

# CAMP-sUmp

CAMPus sustainable University mobility plans in MED areas

Project Nb. 1MED15\_2.3\_M1\_238

Starting date: 01/11/2016

Ending date: 30/04/2018

## Deliverable D3.4.1: Action plan of sUmp in Urban Area

<b>Work Package</b>	WP3: Studying
<b>Version</b>	3
<b>Status</b>	Final Version
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<b>Refer to this deliverable as follows:</b>	Deliverable D3.4.1: Action Plan, of the research project CAMP-sUmp sustainable University mobility plans in MED Urban areas"
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# CAMP-sUmp

CAMPus sustainable University mobility plans in MED areas

## Deliverable D3.4.1: Action plan of sUmp in Urban Area

### **ACTION PLAN RATIONALE**

This Action Plan is a strategic guide with a sequence of steps that planners are encouraged to follow in order to create a sustainable *university* mobility plan (SUMP). This plan takes into consideration universities situated within the urban fabric (Urban), and campuses located outside the city centre (Suburban), providing specific suggestions for these two categories. This document describes the action plan for university **campus inside the urban context**.

This plan offers suggestions to satisfy in particular the needs of students and university members considering the technical, economic, social and environmental sustainability of the proposed mobility solutions. Moreover, the action plan considers the fact that a University Campus is embedded into the overarching mobility context that see other end-users of the mobility services sharing with the University's end-users infrastructures and services.

This document proposes an Action Plan including a comprehensive methodology, guidelines and tailored studies to simplify the adoption of sustainable urban mobility measures by the decision maker or mobility planners of universities (MPUs).

This document identifies the MPU as the coordinator and facilitator towards other stakeholders for managing and strategically planning the main steps of a University's sustainable mobility action plan.

The Action Plan for University campuses located within the urban fabric as well as those campuses located at the periphery of cities share the same methodology, which in this document is being subdivided into four main sections:

1. *Study* -> STUDY SOCIETAL TRENDS AND URBAN MOBILITY SCENARIO. Definition of the most relevant trends of the area where the considered university is situated;
2. *Plan* -> PLAN OF SUSTAINABLE UNIVERSITY MOBILITY. Creation of the SUMP following a detailed step-by-step procedure which suggests and proposes possible solutions for the university mobility;
3. *Do* -> DO IMPLEMENTATION OF PLANNED SOLUTIONS. Implementation of the mobility solutions defined in the previous section;
4. *Check and act* -> CHECK AND ACT OF IMPLEMENTED SUSTAINABLE UNIVERSITY MOBILITY SOLUTIONS. Result evaluation through adequate KPIs and feedback actions to target the defined goals.

This subdivision suggests a loop approach, where the context has been studied and plan measures have been prepared (respectively through section 1. *Study* and 2. *Plan*) the plan is concretely implemented and monitored (respectively through section 3. *Do* and 4. *Check & act*). If, during monitoring phase, some relevant issues occur, countermeasure or adjustment are planned, implemented and monitored again on the basis of Section 2 guidelines.

Each of the four sections (Study, Plan, Do, Check & act) is in turn characterised by a series of sub-topics which underlay the main differences between the action plan for campuses inside urban context and action plan for campuses outside urban context. Indeed, the following subsections are dealing with the most specific features.

In particular, the subsection *1.1 DECARBONISATION AND AIR QUALITY* presents some differences between the two documents: the one dedicated to urban context asserts urban areas local air quality lows which are generally more restrictive than those of suburban contexts (e.g. presence of circulation permissions only for certain categories of vehicles in cities). However, the potential presence of natural protected areas could determinate very restrictive regulatory frameworks even for suburban contexts. In addition, data could be easier to obtain in big city districts, due to the presence of more powered institutions with more resources at their disposal. In small towns' districts far away from big cities instead it is typical to find a lack of resources and competence. The subsection *1.2 LOCAL GEOGRAPHICAL AREA DYNAMICS* (which aims to evaluate local geographical area's dynamics where the University is located. Trends about urban development, university existing and future public transport plans are the most relevant aspects to take into consideration), provides some insight into delays due to consultation mechanism among different territorial institutions. These delays are more probable if the University's campus pertains to a district far away from a big city. Big cities institutions are often better suited to affect dialogue with upper territorial institutions. Moreover, other rows (present in the same subsection) are adding that when

campuses are located far away from urban context but near to protected natural areas, during consultation mechanism could have to take part particular institution (e.g. National park institutions) and further delays may happen. On the contrary, during the study phase, the presence of many constraints could arise due to the nature of the historical urban framework of cities' centres. The subsection *1.3 DEMOGRAPHIC CHALLENGES* contains some differences between action plans for campuses outside urban context and those embedded in urban context due to the different demographic compounds, which characterise the different campus' surrounding context. Moreover, differences arise for trips and the used means of transport for reaching the campus. However, every context is a specific case with its specific features, hence it is important to maintain the same methodological approach, both for campuses inside and outside the urban contexts. The subsection *1.4 DIGITAL SOCIETY* identifies opportunities or barriers to the development of the digitalisation of mobility. In this regard in case of campus outside the urban area, the plan should support specific analysis to understand if networking infrastructures are seamless or need for specific interventions. In case of campus inside the urban context, the need for understanding if it becomes useful to map internet access points to easy users' internet urban connection (or other interventions) is seen. The subsection *1.5 SHARING ECONOMY* is linked to the uptake on large scale of shared mobility systems, and has the target to understand the actual acceptance and take up of shared systems, behavioural aspect of the users and mobility as a service. This part can potentially differentiate, as in suburban campuses, long distance travels have a different impact on the choices of the users and on the decisions of the public urban planners.

Subsection *2.1 STAKEHOLDER IDENTIFICATION AND INVOLVEMENT* contains differences as public and private transport mobility solutions see the involvement of different actors according to the position of the campus, in fact, not all the operators provide the same services. Also in case of private mobility solutions, different operators may be involved considering that means and distances differ in cases where the campus is inside or outside the urban context. A further subsection, *2.4 HINTS ABOUT PLAN'S ACTIONS*, presents differences between the action plan for campuses inside and outside the urban contexts, due to the different nature of the surrounding context, which obligate the planners to take different solutions. However, it should be noted that each specific context is different and it is not possible to know before which are the most suitable measures.

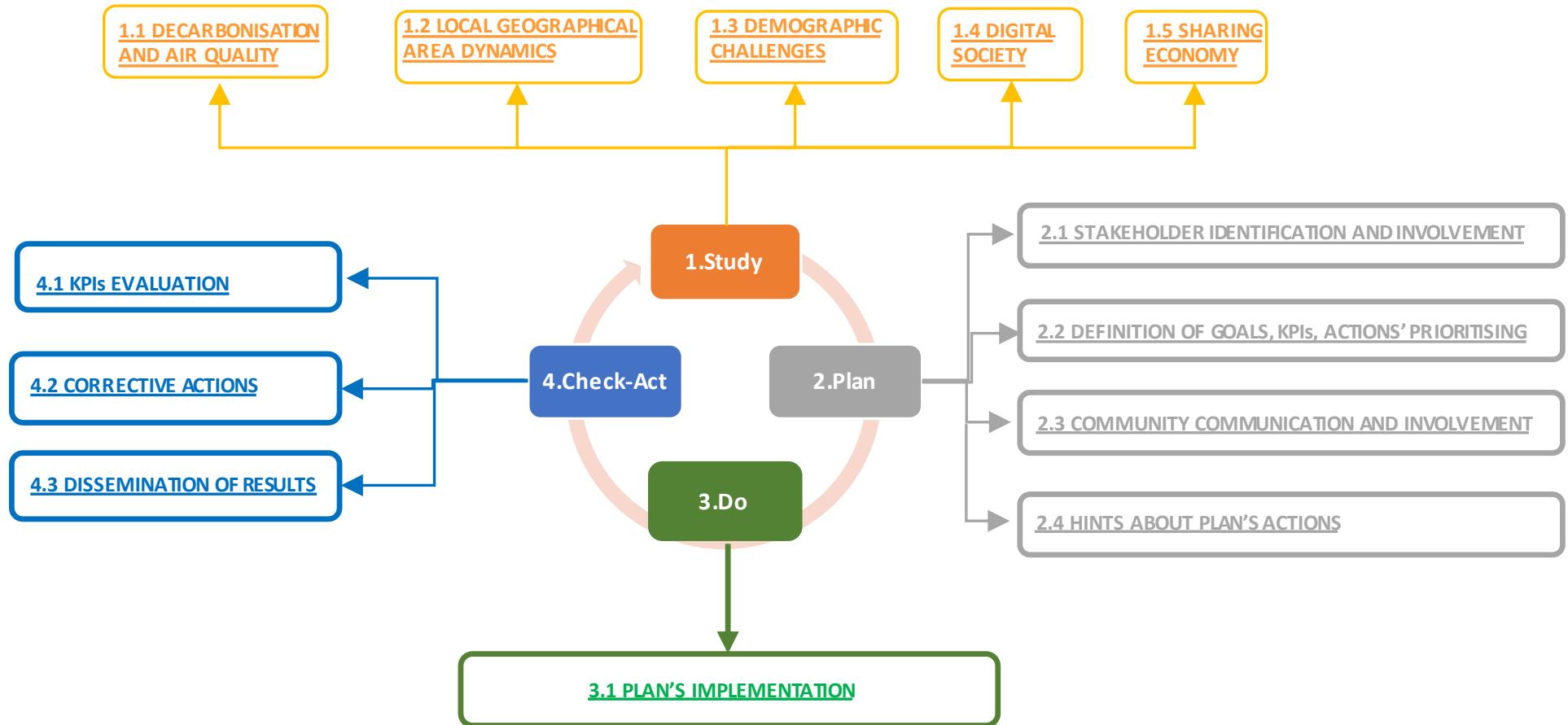
The preparation of this CAMP-sUmp's Action Plan is the outcome of the work performed by the project partners contributing to assess the proposed structure, and that has seen the project partner University of Bologna as key responsible institution for its design and preparation. University of Bologna benefit from the expertise of the Institute for Transport

and Logistics of the Emilia – Romagna region as expert in the SUMP planning and with a qualified experience on sustainable mobility.

Finally, a relevant aspect which distinguishes the developed Action Plan deals with the modularity of the proposed approach. Indeed, considering the most relevant features of the University which adopt the plan, it is possible to exploit a portion of the presented Sections and Activities. In particular, the modular structure of the Action Plan enables the Universities with a limited amount of available resources to focus their effort on those specific portions of the plan which are the most relevant for their scenario. For instance, a certain University could consider important to invest more effort for studying the surrounding environment than to develop and implement a detailed check and act loop, whereas another University could focus on a detailed definition of the implementation portion of the Action Plan rather than on the execution of the activities their selves.

This document is completed with:

- a ready-to-use guide for the implementation of the action plan in university campus with different settings, characteristics and in MED countries (please refer to D3.5.1 road map for decision makers);
- It aims to obtain a new communication model for university campus mobility, its management and monitoring (please refer to D3.5.2 ICT tools model and requirements for communication between different actors and planning instruments).



The approach we have followed in this document is recreated in the table below, customised for the purpose of this project.

<b>ACTIVITY NUMBER</b>	<b>NAME OF THE ACTIVITY</b>
<i>Short description</i>	Description of the activity
<i>Objective of the action</i>	Description the objective of the action
<i>Responsible stakeholder</i>	List type of stakeholder(s) and describe responsibility
<i>Stakeholder involved</i>	List of potential stakeholders
<i>Way of proceeding</i>	Description of the way of proceeding and way of involving stakeholders
<i>Target(s)</i>	List of targets and envisaged qualitative/quantitative indicators to be reached
<i>Duration of the activity</i>	Describe the duration of the activity in days (d) or months (m) <sup>1</sup>
<i>Resources</i>	Human or financial resources necessary
<i>Key elements of the action</i>	List the key elements of the action and operational description

<sup>1</sup> Duration of activity: time of each activity depends to many factors and variables (complexity of system, employees, etc). For each activity will insert a time plan a minimum and a maximum period of time for accomplish the task



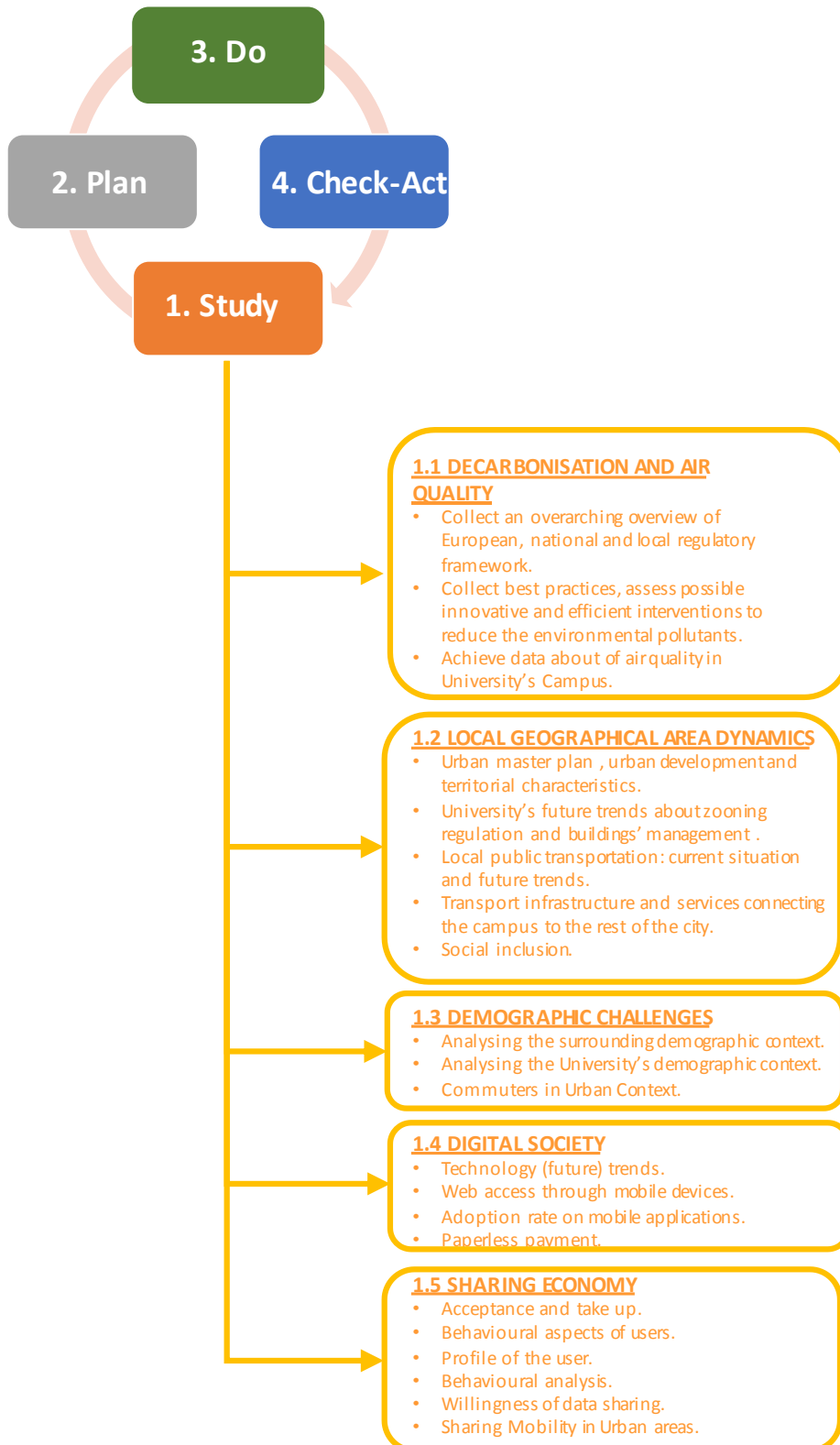
# 1 STUDY SOCIETAL TRENDS AND URBAN MOBILITY SCENARIO

This section focuses on the context analysis, which is fundamental in order to better understand the main features and characteristics of the campus and its background. In the first subsection, *1.1 DECARBONISATION AND AIR QUALITY*, the MPU is to look at European, national and local regulatory frameworks to collect best practices from other experiences in order to improve the air quality and contrast climate changes (furthermore assess possible innovative and efficient interventions to reduce the environmental pollutants) and finally collect data about air quality in University's Campus.

