided. 7 tariff zones around the city of Alba Iulia have been established in order to answer to geographical and administrative criteria.

Travel passes and tickets are available in the appropriate tariff zone but also inside the tariff zones below (as price). One can buy a ticket for tariff zone no. 3; he/she can travel with the same ticket inside tariff zones 2 and 1 and he/she can make any number of interchanges needed (during the validity time of the ticket).

Alba Iulia introduced for the first time in Romania (since 2010) the tariff validity of one hour/ticket, valid on any means of transport, including suburbs (different validity periods, depending on the distance). Since 2011 Alba Iulia introduced the possibility to pay the ride via SMS.

The beneficiaries of local public transportation facilities:

### Annex 1 - New Business Models in mobility sector

- People with disabilities, their personal assistants and attendants (free) - Law 448/2006
- Students in middle school and high school (50% fare reduction) - Law 1/2011
- Veterans and war widows (free) - Law no. 44/1994
- The deportees (refugees) and displaced, persecuted political prisoners for ethnic or political reasons (free) - Law 118/1990
- Fighters in the Revolution of December 1989 (free) - Law 42/1990
- Blood donors (50% fare reduction for 2 months) - H.G.1364/2006
- Army personnel who died in military actions and their offspring (free) - OUG 82/2006
- Pensioners and persons of retirement age (free)
- Unemployed (free)

The payment of the value of transport by local public administration authority for the beneficiaries of local public transportation facilities, established by law or approved for certain categories of persons from the local councils and the General Assembly of AIDA-TL shall be based on ticket validation type card in the buses at the approved tariff for ticket charging area, but no more than the rate for subscription tariff area corresponding to the territorial administrative unit in which the beneficiary resides.

Invoices issued by the operator for each category of persons who benefit from the local public transport facilities will be accompanied, for each territorial administrative unit member of AIDA-TL, by the records of the monthly trips for each beneficiary and will include: name, personal identification number, smart card ID, date, boarding time (validation), route code and the number of the license plate of the bus which was used for each trip.

AIDA-TL and STP Alba Iulia are part of the ***Memorandum of Understanding to ensure the interoperability of fare systems***, alongside other Romanian and European stakeholders: International Association of Public Transport (UITP), Association for Metropolitan Mobility (AMM), Bucharest Public Transport Operator (RATB), Meditur SA Mediaș, Oradea Transport Local SA (OTL) Oradea, Oradea Metropolitan Area (ZMO), Intercommunity Development Association Râmnicu Sărat (ATRAS), Transport Urban de Călători SA Râmnicu Sărat (TUC) and Transmixt SA Bistrita.

N.B: STP Alba Iulia has expressed the openness to work with other SUITS partners to provide interoperability between Alba Iulia e-ticketing system and partners' e-ticketing systems inside the project.

### System results

E-Ticketing systems will permit to contribute to the overall improvement of the public transport network level of services, image, accessibility, with the main aim to facilitate and/or increase the use of public transport and so contribute to the overall political goal of developing a sustainable transport policy.

E-Ticketing systems should be seen as a crucial mean by which travellers may benefit within their mobility chain, and moreover within everyday life reducing the constraints / barriers of



travelling with sustainable transports with a positive financial impact over the operational results of public transport activities both for local and regional public authorities and public transport operators.

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#### **Multi-Modal journey planning**

##### **Definition**

A multi-modal journey planning requires and combines the features of a public transport system, forecasting demand and coordinating services having different alternatives of transport and operators as its main elements. In detail, the system is comprised of multiple data sources that are available at specific locations across the urban network. The user has the option to choose best suitable alternative combining different ways of transport depending on the situation of transit and availability provided by an algorithm through the web and/or an App.



##### **Main concepts of Multi-Modal journey planning**

- Calculation of all possible combinations of transport and operators.
- A possible transport routes are calculated from the starting point of movement to the destination point providing all possible combinations of transit.
- Use of web and/or mobile application.
- All calculated route variations are sorted in ascending order and correspondingly listed on the platform for journey planning according to total travel time. Each route is precisely described and may have the following attributes:
  - Number of interchanges;
  - Total time;
  - Public transport time;
  - Individual vehicle time;
  - Vehicle sequence (for car- and bike-sharing with name of the provider);
  - Coordinate sequence etc.
- Journey solution may be selected according to the users' preferences such as total time, price or number of interchanges.

##### **Benefits for the stakeholders by implementing Multi-Modal journey planning**

###### **Local and regional authorities:**

- Improve the users' transport experience.
- Improve the city image.

###### **Transport operators:**

- Multi-Modal journey planning may include crowdsourcing service that enables the users to share the information about the transport situation in real time. Users may provide the information about the specific events at their location within the transport network.

###### **Users:**

### Annex 1 - New Business Models in mobility sector

- A multimodal journey planner enables to choose the routes with more than one mode of transport.
- Some apps enable to track the users' movement and provide the navigation guidance.
- Multi-Modal journey planner provides real-time information. For example, real-time information on public transport situation such as arrival or departure times, traffic.