In the second subsection *1.2 LOCAL GEOGRAPHICAL AREA DYNAMICS*, the MPU is invited to analyse the territorial and university dynamics and the local mobility services.

The third subsection *1.3 DEMOGRAPHIC CHALLENGES* asks the MPU to analyse the demographic compounds and related future trends of the Campus and of the surrounding contexts. Moreover, the MPU is asked to investigate the end-users' mobility habits with a particular focus on University's users.

In the following subsection *1.4 DIGITAL SOCIETY*, the MPU is invited to study the technology (future) trends, the adoption rate of new mobile devices and mobile applications. Finally, the last subsection, *1.5 SHARING ECONOMY*, encourages the MPU to analyse the potential of sharing economy measures. It should be highlighted that some parts of this section have to be led in parallel with some activities of the section 2. *SUSTAINABLE UNIVERSITY MOBILITY PLAN* in particular with subsection *2.1 STAKEHOLDER IDENTIFICATION AND INVOLVEMENT*. The stakeholders' involvement and commitment is necessary in order to successfully achieve the required sensitive data and to collect useful information.



## 1.1 DECARBONISATION AND AIR QUALITY

<p>Most human activities (such as heating, industries and transport) are taking advantage of a chemical reaction (a redox reaction) which mainly involves carbon (the combustible or the reductant) and oxygen (the combustive or the oxidant) by producing carbon dioxide, which is the primary contributor for Green House Gases (GHGs) resulting in unprecedented climate changes. Furthermore, the most part of combustibles (such as diesel fuel or gasoline) produces other air polluting substances both noxious for the climate and human health. For this reason, worldwide efforts (in particular at European level) are nowadays spent in changing the way energy is produced and used by shifting from a “carbon-based” economy to a low-carbon or carbon neutral economy.</p> <p>This first section of this Action Plan is about the analysis on decarbonisation and air quality. It will produce a report to analyse the current situation in terms of air quality, policies and regulations affecting the University. This preliminary analysis focuses on the (1) European, National and Local legislation and regulation background, (2) Current policy interventions and operative actions to mitigate climate change, (3) Analysis of air quality and finally (4) Assessment of possible innovative and efficient interventions to reduce the environmental pollutants.</p>	
<p><i>Objective of the action</i></p>	<p>The aim is to analyse the <b>overarching</b> European, national and local legislation and <b>regulatory framework</b> and the current <b>policy</b> and <b>operative actions</b> (i.e. experiences and good practices) to <b>mitigate climate change</b> at local level in University Campuses.</p> <p>Following this analysis, the MPU <b>studies the local air quality</b> through a list of preselected <b>KPIs</b> determined during the first phase of the analysis. This concerns the University area’s air quality analysis.</p>
<p><i>Responsible stakeholder</i></p>	<ul style="list-style-type: none"> <li>- <i>University Mobility manager</i> (or other university competent members) guides the analyses and contacts other relevant stakeholders to collect necessary information</li> <li>- <i>Local public authorities</i> (e.g. Municipalities) to support the analysis of the regulations and policies at local level related to the mobility of people inside the City or outside the City</li> <li>- <i>Other stakeholders</i> with competence in the specific matter related to air-quality monitoring (e.g. agency for air quality management for example ARPA in Italy)</li> </ul>
<p><i>Other involved stakeholders</i></p>	<ul style="list-style-type: none"> <li>- Other potential stakeholders able to provide useful data on mobility such as <i>research institutes, consulting companies, public transport authorities</i> (Region, Metropolitan City, Police)</li> <li>- <i>University staff and student</i> questionnaires</li> </ul>
<p><i>Way of proceeding</i></p>	<ul style="list-style-type: none"> <li>- Meeting with local authorities and other stakeholders to discuss the existing regulatory framework, policy initiatives and any initiative for mitigating air pollution</li> <li>- Desk research for collecting information beyond that gathered from meeting with local experts</li> <li>- Desk research on the city’s sustainable mobility good practices</li> <li>- Definition of the key performance indicators together with the stakeholders</li> <li>- Contacting other stakeholders to support the calculation of key performance indicators concerning air quality monitoring at the University</li> </ul>
<p><i>Target(s)</i></p>	<ul style="list-style-type: none"> <li>- Collect an overall regulatory framework for pollution reduction</li> <li>- Collect information about the University and its impact on the environment</li> </ul>

	<ul style="list-style-type: none"> <li>- Assessment of possible innovative and efficient interventions (best practice)</li> </ul>
<i>Duration of the activity</i>	Depending on the availability of information and on stakeholders' availability, this phase should take about 1 month.
<i>Key elements of the activity</i>	<ul style="list-style-type: none"> <li>- <b>An overview of European, national and local regulatory framework</b> such as directives, regulations, laws, and current policy intervention and operative actions (i.e. experiences and good practices) to mitigate the climate and air quality change potentially interesting to Campus mobility. Generally, in urban areas local air quality laws are more restrictive (e.g. presence of circulation permissions only for certain categories of vehicles)</li> <li>- <b>Collect best practices</b> in order to improve air quality and combat climate change, furthermore <b>assess possible innovative and efficient interventions to reduce the environmental impact:</b> <ul style="list-style-type: none"> <li>o Low emitting vehicle usage (e.g. electric and non-polluting)</li> <li>o Car and bike sharing and other innovative solutions</li> </ul> </li> <li>- <b>Achieve data about air quality in University's Campus.</b> Very preliminary list of suggested KPIs: Air quality index (an averaged value amongst the maximum daily values of PM10, NO<sub>2</sub>, CO<sub>2</sub>, O<sub>3</sub>, CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, SO<sub>2</sub>, NO<sub>x</sub>, COVNM and NH<sub>3</sub>). In each City, the panel of involved experts will build a consensus over of these topics.</li> </ul> <p>Some general considerations follow:</p> <p><b>University campuses inside the city:</b> easier information access (more information and knowledge available), but on the contrary the approach is more embedded in the city context and more barriers/risks must be evaluated.</p> <p>When a new study is led, having an updated database is fundamental in order to have a realistic baseline. Available data should be assessed for reliability and gaps.</p>

## 1.2 LOCAL GEOGRAPHICAL AREA DYNAMICS

This part aims to evaluate local geographical area's dynamics where the University is located. Trends about urban development, university future and public transport are the most relevant aspects to take into consideration.	
<i>Objective of the action</i>	<p>The first step in this study is to <b>contextualize</b> the Campus into a singular Urban Master Plan for the purposes of the mobility plan. The existing urban fabric, <b>future urban</b> demographics and residential patterns (related also to zoning and building management) and <b>service/infrastructural dynamics</b> (presence of station, airport, commercial activities, etc.) should be taken into consideration.</p> <p>Secondly, it is important to determine the <b>University's current and future dynamics</b>. Such information about the University's institutional</p>

	<p>regulations and regulatory local framework, zoning and building management is critical.</p> <p>Finally, the third step of this study is to analyse the existing public transport service and its future plans and trends, the existing <b>transport infrastructures</b> and others mobility measures already implemented by the universities (car rental services, special tariffs for students, etc.).</p>
<i>Responsible stakeholder</i>	University mobility manager to organize contacts, meetings or local working groups
<i>Other involved stakeholders</i>	<p>DECISION MAKERS (University services, city/transport authorities, etc.):</p> <ul style="list-style-type: none"> <li>- <i>Public authority</i>: Municipality, metropolitan city or other authority with planning competence on mobility services or other connected to (e.g. environmental, etc...)</li> <li>- <i>Public Transport operators</i>: operating at local level (bus, underground or other metropolitan services, bike sharing, car-sharing) or regional/national level (railway companies)</li> <li>- <i>Mobility agency (where existing)</i>: cooperating with Public Authorities and Transport operators to plan transport services</li> <li>- <i>Private Mobility provider</i> (taxi or similar operators, bicycle fleets, car sharing): as alternative mobility to private and public mobility</li> <li>- <i>Other stakeholders</i> (infrastructure/network provider, ICT provider/Commercial associations/Other Associations/police/...): giving specific competence</li> <li>- <i>Private Carpooling services</i>: Principally operated by private travellers to lessen the impact on congestion and environment</li> <li>- <i>Research and Academia</i>: to participate in the planning phase with results of their research. Can be very useful as supporting entity to support surveys, analysis or other studies</li> <li>- Other potential useful stakeholders able to provide skills on mobility;</li> <li>- <i>Utility and infrastructure providers</i> (e.g. Energy provider ...)</li> </ul> <p>USERS (students, employees, visitors, etc.)</p> <ul style="list-style-type: none"> <li>- <i>Students</i>: main users of the transport services. Main target of the change of behaviours paradigm of sustainable mobility. They are characterised for being flexible, smart and lack of financial means</li> <li>- <i>Employees</i>: as for students, but less flexible and with more financial means.</li> <li>- <i>Occasional workers</i>: occasional workers for maintenance or for meeting with Campus workers</li> <li>- <i>Non-University workers</i> (e.g. in case of start-ups, spinoff or other companies inside the campus): all other activities embedded in the Campus.</li> </ul>
<i>Way of proceeding</i>	<ul style="list-style-type: none"> <li>- <b>(relevant to 1<sup>st</sup> Step) Meeting with public authorities</b> (e.g. Municipality planners, Civil Protection Authority...), University mobility manager (or other competent members) and other potential stakeholders to evaluate how the University's Campus (in particular University's Campus mobility) fits, interfaces and interferes with potential emergency plans, urban plans (present and planned infrastructures) rules, restrictions, geographical constraints. Particular attention is to be given to mobility and</li> </ul>

	<p>infrastructure framework already in place in order to understand how University generated mobility integrates, and interferes with the surrounding context.</p> <ul style="list-style-type: none"> <li>- <b>(relevant to 2<sup>nd</sup> Step) University's Internal Meeting</b> for getting information about University's existing and future dynamics such as information about its institutional regulations and its zoning and building management. Particular attention is to be paid for those areas that are generating or will generate mobility demand.</li> <li>- <b>(relevant to 3<sup>rd</sup> Step)</b> made in parallel with the 3<sup>rd</sup> step of the previous activity. <ul style="list-style-type: none"> <li>o <b>Interviews</b> to students and University's personnel through <b>on-line questionnaires</b> to gather any specific information;</li> <li>o <b>Interviews</b> to personnel of any external entity whose activity is embedded inside the campus.</li> <li>o <b>Interviews / Meeting with public transport authority</b> in order to investigate current and future offering of public transport service (also new planned infrastructures have to be put in consideration if these are directly or indirectly interesting the Campus area). This preliminary analysis is a base of discussion with the competent stakeholders to eventually understand the services needed or related activities/changes to plan.</li> </ul> </li> </ul>
<p><i>Target(s)</i></p>	<ul style="list-style-type: none"> <li>- Achieve an overall image of how the present and future University's mobility and institutional regulations and its zoning and building management are embedded into the urban planning tools.</li> <li>- Achieve an overall image of current and future University trends (zoning and building) that will generate mobility.</li> <li>- Achieve an overall image about present and future public transport service. A particular focus is given also on the current public transport pricing and a comparison among current mobility alternatives is carried out.</li> </ul>
<p><i>Duration of the activity</i></p>	<p>Depending on stakeholder availability and time scheduling for on-line questionnaires. The duration for this activity is about 3 months</p>
<p><i>Key elements of the activity</i></p>	<p>The following key elements represent a detailed list of topics, which have to be studied and considered in order to prepare a state of the art report.</p> <ul style="list-style-type: none"> <li>- <b>Urban master plan<sup>2</sup>, urban development and territorial characteristics<sup>3</sup></b>: Important general considerations about urban master plan and trends about urban development.</li> </ul>

<sup>2</sup> Town planners consider universities as centers that are able to supply relevant public services (such as hospitals, trade fair centers, big supermarkets, etc.). Due to their importance and their relevant effects on transport and on the environment, these are usually thought and planned at territorial (regional or even national) level and or by consultation mechanisms among different and adjacent local authorities (territorial consultations, agreements, etc.). If the university is located in a urban context the consultation mechanism could be easier due to the city's relevance or due to the presence of particular more powered institutions.

<sup>3</sup> Generally planning (also for air quality) includes three main levels: strategic, tactical and operative. The higher is the level the higher is the strategical content: usually strategical planning is the responsibility of vast territorial Authorities



	<ul style="list-style-type: none"> <li>○ City characteristics: metropolitan city, standard, sea/port-city, peripheral, mountain, hilly, cross border city, island, etc. (a fast search about context with reference to risks connected with weather, earthquakes, industries and restrictions linked to the environment and/or to the historical heritage safeguarding).</li> <li>○ Further information about the surrounding area:             <ul style="list-style-type: none"> <li>▪ Present and/or planned residential areas near the campus;</li> <li>▪ Distance from the main present and/or planned transport hubs (Rail or Metropolitan station, Bus station, Airport, ...)</li> <li>▪ Description of surrounding area: in term of main present and/or planned services and traffic generating poles</li> </ul> </li> <li>○ Weather condition during year (rain day/year, mean temperature, etc.)</li> </ul> <p>- <b>University's future trends about zoning, land use, regulation and buildings' management (present situation and future trends).</b> It concerns in particular information from University's institutional regulations and local regulatory framework about zoning and building management.</p> <ul style="list-style-type: none"> <li>○ Campus' present and/or planned organization (areas dedicated to libraries, gardens, canteens, sport facilities, rooms for events etc.);</li> <li>○ Present and/or planned commercial activities inside the campus: restaurants, companies (start-ups), bicycle shop, Other</li> <li>○ Present and/or planned schools inside the Campus, where and how these are located in the urban context.</li> <li>○ Campus's present and/or planned surface total area;</li> <li>○ Work in progress area and planned utilization;</li> <li>○ Abandoned areas;</li> <li>○ present and/or planned legislations which limit the vehicle circulation in a specific campus area or time slot;</li> <li>○ present and/or planned specific regulations for urban streets of interest for the University Campus.</li> </ul> <p>- <b>Local public transport: current situation and future trends.</b> concerns the current situation and future trends about local public transportation by describing the most relevant features. The MPU has to find out with local public transport authorities if public transport authority's future planning interests directly or indirectly the Campus. A suggestion to proceed: MPU gathers</p>
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such as States, National States, Regions, etc. and it provides mainly guidelines to follow. The tactical level instead is mainly the responsibility of local authorities, and it takes efforts in order to find strategies and targets for following the guidelines set at the superordinate level. Finally, the operative level concretely reaches targets by finding resources and skills and making agreements in order to ensure the actual realisation of measures focused on supply the above-mentioned targets set at the superordinate level.

This threefold structure can be present also inside the plan itself. The CampSUMP itself reflect this structure with goals (strategical level), targets (tactical level), and actions (operative level).

	<p>needs of mobility and prepare a first hypothesis for transport service improvement.</p> <ul style="list-style-type: none"> <li>- <b>Transport infrastructure and services connecting the campus to the rest of the city:</b> <i>Unless otherwise indicated, for each question indicate the number of</i> <ul style="list-style-type: none"> <li>▪ Bus dedicated line, Underground line, Tram lanes, Trolleybus, etc...</li> <li>▪ Cycling paths,</li> <li>▪ Pedestrian areas (presence of pedestrian areas that surround the campus)</li> <li>▪ Other ways for reaching the campus: roads, railways, motorway, waterway, etc.</li> <li>▪ Existing carpool, car or bike sharing services</li> <li>▪ Taxi or other type of service dedicated infrastructure</li> <li>▪ Connecting lanes which should be enhanced and new potential links</li> </ul> </li> <li>○ <b>Transport modal share.</b> The MUP has to investigate the most used transport solutions and vehicles to find out their sustainability and impacts. <ul style="list-style-type: none"> <li>Information about <b>vehicles in urban context:</b> <ul style="list-style-type: none"> <li>▪ Vehicle types used in the city;</li> <li>▪ Percentage of population which daily adopts private motorized transport;</li> <li>▪ Vehicle impact on pollution;</li> <li>▪ Possibilities to substitute, increase or reduce the adoption of private motorized transport;</li> <li>▪ Availability of car sharing/pooling systems.</li> </ul> </li> <li>▪ <b>Pricing policies.</b> Information about transport pricing (How much traveling by bus or shuttle costs; How much traveling by car costs; How much traveling by bicycle costs; How much students are willing to spend for moving into the campus or toward the university)</li> </ul> </li> <li>- <b>Social inclusion</b> (e.g. disadvantage transport users and relevant quality of service). In this subchapter the planner will extend and analyse the existing practices to analyse if and how the existing City's context is dealing with mobility solutions that take into account social disparities.</li> </ul>
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### 1.3 DEMOGRAPHIC CHALLENGES

In this part, planners have to study ongoing demographic trends of the considered geographical area. Considerations about urban and University area, should be similar when the university is located in the city centre, otherwise these usually differ. Demographic trends are able to modify the urban shape and transport



demand.	
<i>Objective of the action</i>	<p>The demographic context in which the University lies is crucial, both with reference to present and future scenarios. This information would contribute significantly to understanding the mobility requirements of the university population.</p> <p>It is important to determine the University's socio-demographical features in order to better adapt University's future mobility measures.</p> <p>The final step in this section aims to understand mobility habits of the University's users and workers such as time scheduling and mobility preferences.</p>
<i>Responsible stakeholder</i>	The university mobility manager is to organize contacts, meetings or local working groups
<i>Other involved stakeholders</i>	<p>DECISION MAKERS (University services, city/transport authorities, etc.):</p> <ul style="list-style-type: none"> <li>- <i>Public authority</i>: Municipality, metropolitan City or other public authorities able to give information about the living population in the city/town (or in the area in which the campus is inserted if the campus is outside the urban context)</li> <li>- <i>Public Transport operators</i>: operating at local level (bus, underground or other metropolitan services, bike sharing, car sharing) or regional/national level (railway companies) in order to support on potential surveys and to give other useful information.</li> <li>- <i>Mobility agency (where existing)</i>: cooperating with Public Authorities and Transport operators to plan transport services</li> <li>- <i>Private Mobility provider</i> (taxi or similar operators, bicycle fleets, car sharing): as alternative mobility to private and public mobility</li> <li>- <i>Other stakeholders</i> (infrastructure/network provider, ICT provider/Craft Associations/Other Associations/police/...): giving specific competence</li> <li>- <i>Research and Academia</i>: to participate in the planning phase with algorithms or results of their research. Can be very useful as supporting entity to support surveys, analysis or other studies</li> <li>- Other potential useful stakeholders able to provide skills;</li> </ul> <p>USERS (students, employees, visitors, etc.)</p> <ul style="list-style-type: none"> <li>- <i>Students</i>: main users of the transport services. Main target of the change of behaviour paradigm of sustainable mobility. They characterize for being flexible, smart and lack of financial means</li> <li>- <i>Employees</i>: as for students, but less flexible and with more financial means.</li> <li>- <i>Occasional workers</i>: occasional workers for maintenance or for meeting with Campus workers</li> <li>- <i>Non-University workers</i> (e.g. in case of start-ups, spinoff or other companies inside the campus): all other activities embedded in the Campus.</li> </ul>
<i>Way of proceeding</i>	<ul style="list-style-type: none"> <li>- <b>(relevant to 1<sup>st</sup> Step) Meeting with public authorities</b> (e.g. Municipality, local General Register Office), University mobility manager (or other competent members) and other potential stakeholders to evaluate the contextual demographical trends.</li> <li>- <b>(relevant to 2<sup>nd</sup> Step) University's Internal Meeting</b> for getting</li> </ul>

	<p>information about University's today and future socio-demographic trends such as information about enrolments, presence of international students and working students.</p> <p><b>(relevant to 3<sup>rd</sup> Step)</b> made in parallel with the 3<sup>rd</sup> step of the previous activity.</p> <ul style="list-style-type: none"> <li>- <b>Interviews</b> to students and University's personnel through <b>on-line questionnaire</b> to gather any specific information;</li> <li>- <b>Interviews</b> to personnel of any external entity whose activity is embedded inside the campus.</li> <li>- <b>Interviews / Meeting with public transport authority</b> in order to establish if foster the present transport offering and plan related activities in light of needs gathered from University's users (and workers) through above mentioned interviews.</li> </ul>
<p><i>Target(s)</i></p>	<ul style="list-style-type: none"> <li>- Achieve an overall image about the surrounding demographic context with reference to present and future scenarios.</li> <li>- Achieve an overall image about the University's socio-demographical features with reference to enrolment trends, the presence of international students and of working students. In addition, attention is paid also for University's personnel.</li> <li>- A particular attention is paid for understanding how University's students and workers reach the University and their way of traveling in order to achieve an overall image of users' habits and everyday life concerning paths time scheduling, type of vehicles, required average time, etc.</li> </ul>
<p><i>Duration of the activity</i></p>	<p>Depending on stakeholder availability and time scheduling for on-line questionnaires. The duration is assessed about 2 months.</p>
<p><i>Key elements of the activity</i></p>	<p>Demographic trends inside and outside the University's context are able to shape and modify the urban areas. These considerations help to understand how to adapt the Action Plan to a particular campus.</p> <ul style="list-style-type: none"> <li>- <b>Analysing the surrounding demographic context</b> <ul style="list-style-type: none"> <li>o Demographic trends such as birth and death rate in order to understand future urban and territorial development (Distribution of population in different districts, Distribution of population rate, Past and future trends of the population birth and rate Distribution of age between the different city districts, Household membership evolution which foresees two sub-activities; the first being considerations and analysis about the composition and feature of families that are living in the considered geographical area, while the second is Analysis of the average number of people which compose families and its evolution over time)</li> <li>o Distribution of population wages</li> <li>o Migration features from foreign countries (Expat and immigrant rate, Period of the year when there is the maximum number of migrations, Actual and planned regulations at local, national and European level)</li> <li>o Employment (Number of family members which have an occupation; Typical occupation of family members of family; Distribution of family member between civil servant, private employee, private workers and freelance</li> </ul> </li> </ul>

	<p>professional).</p> <ul style="list-style-type: none"> <li>- <b>Analysing the University's demographic context</b>              Considerations about university are useful to understand how to adapt the Action Plan to a particular campus.             <ul style="list-style-type: none"> <li>o <b>Enrolments trends</b> One of University's most characterizing aspect is the number of enrolled students (Average number of enrolments for the entire university; Average number of enrolments for each course; Course of study that has the maximum number of enrolments per year).</li> <li>o <b>International students</b> University generally works together with other universities within Erasmus or other framework of collaboration (Number of international students which study every year in the considered university, Incoming and out-coming students due to Erasmus programme and its evolution over the year; The course of study distinguished by the largest number of international students)</li> <li>o <b>Working students</b> Lots of students work and study at the same time (Number of students that work and study at the same time; Reasons why students work and study at the same time; Typical occupations of students).</li> <li>o <b>University's personnel</b> (Number of University Employees<sup>4</sup>, Number of other permanent Employees<sup>5</sup>);</li> </ul> </li> <li>- <b>Commuters in Urban Context:</b> In this paragraph planners have to consider students who do not live inside the campus area located inside the city centre but which travel every day to and from the university:             <ul style="list-style-type: none"> <li>▪ Number of students (and University's workers) that are commuters;</li> <li>▪ Average time spent to reach the university; Time scheduling (Paths): Time required to ride the identified paths; Vehicle type mostly used during the day and the night; Time spent by people to move into the campus area; Average time required to reach the stops of public transportation service. Peak hours for population transportation.)</li> <li>▪ Distance between university and the location where they live;</li> <li>▪ Time spent every day by the commuters inside the campus area.</li> <li>▪ Number of occasional Accesses<sup>6</sup>.</li> <li>▪ Presence of seasonal traffic (if the University's campus is interested by seasonal traffics)</li> </ul> </li> <li>o <b>Multimodality.</b> The following information has to be achieved:</li> </ul>
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<sup>4</sup> University Employees are: professors, researchers, PhD students, administrative and technical staff

<sup>5</sup> Permanent Employees i.e. cafeteria workers, barmen, etc.

<sup>6</sup> Maintenance workers, gardeners, etc.

	<ul style="list-style-type: none"> <li>▪ Number of students or university members who use multi-modality transport solutions;</li> <li>▪ Vehicle types used for multi-modality travels;</li> <li>▪ Time spent to travel adopting multi-modality solutions;</li> <li>▪ Situations which facilitate the adoption of multi-modality;</li> <li>▪ Current percentage of modal share by transport mode</li> <li>▪ (private car, bus, pedestrian, shared mobility, train, underground, other)</li> </ul> <ul style="list-style-type: none"> <li>○ <b>Origin of frequent transport demand to reach the campus</b> (<i>especially for Students</i>) <i>Is possible use numbers, percentages or both if available</i> <ul style="list-style-type: none"> <li>▪ urban<sup>7</sup> (if from same City)</li> <li>▪ metropolitan<sup>8</sup> (if same Province or functional urban area)</li> <li>▪ regional (if same Region)</li> <li>▪ national (if from the same Country)</li> <li>▪ transnational (if other Country)</li> </ul> </li> </ul>
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## 1.4 DIGITAL SOCIETY

<p>Personal mobility all over the world is undergoing a profound transformation as a result of digitisation. This is affecting persons, vehicles and infrastructures. Planning the future mobility of University’s campuses cannot be carried out without taking into consideration the future trends in technology.</p> <p>The digital society indicates the web’s evolution from a simply infrastructure of communication to a mass phenomenon of sociological interest. In this paragraph, planners have to study the developing digital society in a particular period of interest. Studies concern present and future trends including some considerations about used devices, applications and paperless payments.</p> <p>Digital innovation is key leverage of sustainable mobility solutions with a direct impact on shifting away from personally owned modes of transportation and towards mobility solutions that are consumed as a service.</p> <p>This chapter of the plan will investigate the technology future trends, how mobile devices are relevant to mobility, the adoption rate of mobile applications and digital payments.</p>	
<i>Objective of the action</i>	The objective of this activity is guiding the planner to understand the impact of technologies on University Campus’s sustainable mobility, in order to integrate its choices with future technological trends.
<i>Responsible stakeholder</i>	- MPU investigating existing technological practices and future trends.
<i>Other involved stakeholders</i>	- Any stakeholders involved in mobility that already has developed technological solutions (public authorities and transport operators)

<sup>7</sup> “Urban” meaning as from an area less far than 10km from city centre

<sup>8</sup> “Metropolitan” meaning outside city area, more than 10km far from city centre

<p><i>Way of proceeding</i></p>	<ul style="list-style-type: none"> <li>- MPU will analyse existing technologies or experiences supporting mobility through desk research (local, regional but also international experiences). MPU can even decide to contact specific stakeholders to collect specific information.</li> <li>- MPU can also investigate future technological trends for mobility by submitting questionnaires to the users (students, professors, etc...) to understand their level of utilization or willingness to use such technologies.</li> </ul> <p>Note: For campus <b>inside</b> the urban context, it should be useful to map internet hotspots to assess users' internet availability .</p>
<p><i>Target(s)</i></p>	<ul style="list-style-type: none"> <li>- Develop a kit of existing technological solutions, or future trends, that could be integrated with standard mobility information systems (e.g.: Artificial intelligence, Applications for mobile, Infrastructures for device or Vehicle to Infrastructure communication) as part of the University's mobility planning.</li> <li>- Develop a set of barriers to the use of technological solutions, gathered through the interviews to users or stakeholders</li> <li>- Identify people's habits in using technologies</li> <li>- Boost the use of mobile technologies through understanding the current and future behaviour / or needs</li> <li>- Assess the potential of paperless payment as leverage to choose sustainable mobility solutions</li> </ul>
<p><i>Duration of the activity</i></p>	<p>This is based on a survey campaign and a collaboration with main stakeholders. Basically 1,5 or 2 months of activities, included of the elaboration of the results, should be sufficient.</p>
<p><i>Key elements of the activity</i></p>	<p><b>Technology (future) trends:</b> Concerning all these different and relevant technology trends, the MPU has to assess the following aspects to develop a proper SUMP:</p> <ul style="list-style-type: none"> <li>- Average number of people that have a computer or a smartphone to surf on internet to be used for mobility's reasons;</li> <li>- Number of students or university members that use internet every day at least one time per day;</li> <li>- Daily time that students and university members spend on internet.</li> </ul> <p><b>Web access through mobile devices:</b> Nowadays people usually surf on internet by smartphone. Certain information has to be collected concerning this topic:</p> <ul style="list-style-type: none"> <li>- Average number of accesses on internet by mobile per day;</li> <li>- Average time surfing on internet by mobile;</li> <li>- Satisfaction of costumers on using mobile phone to access on internet to option transport solutions.</li> </ul> <p><b>Adoption rate on mobile applications:</b> Aim of this paragraph is to facilitate the understanding of how mobile applications are typically used. Thus, planners have to be aware of:</p> <ul style="list-style-type: none"> <li>- Web/mobile Applications which are the most used by students or university members (University's APP, City's APP, Public Transport operator's APP, Tools to see transit data, etc...);</li> </ul>

	<ul style="list-style-type: none"> <li>- Daily use of applications by students and university members;</li> <li>- Existing monitoring systems of local / regional stakeholders (e.g. Mobility agencies, transport operators, Hubs and Infrastructure stakeholders etc...)</li> <li>- Applications for mobility services, such as car sharing or ride sharing, which people normally use;</li> <li>- People categories (classified by age, employment or residential area) who are more willing to use mobile applications;</li> <li>- Customer satisfaction concerning mobile applications.</li> <li>- Accessibility level of internet application and related services</li> </ul> <p><b>Paperless payment</b></p> <p>Assessment of the potential of paperless payment must consider:</p> <ul style="list-style-type: none"> <li>- Type of paperless payment system and future trends (e.g. integrated ticketing, payment by smartphone)</li> <li>- Number of people which usually adopt paperless payment systems;</li> <li>- People categories (classified by age, employment or residential area) which usually use paperless payments;</li> <li>- Customer satisfaction concerning paperless payment.</li> </ul>
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## 1.5 SHARING ECONOMY