#### Different Multi-Modal journey planning models

- **Route planner:** This type of planner relies on a complete road map that is visualised in the form of a network graph. This enables to create a route through a pathfinder algorithm. It works the same for driving, walking and cycling mods with different map that describes the tangible paths for each corresponding mode of transport.
- **Public transport journey planner:** A public transport journey planner is based on a complete service map in network graph form. Some journey planners only support the journey between stops or stations on the transport network (tram, train stations or bus stops). When in its turn door-to-door journey planners integrate a route planner from the starting point of origin to final destination.

Most applications develop their own routing algorithms incorporating both additional layers of information and additional options that influence the route calculations. Some apps are based on a third party routing provider such Google Directions API, Here Routing API and MapQuest Directions API. Moreover, some apps are using region specific routing API, for instance, Transport for London.

## D4.2 - Guidelines to Developing bankable projects, new business models and partnerships

### Annex 1 - New Business Models in mobility sector

Business Model Canvas of Multi-Modal journey planning				
<div>Key Partners</div> <div><ul style="list-style-type: none"><li>Local and regional authorities: public transport policy developers and contracting authority for public transport services;</li><li>Public transport operators: public transport services suppliers;</li><li>Telecommunications operators;</li><li>IT Engineering companies: they will design the size and the architecture of the system;</li><li>Private companies</li></ul></div>	<div>Key Activities</div> <div><ul style="list-style-type: none"><li>Develop strategy to collect data and agreements to get access to real time data with regional and stakeholders such as: Authorities, Mobility Agency and Public Transport Companies</li><li>Develop web and App with good UX/UI and customization, including alerts and related information to provide best possible experience.</li><li>Marketing strategy, especially On-board process for users</li><li>Develop strategy for VC and get funds</li><li>Marketing activities.</li></ul></div> <div>Key Resources</div> <div><ul style="list-style-type: none"><li>Human resources: Sales, Marketing, Design and IT personnel</li><li>Initial capital</li><li>Cloud</li><li>Contact list and relationship with Mobility Agencies and Local Authorities.</li><li>Software</li></ul></div>	<div>Value Propositions</div> <div><ul style="list-style-type: none"><li>An alternative way of planning journey, that avoids congestion, taking into account, events, road works, and it will inform commuter on real time of any unexpected issue to save time and money</li><li>An easier way to move taking into account personal preferences</li></ul></div>	<div>Customer Relationships</div> <div><ul style="list-style-type: none"><li>The web/App will communicate automatically,</li><li>Personal assistance especially if the Multi Modal Journey App is operated by a Public Transport Company.</li></ul></div> <div>Channels</div> <div><ul style="list-style-type: none"><li>Web and App.</li><li>The advertising in the partners transport areas, metro, tram, bus.</li></ul></div>	<div>Customer Segments</div> <div><ul style="list-style-type: none"><li>Commuters: users that choose to travel from/to their working or education destinations</li><li>Tourists that want to move around and explore the city</li><li>Cities and/or Metropolitan Authorities: entities who wish to improve and update old data information system with modern, updated and friendly interface for the user managed by 3rd party.</li></ul></div>
<div>Cost Structure</div> <div><ul style="list-style-type: none"><li>Marketing and sales cost such as events and trips in order to get agreement on data collection with multiple organizations</li><li>System cost using Cloud services such as Amazon services or Google Cloud</li><li>Analysis tools for BIG DATA, ML &amp; AI</li><li>Staff including Sales, Marketing, Design, IT Systems and software development</li><li>Marketing, Sales and Design initiatives</li></ul></div>			<div>Revenue Streams</div> <div><ul style="list-style-type: none"><li>White label App for local authorities and metropolitan agency</li><li>Display advertisements on the site/App</li><li>Mobility tools</li><li>Geo-Marketing for Local Business</li><li>Data &amp; Cross-data generation for 3rd parties</li></ul></div>	

## Case Study of Multi-Modal journey planning: Moovit

Moovit ([www.moovit.com](http://www.moovit.com)) is one of the world's largest transit data and analytics company and the transit app. Moovit provides the multimodal journey planning in many cities all around the world. It combines information from public transit operators and authorities with real-time information from the user community. Moovit provides users with a real-time picture, including the best route for the journey. Moovit collects one billion anonymous data points a day to add to the repository of transit data. The data collection is supported by Moovit's network of more than 250,000 local editors so-called "Moovitors." The users help mapping and updating local transit information in cities in real-time by sharing it with entire Moovit network. Moovit is an early pioneer of Mobility as a Service. Moreover, Moovit integrates other forms of transport, such as local bicycle services, into its application. In 2017 Moovit launched its Smart Transit Suite of products to help cities, governments and local transit operators improve urban mobility in their cities. Moovit application is available for free on Android, iOS, Windows devices, and has a web version, Moovit on Web in more than 2,000 cities, across 80 countries, and provides its services in 44 languages.

Total Equity Funding \$81.5M in 4 Rounds from 10 Investors.

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