<p>Sharing economy promotes form of consumption based on re-using instead of purchasing. It is possible thanks to internet applications and a global connected people and things. Planners have to consider what is linked to shared systems and habits of sharing inside and outside the university's campus.</p>	
<i>Objective of the action</i>	<p>Planning of societal trends and urban mobility scenarios go in parallel to the development of the sharing economy, and specifically <b>on sharing mobility solutions</b>. For this reason, the objective of this sub chapter of the plan is to understand the actual acceptance and take up of shared systems, behavioural aspects of the users and mobility as a service.</p>
<i>Responsible stakeholder</i>	<ul style="list-style-type: none"> <li>- <i>MUP</i> is responsible of collecting City's and campus practices on sharing mobility.</li> <li>- <i>Companies</i> operating on mobility (Public Transport Operators, Car sharing services, Bike sharing services)</li> <li>- <i>Private sharing &amp; Carpooling systems</i></li> </ul>
<i>Other involved stakeholders</i>	<ul style="list-style-type: none"> <li>- Citizens</li> </ul>
<i>Way of proceeding</i>	<ul style="list-style-type: none"> <li>- MUP defines a set of mobility and non-mobility typologies of shared services. If not autonomously, also other stakeholders can give support and provide knowledge.</li> <li>- MUP integrates into questionnaires requests on knowledge of shared mobility solutions in the City the user currently know or utilize and the degree of satisfaction. This part of the questionnaire is supposed to collect information on the existing trends in the City and related to the Campus.</li> <li>- MUP can even plan a questionnaire or a set of focused interviews</li> </ul>



	<p>with share mobility operators to collect overall status of the art, positive or negative practices and trends</p> <ul style="list-style-type: none"> <li>- MUP need to analyse through interviews the practices to behavioural change towards alternative mobility solutions. MUP can also analyse good practices of change of behaviour in Cities to be transferred at local level</li> </ul>
<i>Target(s)</i>	<ul style="list-style-type: none"> <li>- Derive a clear overview of the existing services in the City and specifically related to the Campus, if inside or outside the City</li> <li>- Understand the actual understanding and utilisation of practices for sharing mobility</li> <li>- Derive a set of initiative requested by the users</li> </ul>
<i>Duration of the activity</i>	<p>This is expected to last 1.5 or 2 months, even can be embedded in a overarching questionnaire – see previous steps of the plan</p>
<i>Key elements of the activity</i>	<p>The activity is, as described above, related to a set of questionnaires or interaction with the practitioners and users of shared mobility solutions to derive the status of the art and understand how to promote/facilitate the adoption of such solutions,</p> <p><b>Acceptance and take up:</b></p> <ul style="list-style-type: none"> <li>- Type of shared systems in the considered area (such as: heating, car sharing, room for sleeping, etc.);</li> <li>- Frequency of sharing;</li> <li>- Developed applications for sharing;</li> <li>- Shared services that impact on economy;</li> <li>- Types of shared systems that are more used in the university;</li> <li>- Satisfaction of people who use shared services;</li> <li>- Problems connected with sharing system</li> </ul> <p>The elements become priorities of investigation through questionnaires or interviews. These represent a minimum set of information to be requested, that in each City/Campus the planner can customize or modify accordingly.</p> <p><b>Behavioural aspects of users:</b></p> <ul style="list-style-type: none"> <li>- Average age of shared system users;</li> <li>- People categories (classified by age, employment or residential area) which use shared system;</li> <li>- Number of students or university members who actually use shared services;</li> <li>- Categories of students or university members who use shared mobility every day;</li> <li>- Reasons why people choose shared system;</li> <li>- Satisfaction of people who use shared system</li> </ul> <p><b>Profile of the user:</b></p> <ul style="list-style-type: none"> <li>- Profile of the user (citizen, student, professor, business operator)</li> <li>- Provenience (define a distance in km or other)</li> <li>- Sex</li> <li>- Type of employment</li> <li>- Availability of private car or other motorized transport mean</li> </ul>

	<ul style="list-style-type: none"> <li>- Availability and utilization of smartphone or mobile with internet access</li> </ul> <p><b>Behavioural analysis:</b></p> <ul style="list-style-type: none"> <li>- utilizer or provider of shared solutions</li> <li>- frequency of shared systems' use</li> <li>- type of shared systems' utilization</li> <li>- positive and negative impact</li> <li>- reason for sharing / using shared mobility solutions</li> <li>- degree of satisfaction for each services</li> <li>- proposal of not implemented sharing solutions</li> </ul> <p><b>Willingness of data sharing:</b></p> <ul style="list-style-type: none"> <li>- what type of information the user already shares (e.g. gps position, internet data tracking, ...)</li> <li>- Define personal data which people could decide to not want to not store in the database system;</li> <li>- Define personal data which people could decide to not want to not share with other users of the shared mobility services;</li> <li>- Identify the reasons why people do not want to share certain information;</li> <li>- Be aware of data which are protected by privacy defined by national and European regulations</li> </ul> <p>All these information are then elaborated by the University's staff with the support of competent stakeholders (if needed). Data analysis is also necessary to derive information and plan strategies of intervention.</p> <p><b>Sharing Mobility in <i>Urban</i> areas:</b></p> <ul style="list-style-type: none"> <li>- Average number of people who usually share rides;</li> <li>- People categories which share rides;</li> <li>- Transport mode usually shared by students or university members;</li> <li>- Number and categories of students and university members who normally offer shared mobility services;</li> <li>- Satisfaction of people which offer shared systems;</li> <li>- Satisfaction of people which use shared systems</li> </ul>
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**MILESTONE:** At the end of this section, the MPU should have analysed and achieved information about the active air quality regulatory framework, about the university campus context its future trends (and even information about campus' air quality level).



## 2 PLAN OF SUSTAINABLE UNIVERSITY MOBILITY

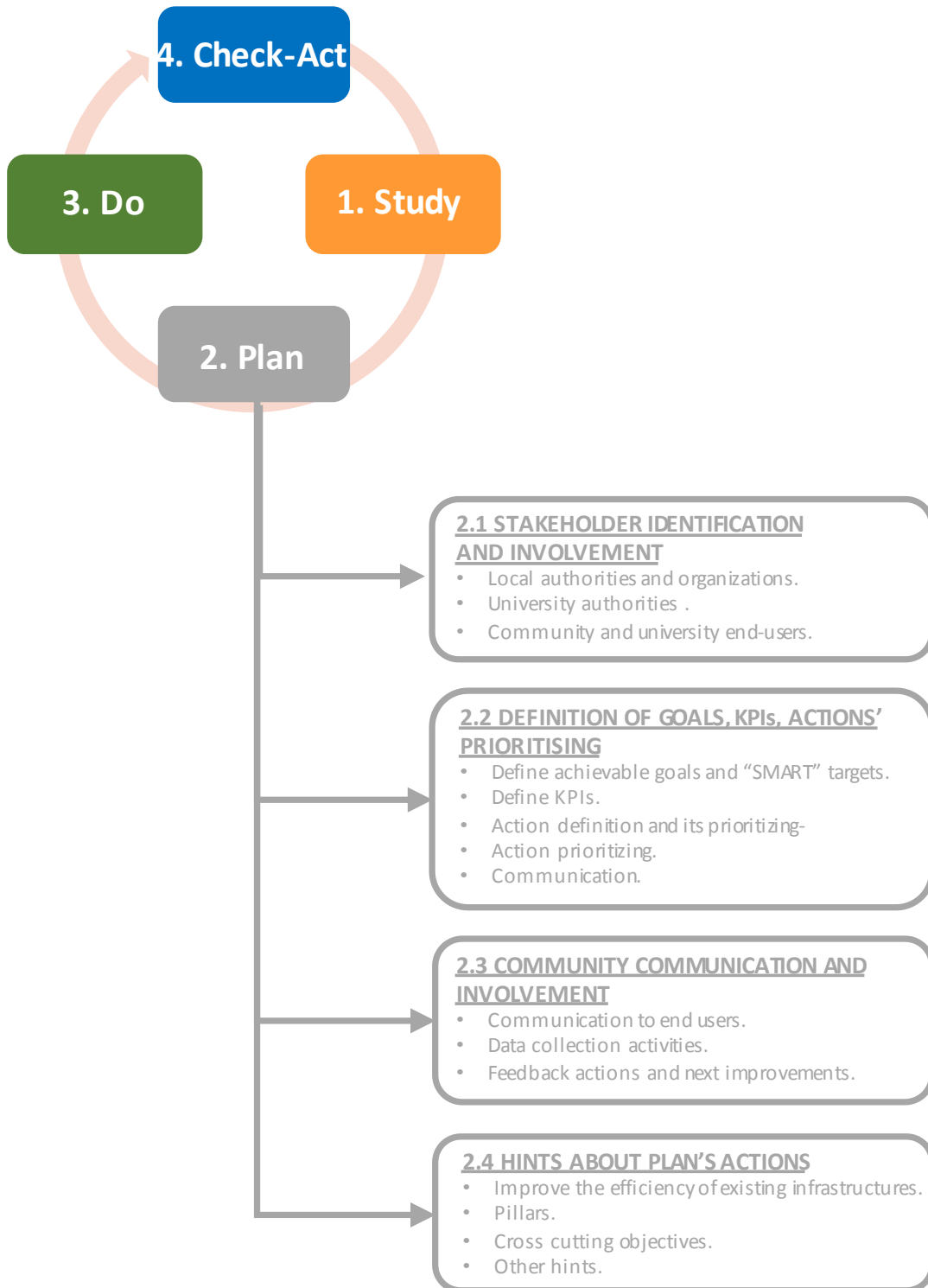
This section describes the stakeholder involvement. This phase of the SUMP is essential, making it the most challenging by far. It is likely that the presence of contrasting interests among different stakeholders will result in long discussions. However, this is what determines the projects acceptance and feasibility. The MPU should be aware that a perfect agreement among all stakeholders is very difficult to reach and fair compromises often lead to a balanced solution.

The first subsection *2.1 STAKEHOLDER IDENTIFICATION AND INVOLVEMENT* exhorts the MPU to select CAMP-sUMP plan's relevant stakeholders and gives instructions for how to start and manage their involvement and commitment. In the second subsection, *2.2 DEFINITION OF GOALS, KPIS, ACTION PRIORITISING*, the procedure to determine CAMP-sUMP plan's, goals, targets, KPIS, where their actions and prioritising are described.

The third subsection, *2.3 COMMUNITY COMMUNICATION AND INVOLVEMENT*, describes the communication activities required in order to inform the end users and achieve valuable feedback which would enable the MPU to optimise the plan before, during and after the execution.

Finally, the last subsection, *2.4 FEEDBACK ON PLAN'S ACTIONS*, presents some feedback concerning plan's actions (measures). It might be highlighted that these provided hints constitute only a suggestion which can be discussed among the involved stakeholders in order to achieve the measures' effective future feasibility and acceptance. Indeed, each context constitutes a particular and singular case, which could require specific measures related to contexts' needs, resources and stakeholders' availability to be adopted.

Moreover, it might be added that the involvement of the stakeholders is not only functional for this section in order to define the plan's goals, targets and actions, but it is also essential for achieving useful information for the plan's study phase. Hence, this section is strictly linked to section *1. STUDY SOCIETAL TRENDS AND SUBURBAN MOBILITY SCENARIO*.



## 2.1 STAKEHOLDERS IDENTIFICATION AND INVOLVEMENT

This section proposes specific guidelines to be followed to create a SUMP. In particular, the main aspect of this part is the Stakeholders' commitment and the community involvement in order to ensure a successful implementation of the SUMP. A stakeholder may be anyone (people, association, organisation etc.) who influences or could be influenced by the project.

Hence, in this phase, it is essential to define needs and wishes, and match together people with the same interests. The nature of stakeholders depends on where the University is situated.

Collaboration and cooperation with organizations' spokespeople or directly with relevant associations let the University to obtain a competitive advantage by limiting the risks related to the project.

The Stakeholders' involvement is important in order to ensure the participation of involved people or associations. This phase should follow these ten main features<sup>9</sup> in particular for end user involvement who are the main target on which the project is focusing:

1. Collaboration
  - A participative process positively involves institutions (public and privates) by promoting cooperation among the different parts in order to reach the public weal
2. Trust
  - A participative process promotes trust among participants, promoters and decision makers. From maintaining the initial trust it is important that the process results are applied
3. Communication
  - A participative approach promotes transparency and provides accessible and understandable information about the process, its objectives and results to all involved actors.
4. Inclusion
  - A participative process does not only involves decision makers but it is based on active listening and inclusion of all interested parts
5. Effectiveness
  - The end-users' opinions are important and these can improve final choices
6. Productive interaction
  - Participation should ensure dialog among parts in order to find shared solutions by saving time
7. Equality
  - Who plans, organises and manages a participation process or event has to maintain its neutrality and it valorises all presented opinions (even though these are in minority).
8. Harmony (or reconciliation)
  - A participating process must not be divisive, even though different opinion are present, the process must spend efforts in order to guarantee harmony among part by not accentuating the different point of views but rather evidencing the common intentions.
9. Accounting for results
  - A participative process provides results and motivates its choices with transparency by arguing the reason of proposal acceptance or refusal (this last aspect mainly concerns decision makers)
10. Judgement
  - Results might have to be valued by all participants with adequate methodologies. Results have to be accessible and understandable.

*Objective of the action*

The aim of this section is to select and activate the stakeholders in order to involve them into the project. Their participation ensures the whole project effectiveness.

In this section the Stakeholders (subdivided in three main bunches: local authorities and

<sup>9</sup> www.inu.it

	<p>organisations, university authorities, and finally University community and users) have to be identified. Moreover, their involvement have to start by assuming different forms depending on the Stakeholder's nature.</p> <p>Round table are more suitable for decision makers, forums are instead suitable for both Decision-makers and End-users. Finally, interviews, exhibitions, information activities through media (e.g. web) and alternative form of involvement are suitable only for End-users.</p> <p>It might be highlighted that the kick-off meetings are organised in order to collect stakeholders will, availability, opinions and habits (these two last aspects are more linked to End-users) and to inform about the intention to create a University's sustainable mobility plan.</p>
<p><i>Responsible stakeholder</i></p>	<ul style="list-style-type: none"> <li>- <i>University mobility manager</i> (and its<sup>10</sup> potential collaborators) able to organize contacts, meetings or local working groups</li> </ul>
<p><i>Other involved stakeholders</i></p>	<p>Stakeholders can also be split in two main categories: Decision-makers and End-users (Users).</p> <p>DECISION MAKERS (University services, city/transport authorities, etc.):</p> <ul style="list-style-type: none"> <li>- <i>Public authority</i>: Municipality, metropolitan city or other authority with planning territorial competence on mobility services or other connected to (e.g. environmental, etc...)</li> <li>- <i>Public Transport operators</i>: operating at local level (bus, underground or other metropolitan services, bike sharing, car-sharing) or regional/national level (railway companies)</li> <li>- <i>Mobility agency</i>: cooperating with Public Authorities and Transport operators to plan transport services</li> <li>- <i>Private Mobility provider</i> (taxi or similar operators, bicycle fleets, car sharing): as alternative mobility to private and public mobility</li> <li>- <i>Other stakeholders</i> (infrastructure/network provider, ICT provider/Craft Associations/Other Associations/police/...): giving specific competence</li> <li>- <i>Private Carpooling services</i>: Principally operated by private travellers to less impact on congestion and environment</li> <li>- <i>Research and Academia</i>: to participate in the planning phase with algorithms or results of their research. Can be very useful as supporting entity to support surveys, analysis or other</li> <li>- <i>Financer</i>: as private financer of innovations, e.g. to set up mobility start ups</li> <li>- <i>Utility and infrastructure providers</i> (e.g. EVs, ...)</li> </ul> <p>USERS (students, employees, visitors, etc.)</p> <ul style="list-style-type: none"> <li>- <i>Students</i>: main users of the transport services. Main target of the change of behaviour paradigm of sustainable mobility. They characterize for being flexible, smart and lack of financial means</li> <li>- <i>Employees</i>: as for students, but less flexible and with more financial means.</li> <li>- <i>Occasional workers</i>: occasional workers for maintenance or for meeting with Campus workers</li> <li>- <i>Non-University workers</i> (e.g. in case of start-ups, spinoff or other companies inside the campus): all other activities embedded in the Campus</li> <li>- <i>Citizens</i> that where necessary become part of the initiative</li> </ul>
<p><i>Way of proceeding</i></p>	<p>The relevant Stakeholders are selected, by the MPU, informed and some information about their points of view are collected. It is important to start their involvement in order to assure a complete participation process: indeed here, the MPU and Stakeholders' categories to interview are identified. After this phase 1.2, 1.3, 1.4 and 1.5 of the STUDY SOCIETAL TRENDS AND URBAN MOBILITY SCENARIOS can start.</p>

<sup>10</sup> The use of neuter is because the MPU can be also a legal entity as a pool of experts.

	<p>The information phase can be lead in different modalities: face-to-faces or meetings (if few people are involved), or plenary sessions (in case of many attendnts), however exist other alternative ways for involve and/or inform a large public such as web, workshops and exhibitions. In this phase local working group with representatives of the panel of experts and practitioners for mobility are opened and chaired by the MPU.</p> <p>University or specifically the Mobility Manager sends invitation to relevant contacts and provides process to inform and/or interview the wide public (internet, papers, media, etc.).</p>
<p><i>Target(s)</i></p>	<ul style="list-style-type: none"> <li>- Select relevant Stakeholders in order to inform and inteview them (through the first phase).</li> <li>- Activate a participative process in order to inform achieve first impressions and give process transparency.</li> </ul>
<p><i>Duration of the activity</i></p>	<p>Depending on stakeholders' availability, however this phase should could take about between 1-3 months.</p>
<p><i>Key elements of the activity</i></p>	<p>This activity 2.1 is structured in two main phases (First and Second phase), each described in details below. Relevant Features: for the stakeholders' involvement and its further commitment, it is essential to define needs and wishes, and match together people, association and institutions with shared interest. Therefore, first of all stakeholders have to be defined and informed, and then meetings and events have to be set in order to achieve useful information and share ideas. Stakeholders' type depends on where the university is situated. Moreover, it is important to create collaboration and cooperation between the University and public and private organisations. This aspect lets the University to obtain a competitive advantage in order to limit the risks related to the implementation of the plan.</p> <p><b>First phase</b></p> <p>In this phase, relevant stakeholders are selected. Stakeholders' type depends on where the university is situated.</p> <p><b>Local authorities and organizations.</b> Each public organization is a potential stakeholder of the SUMP. Thus, this paragraph has to provide clear guidance to the MPU, be understandable and always revised for each pf these sub-categories. In urban context, many stakeholders are present and their interests are connecting each other.</p> <ul style="list-style-type: none"> <li>- <b>Public authority:</b> MPUs have to consider the following suggestions <ul style="list-style-type: none"> <li>o Define stakeholders of public authority starting from the local zone (such as city, district, region) to the national administration;</li> <li>o Understand how much local administrations are available to take decisions to change the reality;</li> <li>o Consider problems related to legislations or time. It is important to understand which aspects are possible to define, delete and maintain;</li> <li>o MPUs have to define agreements concerning the economic commitment, guaranteed by local administration as well as possible collaborations and co-operations with European institutions.</li> </ul> </li> <li>- <b>Public Transport operators in Urban Context:</b> Public transport authorities are among the most relevant stakeholders to be involved during the planning phase of a SUMP. For this reason, the MPUs have to follow these guidelines: <ul style="list-style-type: none"> <li>o Identify every public transport authority of the area (bus and train, other if available);</li> <li>o Ensure the public transport authorities commitment to decision making and SUMP endorsement including of the economic dimension;</li> </ul> </li> </ul>

- Share ideas, goals and possible changes with authorities;
- Define joint mobility's requirements to be quickly implemented;

- **Private Mobility (service) provider:** Not every supplier of transport service has to be necessarily public. Thus, the MPUs which have to efficiently and effectively plan a SUMP have to:
  - Identify all the private suppliers of transport services who can support the university's SUMP (bike sharing, taxi – not exhaustive list);
  - Identify all the offered transport services;
  - Inform separately or together about the project and preliminary collect contacts to fix the following activity as below
  - Understand the type and quantity of transport suppliers willing to be involved in the SUMP's action plan, by understanding their potential level of involvement, support and future investments' plan.

**University authorities** Analysis of the university authorities potentially involved in the project. Assessment of the possible interest and commitment to the project by the different university groups and authorities.

- **Mobility manager** The key role of university concerning mobility is the mobility manager. Thus, it is necessary to:
  - Identify who is the mobility manager;
  - Assess the decisional power he has;
  - Clarify the willingness of the mobility manager to change the reality;
  - Discuss with him about the activities he already planned;
  - Compare the goals of the mobility manager with the one declared in the project definition;
  - Assess with him the organizational and financial economic plans already.
- **Student organizations (representing the Students)** Proper organizations directly represent the students, their habits, needs and problems. Thus, the MPU should:
  - Identify student organizations which represent as much as possible all the student categories;
  - Assess the decisional power they have;
  - Compare the goals of the student organizations with the one declared in the project definition.
- **University rector and department directors (part of the Employees category)** University rector and department directors represent relevant stakeholder to be considered. Indeed, they manage the organization of each course and they have the power and resources to contribute to the mobility service improvement.
  - Be aware of problems and requirements deriving from the course organization;
  - Discuss with them about the activities they already planned;
  - Compare the goals of the University rector and department directors with the one declared in the project definition;

**Community and university end-users** Every member of the local community, university student and end-users of the offered mobility service have the opportunity to contribute to the plan realisation. This contribution could be economic or social and sometime not direct, e.g. questionnaire. Some of the most representative community end-users are described in the following.

- **Local citizens:** Universities located in urban areas are distinguished by citizens who enjoy and utilize the offered mobility services along with the students and other university



	<p>members. Thus, MPUs have necessarily to:</p> <ul style="list-style-type: none"> <li>○ Meet public authorities or transport operators to identify the local citizen categories who are more willing and prone to use the offered mobility services;</li> <li>○ Set up a campaign to analyse the followings: the commitment to these citizens to the project and its promotion among peers; Analyse the problems and needs of citizens concerning the actual offer of public transport, as public lines or timetable; Understand relevant problems of citizen linked to mobility services actually offered.</li> </ul> <p>- <b>Merchants:</b> The newly offered mobility services significantly affect the economic activities of merchant located in the city centre. For universities located in the city centre, many merchants could collaborate with the project and benefit from it. Thus, it is highly recommended for MPUs to:</p> <ul style="list-style-type: none"> <li>○ Identify the merchant categories that are willing to contribute to the project;</li> <li>○ Identify how the merchants could benefit from the project and categorize them accordingly;</li> <li>○ Assess potential actions to involve each merchant category leveraging of their benefits from the project;</li> <li>○ Analyse the potential activities that the merchant could implement to assist the project.</li> </ul> <p>- <b>Students</b> The people enrolled to the university are among the ones mostly affected by the development of a SUMP. Their needs and potential contribution to the project have to be carefully assessed to maximize the success of the initiatives to be implemented. For all these reasons the MPU has to:</p> <ul style="list-style-type: none"> <li>○ Identify the student categories the project wants to target;</li> <li>○ Identify the student needs and problems concerning the mobility services.</li> <li>○ Assess the most relevant actions to maximize the student adoption of the proposed mobility solutions;</li> <li>○ Identify and involve the most relevant and prestigious student organizations which can ease the project promotion among students.</li> <li>○ Analyse possible strategies to involve the students in the promotion and further development of the planned SUMP solutions.</li> </ul> <p>- <b>Administrative and technical staff (Employees)</b> University end-users also include other categories who can benefit from and collaborate to the project. Between these people administrative and technical staff represent a relevant source of knowledge and expertise for a project contribute:</p> <ul style="list-style-type: none"> <li>○ Identify the most relevant and urgent problems and needs of the administrative and technical staff concerning mobility;</li> <li>○ Analyse how much of their personal time and which kind of knowledge they offer.</li> <li>○ Analyse possible strategies to involve administrative and technical staff in the promotion and further development of the planned SUMP solutions.</li> </ul> <p>- <b>Researchers and professors (Employees)</b> Researches and professors are both end-users of the solutions proposed by a SUMP and potential developer of further initiatives and actions to improve the mobility for universities. MPUs should:</p> <ul style="list-style-type: none"> <li>○ Identify researches and professors willing to share their knowledge and competences to improve and develop mobility services solutions;</li> <li>○ Analyse the differences and similarities in the demand for mobility of professors and the other end users within the university population;</li> <li>○ Analysing needs and necessities which can be satisfied by the same solutions developed for students;</li> </ul>
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- Assess specific initiatives to adapt the SUMP to the peculiar needs of professors and researchers.

Other type of stakeholders can be proposed in each local action plan. We still support the full list of them listed in above *Other stakeholder involved section*.

## Second phase

Once stakeholders are selected, this phase concretely organises interviews, meetings and events. Further information coming out from these organised events will be collected. Arose suggestion from meetings and events can give added value to the project. Afterwards, these information and hints will be useful for the following section 2.2 in order to define goals. It should be important to underline that participation can give more longevity and effectiveness to the plan because of the increased presence of hints and transparency. The MPU will decide time and modalities how to organise meeting and events.

For helping the reader (and the MPU) herein his reported a schematic schedule which describes how stakeholders should be involved. Each bullet of the schedule does necessarily represent a specific meeting but rather an involvement phase which can requires more than one meeting/event; however, could happen even an opposite situation, more points can be grouped in a same meeting/event if it is required (for instance some parts of bullet 1 and 2 can be arranged together). A certain degree of freedom is allowed in order to adapt the CAMP-sUMP to the specific context and local resources:

1. **Kick-off phase:** kick-off meetings in order to present and inform about the wish to prepare a Campus mobility plan, which are the motivations, the leading themes and the ultimate aims.
  - a. MPU organises meetings/calls with public Authorities;
  - b. MPU organises meetings/calls with public transport provider;
  - c. MPU organises meeting/events with end users: events, workshop, websites etc. in order to catch the attention of end users and sensitise the public.
2. **Data gathering<sup>11</sup>:** in this phase the MPU involves stakeholders in order to get data useful for achieve a realistic context view (this phase is strictly linked with **1. STUDY SOCIETAL TRENDS AND SUBURBAN MOBILITY SCENARIO**). This phase is very delicate and important at the same time since data gathered will influence the MPU vision and the future Campus mobility planning. Hence it is important that achieved data are realistic, updated and that the analysed samples are representative.
  - a. MPU organises meetings (or establishes agreements and obtain permissions) with public Authorities in order to obtain useful data about Campus context (Air quality, local geographical are dynamics, demographic trends, etc.)
    - i. At this moment the MPU can prepare questionnaires (potentially even with the help of public Authorities and – if it is suitable – taking in consideration some aspect came out from point 1.a of this list) to submit to end-users. The MPU can commit the public Authorities (or request permissions) to collect information from questionnaires.
  - b. MPU organises meetings/calls with public transport providers in order to achieve information about local transport services.
    - i. At this moment the MPU can prepare questionnaires (potentially even with the help of public transport provider and – if it is suitable – taking in consideration some aspect came out from point 1.a of this list) to submit to end-users. The MPU can commit the public Authorities (or request permissions) to collect information from questionnaires.
  - c. MPU prepare and submit questionnaires to University's end users and collect data

<sup>11</sup> Data gathering can be arranged with the kick-off phase if it is suitable.



	<p>from these questionnaires.</p> <ol style="list-style-type: none"> <li>3. <u>Definition of goals and targets</u>: once that the MPU has studied and analysed the context and has achieved useful information about, CAMP-sUMP plan goals and targets need to be defined (this point is strictly linked to <b>2. PLAN OF SUSTAINABLE UNIVERSITY MOBILITY</b>).             <ol style="list-style-type: none"> <li>a. MPU organises meetings/forums with public Authorities and public transport provider in order to discuss about the plan's target and goals though considering data achieved form point 2. of this list;</li> <li>b. MPU organises facultative meeting/events with end users: events, workshop, websites etc. in order to inform and achieve further useful hints.</li> </ol> </li> <li>4. <u>End users' judgement</u>: once decisions are taken, the public (end-users) have to be informed about. Events, exhibitions and websites could be the right means of communication. At this place, end users can express their opinions about and present constructive observations. Then the MPU will decide if apply small variation and adjustment in accordance with considerations and opinions provided by end users. The MPU will inform the public (and the decision makers) by media (web) or further meeting and/or events about refuse or acceptance of end users' observations and opinions.</li> </ol> <p><b>NOTE:</b> Universities campuses are classified as service provider hubs (since these are centre able to provide relevant services for the surrounding population) and, due to their elevate attractiveness, they need for their management the involvement of superordinate territorial institution and/or the activation of consultation procedures amongst interested surrounding local Authorities. When the University Campus is located inside an urban context, ruled by a big city's municipality, the consultation procedures among different territorial Authorities could be facilitated because of the presence of City's more powered Authorities.</p>
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## 2.2 DEFINITION OF GOALS, KPIs, ACTIONS, PRIORITIES

<p>This section constitutes a guide to the formulation of the plan's goals, definition of the KPIs and the actions necessary to reach the respective goals and priorities for intervention. It comes with the support of the stakeholders involved in the previous phase.</p>	
<p><i>Objective of the action</i></p>	<p>Whilst the MPU and its collaborators analysed the context and achieved stakeholder support, the plan should start to take shape. Firstly, goals and targets have to be strategically selected in order to mainstream the plan's process into specific planning choices. Once goals are defined, corresponding KPIs are selected in order to monitor and evaluate the plan's effectiveness. Later, actions are defined in order to give concrete measures to the plan. This phase should involve key stakeholders. Once actions are defined, these have to be prioritised by using a matrix approach (see below in this table).</p>
<p><i>Responsible stakeholder</i></p>	<ul style="list-style-type: none"> <li>- MUP and its collaborators to decide goals, actions and target, to organize contacts, meetings or local working groups</li> </ul>
<p><i>Other involved stakeholders</i></p>	<p>DECISION MAKERS (University services, city/transport authorities, etc.):</p> <ul style="list-style-type: none"> <li>- <i>Public authority</i>: Municipality, metropolitan city or other authority with planning territorial competence on mobility services or other connected to (e.g. environmental, etc...)</li> <li>- <i>Public Transport operators</i>: operating at local level (bus, underground or other metropolitan services, bike sharing, car-sharing) or regional/national level (railway companies)</li> <li>- <i>Mobility agency</i>: cooperating with Public Authorities and Transport operators to plan transport services</li> <li>- <i>Private Mobility provider</i> (taxi or similar operators, bicycle fleets, car sharing): as alternative mobility to private and public mobility</li> <li>- <i>Other stakeholders</i> (infrastructure/network provider, ICT provider/Craft Associations/Other Associations/police/...): giving specific competence</li> <li>- <i>Private Carpooling services</i>: Principally operated by private travellers to less impact on congestion and environment</li> <li>- <i>Research and Academia</i>: to participate in the planning phase with algorithms or results of their research. Can be very useful as supporting entity to support surveys, analysis or other</li> <li>- <i>Financer</i>: as private financer of innovations, e.g. to set up mobility start ups</li> <li>- <i>Utility and infrastructure providers</i> (e.g. EVs, ...)</li> </ul> <p>USERS (students, employees, visitors, etc.)</p> <ul style="list-style-type: none"> <li>- <i>Students</i>: main users of the transport services. Main target of the change of behaviour paradigm of sustainable mobility. They characterize for being flexible, smart and lack of financial means</li> <li>- <i>Employees</i>: as for students, but less flexible and with more financial means.</li> <li>- <i>Non-University workers</i> (e.g. in case of start-ups, spinoff or other companies inside the campus): all other activities embedded in the Campus</li> <li>- <i>Citizens</i> that where necessary become part of the initiative</li> </ul>
<p><i>Way of proceeding</i></p>	<ul style="list-style-type: none"> <li>- <b>(relevant to 1<sup>st</sup> Step) Goals and targets</b>: the MPU with its collaborators defines goals of the University Campus' SUMP project. Goals are very important since, once these are defined, they will mainstream the whole plan. However, in this preliminary phase goals should be maintained at strategical level. Goal formulation should follow rules and regulation identified earlier in the study (implemented in section 2.1). Once goals are selected, targets have to be defined. Targets specify a quantitative measures to evaluate the</li> </ul>

	<p>goals (e.g. 10% CO<sub>2</sub> reduction). In accordance to the ELTIS Guidelines, targets have to be SMART (Specific, measurable, Achievable, Relevant, Time-bound).<sup>12</sup></p> <ul style="list-style-type: none"> <li>- <b>(relevant to 2<sup>nd</sup> Step) Definition of KPIs:</b> The list of KPIs have to be seen as a pool of indicators providing the MPU with the possibility to monitor the project and to give a final evaluation. The MPU is free to increase the list of KPIs. <sup>13</sup></li> <li>- <b>(relevant to 3<sup>rd</sup> Step) Definition of actions and priorities:</b> This step concerns the definition of actions that have to be defined in order to ensure the plan’s goal achievement. This phase should ensure a strong stakeholder participation since is one of the plan’s cornerstone: meetings, forums, workshops should be useful in order to achieve Stakeholder engagement. Once those actions have been identified, these have to be prioritised. The prioritising process uses a matrix whose columns indicate the decreasing level of importance and the rows indicate the growing level of urgency.</li> </ul> <p>NOTE: In order to guide the reader and the MPU into the identification of actions, these are classified through pillars and cross cutting issues. Pillars and cross cutting issues constitute the thematic areas of the CAMP-sUmp project.</p>
<p><i>Target(s)</i></p>	<ul style="list-style-type: none"> <li>- Selection of goals and targets.</li> <li>- Selection of KPIs: KPIs can be divided into: <ul style="list-style-type: none"> <li>o quantitative, in order to monitor quantitative measurable performances;</li> <li>o qualitative, in order to monitor non- quantitative measurable performances;</li> </ul> </li> </ul> <p>Moreover, KPIs can be grouped by following a different criterion:</p> <ul style="list-style-type: none"> <li>o KPIs describing the plan’s context</li> <li>o KPIs describing the plan’s implementation</li> </ul> <p>The MPU is requested to monitor the plan:</p> <ul style="list-style-type: none"> <li>o during its implementation in order to evaluate the actions’ effectiveness</li> <li>o In the final phase, in order to evaluate the whole plan’s effectiveness</li> </ul> <ul style="list-style-type: none"> <li>- Selection of plan’s actions and its prioritising: MPU with its collaborators, in accordance with preselected goals, identifies the plan’s actions after a consultation phase with stakeholders. Once actions have been identified, these are prioritised.</li> </ul>
<p><i>Duration of the activity</i></p>	<p>Depending on stakeholder availability. The duration is assessed to about 3 months</p>
<p><i>Key elements of the activity</i></p>	<ul style="list-style-type: none"> <li>- <b>Define achievable goals and “SMART” targets:</b> this paragraph focuses on the project goals’ definition and targets selections. Goals are lying in the plan’s strategical level (e.g. congestion reduction due to private mobility), once goals are defined, these have to be targeted (private cars’ matriculation reduction). Hence, targets should define “numerically” the objective to reach. The definition of deadlines helps to monitor project effectiveness and possible deviations can be constantly monitored.</li> </ul> <p>A further characteristic of goals and targets is that these can be modifiable during the process running. However, their update during the project execution have to be communicated to project members.</p> <ul style="list-style-type: none"> <li>o <b>Goals:</b> goals can be divided into categories (short, medium and long terms) as proposed in the following subsections. Goals are important since they constitute the plan’s shape and direction, hence their nature should be strictly strategical. They do not have to define specific measures but rather indicate a direction or a particular aspect (e.g. air quality improvement)</li> </ul>

<sup>12</sup> ELTIS Guidelines *Developing and implementing a sustainable urban mobility plan*, 2013

<sup>13</sup> Source: SUMPORT Sustainable Urban Mobility in MED PORT cities

that have to be concretely followed or threatened through plan's actions (e.g. introduction of electric busses by public transport provider). The data gathered during the plan's *Study* phase are essentials in order to find out threats and weakness, which have to be solved and mitigated through the identification of goals.

Meetings, forums, media (web), and events could be useful in order to find out further hints and needs from End-Users.

Furthermore a first involvement of Decision-makers could be useful in order to achieve their availability and resources.

- **Short-term:** The definition of short-term goals is a complex process, which should consider the urgency and time-schedule of each specific objective as its most relevant features. The MUPs have to define a bunch of short-term goals for a SUMP by assessing for each goal the following features:

- ⌚ Time-bounding:

- duration of the required activities related to each specific goal;

- Importance and Urgency;

- ⌚ Involved skills and resources;

- ⌚ Relevancy:

- Links with other targets

- Producible changes to the society;

- Impact on local economy.

- **Medium and long term:** Medium and long terms goals have similar features to short-term ones but are distinguished by a longer time horizon. For this reason, planners have to consider different aspects in order to define them more properly.

- ⌚ Socio-economic trends and challenges;

- ⌚ Environmental framework;

- ⌚ Goal relevance in a wider framework, e.g. national, European, etc.;

- ⌚ Kind and skills of stakeholders involved for goal achievements;

- ⌚ Service level and end-user satisfaction;

- ⌚ Breakeven period and investment return.

- **Targets:** In accordance to ELTIS guidelines targets have to be SMART:

- *Specific* – precisely described by using qualitative and/or quantitative terms in order to be understandable by all stakeholders.

- *Measurable* – the context is known since it has been measured. Resources are also available in order to measure the changes (quantitative and qualitative) that occur.

- *Achievable* – based on the financial, operational and technical competencies in place and on commitments/agreements that have been made.

- *Relevant* – targets should concern and lead urban mobility and support and/or be aligned with other targets

- *Time-bound* – key dates for the target achievement are clearly defined<sup>14</sup>

- **Define KPIs:** KPIs (Key Performance Indicators) are indicators, which measure the

<sup>14</sup> ELTIS Guidelines *Developing and implementing a sustainable urban mobility plan*, 2013

performance of a preselected goal. They are distinguished in quantitative and qualitative KPIs as proposed in the following. The main features which should distinguish KPIs are:

- Their definition before the project begin;
- Linkage to the project goals and aims;
- Measurable on short and long term;
- Measurable and comparable;
- Quantitative or Qualitative.
  
- **Quantitative:** for quantitative KPIs it is important to define thresholds and values which simplify their assessment and comparison. Quantitative KPIs should be:
  - Measurable;
  - Univocal;
  - Available to the public;
  - Traceable;
  - Understandable;
  - Representative.
  
- **Qualitative:** qualitative KPIs are of strong help for monitoring and comparison of non-quantitatively measurable performance. Thus, they should be:
  - Linked to project goals;
  - Assess the project progress;
  - Available to the public;
  - Represent stakeholder needs;
  - Understandable and univocal (for this reason is suggested the use of a Likert scale from 1 to 5)

- **Action definition and its prioritizing:** in this phase, actions (or measures) have to be defined by the MPU and its collaborators in order to ensure the plan's goal achievement.

This phase should ensure a strong stakeholder participation since is one of the plan's cornerstone: meetings, forums, workshops should be useful in order to achieve hints needs and availability. It should be important that Stakeholders could be divided (as reported in this table) in Decision-makers and End-users. The latter's involvement is mostly advisory but they are crucial in the definition of local needs. The former are instead important for their skills, competences and resources and they closer take part during decisional moments. Due to their different nature, Stakeholder's involvement assumes different form.

End-user involvement is led by MPU in order to:

- find out unsatisfied needs which could potentially become demand for services;
- analyse and select demand components based on specific drivers;
- help the MPU to prioritise and mainstream the demand towards action to implement

If all these three aspects are followed during End-users involvement, the MPU can foresee the future demand trend and supply the demand of mobility services.

When needs are collected, the MPU convenes the local Decision-maker in order to find out suitable actions able to satisfy the collected end-users needs in accordance to the local context, to the local and national regulatory framework and to potential international guidelines (in particular those concerning environmental subject matters) whose data and information gathered during phase 1. *Study*. In this phase stakeholder can provide their skills, resources and competences, even though the decision always compete to the MPU. For each action definition, respective competent Stakeholders (Decision-makers) have to be

involved.

When decisions are selected the MPU has to communicate to the public (End-users) its decision through media (web, forums, meetings, events, etc.) in order to collect their opinion about. If, in this place, there are some disagreements, the public is allowed to make observations. Then, if MPU decides to refuse them, it has to communicate by motivating its decision.

The effective and efficient use of budget and resources give the MPUs the opportunity to inform the end users of the existence of the SUMP project for their university and keep them updated in case of changes. Some suggestions for the MPUs are the following:

- Define active polices to influence the demand of university mobility service;
- Increase the project visibility with events to persuade people to change their mobility habits;
- Collaborate with different public and private transportation companies to improve your and their mobility services.

Actions are concrete measures constituting the solution (new tram/bus lane creation, carpooling policies implementation, use of IT – Intelligent Transport – to support public transport, etc.) provided by the plan in order to reach the preselected goals and their targets. It should be important underline that actions must not be seen as singular interventions, but they have to be planned in order to connect their effects and create synergies. For instance, the carbon dioxide reduction will be higher if the public transport will be enhanced by also promoting a substitution of old busses with new electrical one and by also supporting the new transport service with IT solutions).

Actions' characteristics are reported below:

- *Relevant*: in order to have a positive and significant impact on the context;
- *Realistic and achievable*: in order to be well dimensioned with context resource and needs since the project have to be actually realised;

Pillars: In order to help the MPU in its decisional process, the plan's measures can be grouped in four main pillars and cross cutting focuses. Indeed, even though the MPU have to be suitable for the context, respect the active regulatory framework and international guidelines, consider the End-users' needs, take advantage of Decision-makers' competences and resources, the plan should be mainstreamed by pillars' contents and cross-cutting focuses in order to guarantee the whole plan's sustainability.

Herein the **four main pillars** are reported:

- pedestrian commute,
- use of the bicycle and clean vehicles,
- public transport,
- sustainable motorised private transport (carpooling, low-emitting vehicles, etc...),

Cross cutting objectives related to all the aforementioned pillars.

- ICT;
- Sustainability;
- Safety.

Each pillar is hereinafter presented:

- **Pedestrian commute**: one of the most underrated actions to ensure sustainable mobility for universities is foster the walking to reach the Campus



and move inside it. Despite the common believe, pedestrian community could represent a valuable alternative to other transport modes

- **Use of the bicycle and clean vehicles** The average daily distance travelled by a European student to reach those Campuses inside the city centre is about 5 km. A similar distance is experienced for the travelling of students inside Campus area, even far from the city centre. The fastest way to cover this distance is by bicycle. MPUs should consider bicycle option as a competitive transport mode analysing the following aspects (average distance between student housing and Campus; climatic condition of the geographical area involved; integration of inter and multimodal transport with bicycle; perception of cycling as a leisure and healthy activity).

- **Public transport** A traditional pillar of sustainable mobility is represented by public transport. The evolution of the management systems of these fleet of vehicles typically increase its punctuality and average speed. These features, along with its low prices make public transport a competitive solution for the mobility problem of the university community. The MPUs interested in the implementation of such a solution should consider:

- Punctuality and average speed of the public transport in the geographical area considered;
- Time-schedule of public transportation offer;
- Reputation related to public transport usage;
- Possibility to co-manage and co-plan the public transport with local transport authorities as well as condition its decisions.

- **Sustainable motorised private transport:** recent advances in ICT enable to limit the emissions produced by this transport mode. Thus, a MPU should consider the following aspects:

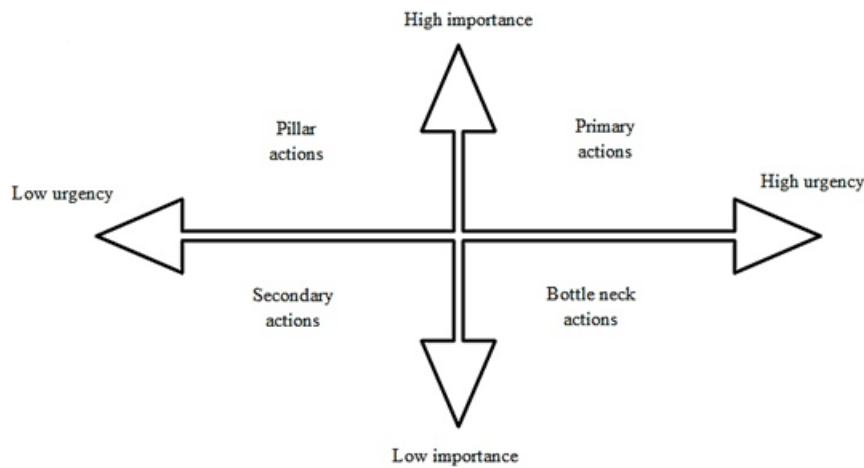
- Adoption rate and satisfaction rate of ICT tools for motorized private transport;
- Car sharing and carpooling solutions;
- Reputation related to the private transport usage;
- Financial and economic aspect of motorized transport;

- **Cross cutting objectives:** the aforementioned pillars of the sustainable mobility for European universities requires cross cutting objectives to ensure their harmonization and the achievement of shared goals. Two are the main drivers that have to be followed by a MPUs:

- **ICT:** Considering the enormous potential of ICT technologies in the 21<sup>st</sup> century, proper SUMP have necessarily to leverage the big data generated by the ubiquitous sensor represented by the smartphones always connected through internet. Innovative Artificial Intelligence methods and algorithm adequately manage and process these volume of data to provide meaningful information to the MPUs which acts as a decision maker of the university future mobility.
- **Sustainability:** The common and final goal of all the aforementioned pillars is the sustainability of the developed solutions to satisfy the mobility needs of the academic community. Thus, MPUs should define indices and metrics to measure and assess the overall sustainability of a developed and implemented mobility solution, considering its technical, economic, social and environmental sustainability.

- Safety:** the action plan should select actions that should increase the overall mobility safety. This aspect should have the same importance of Sustainability's theme (and in some way is a part of it). Decrease the accidents rate is very important since it can decrease costs given by traffic externalities.

**-Action prioritising:** when all actions have been defined, the MPU with its collaborators defines actions' priorities in order to adapt plan's interventions to context's resources, urgencies and needs. Project actions could be prioritised by classifying them in four categories according to the following matrix:



The matrix suggests an original classification in four different classes of actions grouped according to urgency and importance:

- **Primary actions** include every activity to be implemented as soon as possible because its importance is vital for the project continuity;
  - **Pillar actions** are the activities whose importance is essential for the project execution but it could be implemented in the near future;
  - **Bottleneck actions** contains all the activities which have to be done before or after a particular action but that are not essential;
  - **Secondary actions** classify the activities of limited important implementable even on the long term.
- Communication:** communication is fundamental in order to coordinate all efforts, inform collect opinions and needs. Communication assumes different form related to the different Stakeholders' nature.
  - **Communications within the project partners:** Communication among Decision-makers (project partners) takes on characteristics of an internal communication mainly led with private e-mails, meetings with specialised people, conventions and conferences. Transparency have to be always guaranteed (further explanation about are reported at point 3.1 *Plan's implementation*). Decision-makers' availability and resources (financial and skills) are important for action's implementation in order to supply End-users needs. Furthermore, it might be underlined that economic and especially environmental sustainability constitute CAMP-sUmp's main aim and hence the MPU have to make efforts in order that sustainable matters are actually present within the actions established by the MPU itself and competent project partners.



	<ul style="list-style-type: none"> <li>○ <b>Communication among End-users:</b> first of all, during the first End-users' involvement, they have to be informed from the early beginning about the existence of a University's sustainable mobility plan with its essence and initial intentions and at this place their needs and characteristics have to be collected from events, meeting, forums, interviews (also on-line). When actions are set by the MPU in accordance with Decision-makers' availability and resources, they have to be informed through other meetings, forums, events, internet (web or apps), etc.... End-users can express their opinion and constructive observations to the MPU that in case of refuse have to communicate his motivations (through media, web, meetings, etc.); however, interesting non-before-considered hints could emerge. Finally End-users acceptance, adoption and satisfaction is monitored also during the whole plan implementation in order to understand if some actions have to be strengthened, improved, or changed. Since the communication with End-users is a relevant aspect for planning, a dedicated section <i>2.3 Community communication and involvement</i> is herein inserted and some references are present also in <i>3.1 Plan's implementation</i>.</li> </ul> <p>NOTE: KPIs can be conceptually divided also by:</p> <ul style="list-style-type: none"> <li>⌚ Indicator describing the carrying out of the plan. In particular with reference to those that are referring plan's action.</li> </ul>
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Some examples of KPIs' concerning **actions** (with related indicator) are herein reproduced in Table 1.

Table 1. Examples of actions and indicators (KPIs) and units of measure

Strategy	Action	Indicator	Unit of measure
<b>integration among different transport systems</b>	transport network redesigning (by following a hierarchical and synergistic form); road (and public space) recovering with new infrastructural interventions by giving more usability for pedestrian, cyclist, LPT users, and low impacting private mobility	new transport network and lanes classification (reserved lanes)	added km of reserved lanes
	integrated action to reinforce the accessibility of main transport nodes and their integration in a multimodal transport system, also foreseeing the planning of new transport nodes	number of interchange nodes, interchange parking capacity (for cars, bike, motorcycle); improvement of public transport network connected to interchange parking	number of nodes, number of parking spaces for cars, motorcycle, bicycles Km of roads dedicated to LPT for connecting interchange nodes or parking
	make possible bike transport through LPT vehicles	LPT vehicles adaptation LPT integration of tariffs	number of modified vehicles or % on the total km served with integrated tariffs % on the total
	ITS and application (e.g. call service, ...) utilisation in order to integrate different transport systems (data sharing, innovative service providing)	networks served by ITS	km
<b>collective mobility development by improving service</b>	dedicated lanes (which can improve the LPT speed, safety and the whole quality service)	dedicated lanes extension	km or % of improved dedicated lanes

<b>quality and vehicle speed</b>	number of passengers counting system through installation of devices (also by mobile phone employment)	counting system equipment	% of vehicle with counting system device
	use of different communication channels (displays, social, SMS, smartphone applications...)	real time information about LPT service (parking place availability, presence of other transport service, travel time, ...)	number of installed displays
<b>foster cycle and pedestrian mobility</b>	foster bike sharing services for end-users	stations and shared bikes	number of stations number of bike to share
	bicycle lanes extension (by linking the main places of interest)	lanes extension, lane creation	number of new lanes or km of new lanes
	marketing promotion and awareness campaign	campaign for end users	% of involved population
	dedicated maintenance services for bike along the paths	bicycle stations, bike maintenance areas	number
<b>introduction of shared motorised mobility systems (by fostering low emitting vehicle)</b>	use of ITS system in order to manage the shared mobility system (and facilitation for parking)	carpooling and shared vehicle polices	activation YES/NOT
	recharging places (for electrical vehicles)	recharging points	number recharging points
<b>foster the safety culture in order to decrease accidents</b>	increase the safety of pedestrians, cyclists, LPT users	signals, raised sidewalks, road signage, ...	improved km

Some hints concerning **goals** (with related indicator) are herein reported:

impact area	main objective	indicators	unit of measure
mobility system efficiency and effectiveness	LPT improvement	users	passengers/year (each 1000 inhabitants)
	multimodality	% trips by car	dimensionless
		% trips by LPT	dimensionless
		% trips by motorcycle	dimensionless
		% trips by bicycle	dimensionless
		% pedestrian trips	dimensionless
		% multimodal trips	dimensionless
	people accessibility improvement	sum of: population percentage dwelling not more than 400m from a bus/tram stop and a bike/car sharing station and population percentage dwelling more than 800m from train station	percentage
integration improvement between the mobility system and urban planning tools	number of urban planning tools dealing with LPT	number	
air quality improvement	traffic NOx emission per person	kg Nox/inhabitant/year	
	traffic PM10 emission per person	kg PM10/inhabitant/year	
	traffic PM2,5 emission per person	kg PM2,5/inhabitant/year	
	days when air pollutant concentrations overcome European limits	number of days when air pollutant concentrations overcome European limits	

		traffic CO2 emission per person	tCO2 or number of days when air pollutant concentrations overcomes European limits
		CO concentration	kg or number of days when air pollutant concentrations overcomes European limits
		SOx concentration	kg or number of days when air pollutant concentrations overcomes European limits
		VOC (Volatile Organic Compounds)	kg or number of days when air pollutant concentrations overcomes European limits
		NH3	kg or number of days when air pollutant concentrations overcomes European limits
		CH4 concentration	kg or number of days when air pollutant concentrations overcomes European limits
		N2O concentration	kg or number of days when air pollutant concentrations overcomes European limits
	noises decrease	traffic noises	dB(A)
			% of people exposed to a level of dB > 55dB(A)
<b>economy and energy</b>	income generated	Estimated operating revenue per measure (total income generated)	EURO (or other monetary unit)

	planning and managerial costs	Estimated cost incurred during the planning and designing phase of the project, policy or measure. Costs associated with the planning process (e.g. setting up a survey or a feasibility study of a project, policy or measure), also includes the managerial costs that occur only during the planning and designing phase (decision making at strategic level)	EURO (or other monetary unit)
	social cost	estimated saved externalities on total social costs	EURO (or other monetary unit)
<b>socio-economic sustainability</b>	accident reduction	accident rate	number
	social inclusion improvement	satisfaction level of people with handicap	Likert scale (1-5)
	employment rate increase linked to sustainable mobility	employment rate	employed number/working population
	mobility cost reduction (private mobility reduction)	annual averaged costs' reduction of car usage (taxes, fuel costs, insurance policy)	euro per person



<b>social acceptance</b>	public acceptance	society acceptance level - social, policy acceptance stated by (the interviewed) citizens. attitude (behavioural change) towards intervention or degree to which people favourably receive or approve the measures, policies and any changes in UFT activities organisation	Likert scale (1-5)
	final user acceptance	percentage of final users or customers using the new service	Likert scale (1-5)
<b>success</b>	success rate	statistic state of the art reviews concerning the replication of city case policies and measures percentage of city case policies and measures planned to be replicated by other cities within or beyond project duration	Likert scale (1-5)

specific objectives	indicators	unit of measure
improve the LPT attractiveness	LTP use	passengers/year (each 1000 inhabitants)
	Travel speed	km/h
	LTP punctuality	Likert scale (1-5) or % of punctuality on total travels
	Security and safety	Likert scale (1-5) or % of security and safety on total travels
	LPT load factor	pax-km/offered places-km in specific time-windows
sharing mobility increase	carpooling use	number of user/inhabitants
	bike sharing use	number of user/inhabitants
	car sharing use	number of user/inhabitants
cycle/pedestrian mobility increase	bike/pedestrian flows	number of bike/pedestrian users per each transport section (arch of the network)
reduce traffic congestion	density of vehicle on movement	number of vehicle equivalent travelling or occupying the way measured on total of kmq

## 2.3 COMMUNITY COMMUNICATION AND INVOLVEMENT

<p>This phase ensures a profitable communication with end users. This phase is very important and it is strictly linked to activity 2.1 (Stakeholder involvement) and activity 2.3 (Development of method and approaches) and provides guidelines to MPUs to engage with users.</p> <p>This activity also includes an element of assessment where stakeholders are required to provide feedbacks on the proposed solutions (see below).</p> <p>A preliminary list of suggested relevant tools for informing the end-users is also provided. Moreover, relevant tools to achieve community acceptance are also listed.</p>	
<i>Objective of the action</i>	<p>This section focuses on community involvement in order to both inform and ensure project acceptance and effectiveness before the implementation of the plan. When data from the context is gathered, the MPU can value the project's effectiveness and address issues through corrective actions (in the sub-activity "Future improvements" in activity 2.3). Maybe some further hints can stand out during this public involvement phase.</p>
<i>Responsible stakeholder</i>	MPU with its collaborators prepares information activities and data collection about acceptance and effectiveness
<i>Other involved stakeholders</i>	<p>DECISION MAKERS (University services, city/transport authorities, etc. who help the MPU or receives, roles and responsibilities):</p> <ul style="list-style-type: none"> <li>- <i>Public authority</i>: Municipality, metropolitan city or other authority with planning territorial competence on mobility services or other connected to (e.g. environmental, etc...)</li> <li>- <i>Public Transport operators</i>: operating at local level (bus, underground or other metropolitan services, bike sharing, car-sharing) or regional/national level (railway companies)</li> <li>- <i>Mobility agency</i>: cooperating with Public Authorities and Transport operators to plan transport services</li> <li>- <i>Private Mobility provider</i> (taxi or similar operators, bicycle fleets, car sharing): as alternative mobility to private and public mobility</li> </ul>

	<ul style="list-style-type: none"> <li>- <i>Other stakeholders</i> (infrastructure/network provider, ICT provider/Craft Associations/Other Associations/police/...): giving specific competence</li> <li>- <i>Private Carpooling services</i>: Principally operated by private travellers to less impact on congestion and environment</li> <li>- <i>Research and Academia</i>: to participate in the planning phase with algorithms or results of their research. Can be very useful as supporting entity to support surveys, analysis or other</li> <li>- <i>Financer</i>: as private financer of innovations, e.g. to set up mobility start ups</li> <li>- <i>Utility and infrastructure providers</i> (e.g. EVs, ...)</li> <li>- <i>Private companies</i>. Able to support the MPU in its decisions</li> </ul> <p>USERS (students, employees, visitors, etc. who should be informed about)</p> <ul style="list-style-type: none"> <li>- <i>Students</i>: main users of the transport services. Main target of the change of behaviour paradigm of sustainable mobility. They characterize for being flexible, smart and lack of financial means</li> <li>- <i>Employees</i>: as for students, but less flexible and with more financial means.</li> <li>- <i>Visitors</i>: occasional visitors</li> <li>- <i>Occasional workers</i>: occasional workers for maintenance or for meeting with Campus workers</li> <li>- <i>Citizens</i></li> </ul>
<p><i>Way of proceeding</i></p>	<p>A non-exhaustive list of relevant tools for informing the community is listed here:</p> <ul style="list-style-type: none"> <li>o Workshops, Gaming or Forums and talks (dedicated to huge mass of people typically in big rooms or in the streets of the City, inside the campus);</li> <li>o Exhibitions (dedicated to present posters, distribute dissemination material; possibility to talk with the experts. It can be organised in the city centre, inside the campus, Libraries also in collaboration with other events, for instance European Mobility Week, etc...);</li> <li>o Media: web, papers, apps, social media etc.</li> </ul> <p>A non-exhaustive list of relevant tools to achieve community's acceptance is listed here:</p> <ul style="list-style-type: none"> <li>o Questionnaires (on-line or distributed in specific places, for instance inside the Campus, city's main transport hubs);</li> <li>o Data analysis from public authorities or transport managers (public and private);</li> <li>o Interaction during the events listed above</li> </ul>
<p><i>Target(s)</i></p>	<ul style="list-style-type: none"> <li>- Inform the public about the upcoming project implementation</li> <li>- Collect data about plan's acceptance and effectiveness.</li> </ul> <p>NOTE: Even though information and data collection are appearing above as separated, they can be 'utilized' together depending on the opportunity or needs for achieving the community.</p>
<p><i>Duration of the activity</i></p>	<p>Approximatively the whole duration of the plan implementation as it constitutes a monitoring and information activity.</p>
<p><i>Key elements of the activity</i></p>	<ul style="list-style-type: none"> <li>- <b>Communication to end users</b>: information activities are performed as described above and take into account the tools for informing as workshops etc...; these are very important for ensuring the project acceptance and effectiveness. These activities could even follow the project during its whole phase and only be limited to the preliminary phase, in order to maintain a persistent contact with the public and eventually capture potential further hints.</li> <li>- <b>Data collection activities</b> <ul style="list-style-type: none"> <li>o <b>Adoption of the development solution by end users</b>: MPUs have to consider if the proposed solution under development will be used or not. A proper analysis should focus on, not exhaustively:           <ul style="list-style-type: none"> <li>▪ Number of people who will use the service;</li> <li>▪ Number of people who will find difficult the usage of the new service;</li> <li>▪ Number of people who download the planned mobility apps;</li> </ul> </li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>▪ Number of people who effectively use the mobility app on daily base;</li> </ul> <p>- <b>Feedback actions and next improvements:</b> MPUs should adopt questionnaires to evaluate the satisfaction of the people involved in the project and questions about the improvements that they considered should be done. MPUs should schedule monthly meetings to gather and analyse the feedbacks. When MPU implement a change to improve a portion of the SUMP it is of extreme importance that as much as stakeholders as possible notice that.</p>
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## 2.4 HINTS ABOUT PLAN'S ACTIONS

<p>This activity reports on specific feedbacks collected that will help the MPU during actions' selection. All the initiatives relevant to the plan must be compliant to the University' campus context (territorial, political, regulatory, social, environmental) and the available skills and resources provided by decision makers. Plan's actions are invited to follow the schema according to the objectives matrix described in 2.2.</p>	
<p><i>Objective of the action</i></p>	<p>This section would give some guidance about measures (actions), which have to be implemented into the action plan. The SUMP actions should be selected through participative processes by agreements among the MPU and Decision-makers in order to respond to End-users' needs.</p> <p>NOTE: This section does not want to give specific and binding instructions to the reader (and to the MPU), but rather it wants to remain at a strategic level. In this way, the reader (and the MPU) is free to reflect and adapt the plan to its specific context. The approach should both consider all the Action Plan sections and subsections in order to develop sustainable and virtuous solutions, and take into account the end users will and opinions.</p>
<p><i>Responsible stakeholder</i></p>	<p>The MPU and its collaborators.</p>
<p><i>Other involved stakeholders</i></p>	<p>Even though final decisions belongs to the MPU, all stakeholders are potentially involved, in order to collect both end-user needs and decision-makers availability and resources. Furthermore, end-users are informed about the plan's direction and they can express their constructive opinions and observations. End-users are involved also during the plan implementation for providing satisfaction and adoption level in order to find out if some measures have to be strengthened, improved or changed.</p> <p>DECISION MAKERS (University services, city/transport authorities, etc. who help the MPU or receives, roles and responsibilities):</p> <ul style="list-style-type: none"> <li>- <i>Public authority:</i> Municipality, metropolitan city or other authority with territorial planning competence on mobility services or other connected to (e.g. environmental, etc...)</li> <li>- <i>Public Transport operators:</i> operating at local level (bus, underground or other metropolitan services, bike sharing, car-sharing) or regional/national level (railway companies)</li> <li>- <i>Mobility agency:</i> cooperating with Public Authorities and Transport operators to ensure commitment in transport services</li> <li>- <i>Private Mobility provider</i> (taxi or similar operators, bicycle fleets, car sharing): as alternative mobility to private and public mobility</li> <li>- <i>Other stakeholders</i> (infrastructure/network provider, ICT provider/Craft</li> </ul>

	<p>Associations/Other Associations/police/...): giving specific competence</p> <ul style="list-style-type: none"> <li>- <i>Private Carpooling services</i>: Principally operated by private travellers to less impact on congestion and environment</li> <li>- <i>Financer</i>: as private financer of innovations, e.g. to set up mobility start ups</li> <li>- <i>Utility and infrastructure providers</i> (e.g. EVs, ...)</li> <li>- <i>Research, Academia and Private companies</i>. Able to support the MPU in its decisions</li> </ul> <p>USERS (students, employees)</p> <ul style="list-style-type: none"> <li>- <i>Students and University's employees</i>: Useful in this phase in order to achieve their hints and opinions oriented to improve the Campus mobility.</li> <li>- <i>Non-University workers</i> (e.g. in case of start-ups, spinoff or other companies inside the campus): Useful in this phase in order to achieve their hints and opinions oriented to improve the Campus mobility.</li> <li>- Citizens</li> </ul>
<p><i>Way of proceeding</i></p>	<p>In accordance with results collected from the <i>1. Study's</i> (End-users' needs and characteristics, context's features, regulatory frameworks and international guidelines), the MPU identifies the plan's measures (actions). The action definition has to involve Decision-maker, since they will be the actions' actuators by providing their resources. The MPU have to make efforts in order to guarantee that the defined measures are actually sustainable from an economic and environmental point of view. When the plan's actions are defined, in order to guarantee the plan's transparency, these are communicated amongst End-users through meetings, events, forums, web, etc. At this point, End-users may express their constructive opinions and observations. If these are refused, the MPUs have to motivate its decisions (by media, web, forums, etc.).</p> <p>This section would give some hints to the reader in order to find solutions related to specific Pillars (pedestrian commute, use of the bicycle and clean vehicles, public transport, sustainable private transport) and cross cutting objectives (ICT, sustainability, safety). It might be reminded that these solutions – if actually selected implemented – should match the stakeholders' availability. Hence, the reported below hints are merely proposals and advices.</p>
<p><i>Target(s)</i></p>	<p>Achieve selected and accepted measures.</p>
<p><i>Duration of the activity</i></p>	<p>Depending on the stakeholder availability, since this section is strictly linked to the stakeholder involvement. The duration is deemed about 3 months.</p>
<p><i>Key elements of the activity</i></p>	<p>The collected feedbacks are grouped into four Pillars (pedestrian commute, use of the bicycle and clean vehicles, public transport, sustainable private transport) and Cross Cutting focuses (ICT, sustainability, safety).</p> <p><b>Improve the efficiency of existing infrastructures:</b> Before implementing new infrastructural solutions to promote sustainable mobility for universities, it is mandatory to improve the efficiency of the existing infrastructures. Thus, for each of the four pillars of the SUMP possible actions should be investigated and implemented in order to help gain a better understanding of how to increase the efficiency of mobility services through the improvement of the existing infrastructures. Another important leading theme could be the shift towards more sustainable way of travelling. In this field, innovative solutions should be focused on shared mobility fostered by the use of apps and on new electric vehicle introduction. However, other more traditional solution can improve the action plan's sustainability such as improvement of the existent transport fleet by fostering the rail transport (new train lines and trams) and the use of electrical vehicles. It should be reminded that an efficient and cheap public transport matched with</p>

adequate restrictive policies could be strong deterrents in order to discourage the private transport, one of the most responsible causes of traffic congestion and pollution.

**PILLARS:**

**Pedestrian commute**

- **Pedestrian commute: pedestrian area, dedicated apps, event organization – *Urban Context*** Existing infrastructures can potentially be of strong help to facilitate the pedestrian trips, from and inside the campuses. For campuses located inside urban areas, pedestrian commute represents a viable and efficient mobility solution for students and university members. The existing pedestrian areas should be planned in terms of dimension and time horizon to integrate the citizen needs with the University community's ones.  
Dedicated apps, which foster sustainable ways of travel, should strengthen the sense of membership and user's acceptance also by providing discounts to local shops or services. Furthermore, these apps can provide statistics useful to find out the actual adoption rate. Finally, organization of various events on pedestrian areas mostly crossed by pedestrian paths during rush hours could foster the habit to move on foot. Indeed, the pedestrian commuters could enjoy with a bunch of activities while they are coming back from the University Campus.

**Use of bicycle and clean vehicles**

- **Use of the bicycle and clean vehicles: cycle path, safety and health, sharing and inter-modality – *Urban Context*** Cycle-lane infrastructures should be significantly revised in order to enable the University's community to adopt this transport mode as the preferred one for reaching the University Campus. Cycle-lanes have to be updated and improved in order to match the requirements of students and University members focused to ease connections of the University facilities towards the major points of interest across the city. Adequate initiatives should ensure cyclists' safety and health<sup>15</sup> (by considering that could happen that they have to share the same road spaces with other vehicles). Finally, in order to foster the use of bicycle, efficient and cheap services of bike sharing could be developed. Hence, those University's members which adopt the bicycle just for a portion of their daily commute path (e.g. from railway station to lecture halls) will be targeted. Combining the bike use with short-distance transport means (such as bike and tram or underground train) could allow the End-users to quickly reach all of the city's major destinations.

**Public transport**

- **Public transport: punctuality of public transport, real-time and dynamic scheduling, improve end-users satisfaction (i.e. seating capacity) – *Urban Context*** The aim of this paragraph is the definition of the best methods to improve the public transport offering for Campuses inside the urban area. Universities located in the city centre are typically affected by mobility related problems such as: Traffic jams; Low average speed; Inefficient transport services;  
A number of activities can be implemented to improve mobility efficiency. Real time and dynamic scheduling could support drivers of public vehicles in order to select the fastest paths and then limit the travel time. The End-users can benefit from these solutions

<sup>15</sup> See also the voice **Safety** in the list among Cross cutting focuses



through a real time management of their transport choices concerning paths and transport mode. In order to ensure a realistic implementation of the aforementioned corrective actions the MPUs should: Immediately implement actions with short-term deadlines; Scheduling actions with long-term deadlines; Keeping the action scheduling constantly under revision to facilitate its realization and monitoring.

Finally, MPUs should monitor and improve the satisfaction of the university community concerning public transport services through the analysis of the following aspects: Connection of the university facilities with the different city districts; Easiness in public transport services' adoption, e.g. time to get a taxi; If transport modes are suitable, effective and proper for people with disabilities.

#### **Sustainable private transport**

- **Sustainable private transport: reduce traffic congestion, improve road safety, dynamic traffic control - *Urban Context*** Dynamic traffic control through apps widely spread in the driver community could be able to significantly decrease the road congestions through the real-time management of every single vehicle's paths. Travel time and greenhouse gases emission reduction are two of the most relevant outcomes of such systems. Proper events and meetings should be organized in order to mainstream the car drivers to shift into more sustainable way of travel and sensitise them about safety issues related with congested infrastructures. Shared vehicles and trips could be suitable in order to decrease the number of circulating vehicles and increase the load factor. These services could be provided by public transport operators (or maybe by private companies), and in addition managed by apps supplied by the same service providers.

#### **CROSS CUTTING OBJECTIVES**

- **ICTs and soft solutions** MPUs have to focus on methods and technologies to help the transmission, reception and elaboration of information related to the project. MPUs should focus their effort in the implementation of ICT solutions to help public transport services through mobile application and other integrated services as cyber hubs, stations and stops.
  - o **Unique public transport mobile application** As previously mentioned in Section 2.2, mobile apps are of major help for supporting the mobility services offered by public transport authorities. These applications help also MPUs and transport authorities to collect information from end users. The main benefits provided by the adoption of a unique mobile app for managing all public transport services provided to the University's community are: Knowledge of user mobility habits; Integration of promotion from different transport service providers; Direct feedback from end-users; Data exchange between different public and private organizations; Integration in a unique platform of real-time information of different public transport services.
  - o **Cyber hubs, stations and stops: integrated services - *Urban Context*** Technology innovations and upgrades can be adopted in railway and bus stations and stops too. MPUs have to implement those integrated services at transport stations that are helpful to university members and students. Some examples of possible integrated services to be offered to university campuses located inside the city centre are: Giving information about the arriving transport mean; Giving information about timetable, delays and strikes; Giving

information about shared cars and bikes available at a particular station;  
 Defining possible services available for students and university members at a particular transport station, such as: pharmacies, shops, supermarkets, banks, restaurants or car parks

- **Sustainability:** sustainability is the leading theme of the Action Plan. Sustainability embraces many different branches such as economics, society (and health) and environment. Even though the plan's objectives are focused in order to provide mobility services, the plan's adopted measures should be focused in order to foster policies and habits with a slight impact on the environment, since transports are one of the most polluting human activities. However, it is desired that implemented Action Plan's solutions will not need any or too much external helps when the plan is running. Indeed, the plan have to be economically self-sustainable, only in this way its effects can be provided also in long term. For this last mentioned aspect are fundamental the participative events in order to find skills, availability, proposals and opinion among stakeholders (in addition, stakeholders can provide useful information about plan's effects and acceptance also when the plan is running). Therefore, Stakeholders' involvement have to be seriously considered since it not constitutes a mere marketing process but it helps the MPU and its collaborators in order to find the most suitable solutions.

- **Safety** Road accidents are forecasted to be the third major cause of death in 2020 with about 1.4 million deaths. Traditionally, the solution to increase road safety, has always been to secure the different users' categories by mode of transport (e.g, dedicated lanes for cycling, road for private cars, etc...). As an instance, benefits given by the introduction of cycle lanes are well known in literature not only in terms of sustainable mobility fostering but also in terms of users' safety. However, It might be worth mentioning that this solution is effective only if it is well designed in order to avoid too long paths and an excessive number of dangerous intersections with highways. The same solution has always been adopted for pedestrians, who are allowed to walk in footpaths alongside roads. However, recent studies – for a restrict number of cases – are revolutionising the concept based on separation of road users: indeed, in some urban central areas the distinction between sidewalk and carriageway does not exist and traditional road signals are substituted with alternative and more intuitive ones. Safety is guaranteed by visive contacts, human instincts and interactions. These measures are bringing a traffic calming and seem to bring good results (an example of this solution have been adopted in Almada, Portugal). Indeed even though road user separation could avoid collisions between different users, this solution fosters the road stronger users' speed increase. Therefore, paradoxically the number of fatal accident could increase if a certain number of necessary intersections are present. Hence, when speed is not a priority and roads are not wide enough (such as in historical centres) shared areas among different road user could become the most suitable solution in order to guarantee safety.

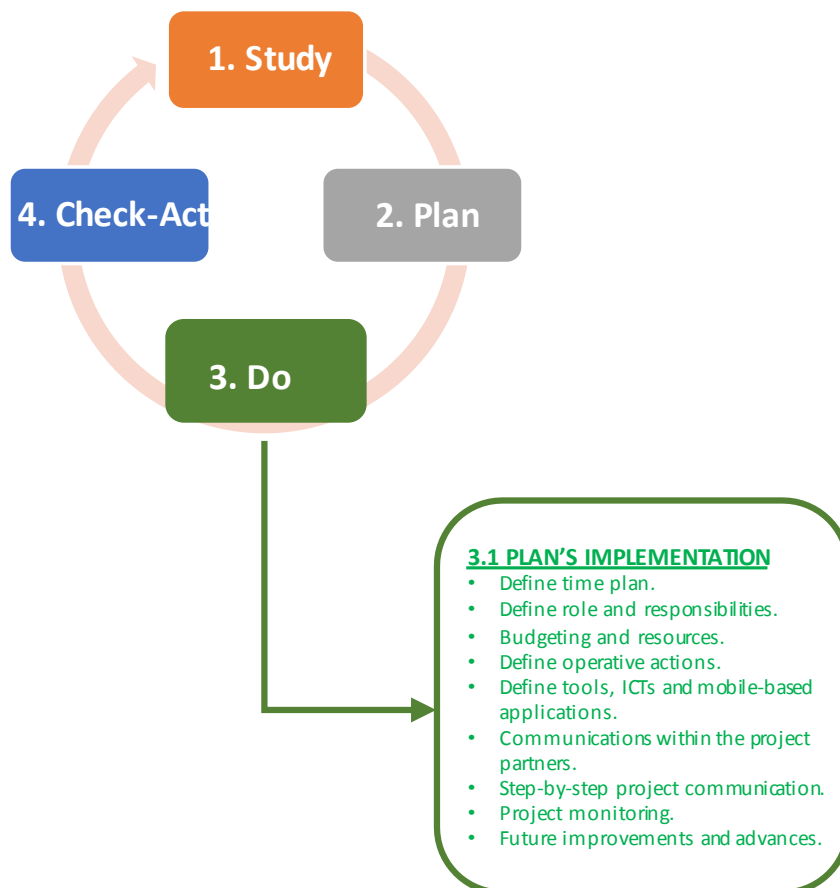
Below are reported some intervention focused on increase of safety for road non-motorised users. In night-time, visibility sense is hindered; hence, the road lighting always assumes a relevant role; Separated lanes such as cycle lanes, underpasses and overpasses (useful in order to avoid dangerous intersections), barriers in order to avoid pedestrian crossing, etc.; Separate lanes for trams (low emitting vehicles with an elevate load factor); speed reduction in urban areas; promote the use of helmet for cyclists, promotional campaign for road safety; devices (trees, humps, zig zag paths, etc.) able to calm traffic speed in urban areas with strong presence of pedestrian (30km/h areas); shared road spaces among different users; Rigorous surveillance of speed limits provided by ITS.

	<p><b><u>OTHER FEEDBACKS</u></b></p> <ul style="list-style-type: none"> <li>- <b>Infrastructure connections: intermodal and multimodal transports, interexchange hubs, integrated public transport pass, integrated transports scheduling, public vehicle sharing – <i>Urban Context</i></b> MPUs have to implement significant improvements to the infrastructure connections following specific procedures, from ask for permissions to authorities, to inform the end-users of the defined changes. Concerning interexchange hubs, they should be connected each other through several transport modes without any difficulty. Specific needs concerning dedicated hubs in order to share vehicles (mainly bike or electric vehicles), especially for universities located inside the city centre. To properly develop these hubs, MPUs have to consider: Penetration of vehicle sharing usage between the university members; Usage profile and satisfaction level of the users of vehicle sharing services; Mobile apps to ease the management of get and release a shared vehicle at the travel begin and end</li>   <li>- <b>Innovative roadway design and solutions for integrated multiple transport modes</b> the aim of this section is a radical innovation concerning the roadway organization. MPUs should collaborate with local administrations to develop new concept of shared infrastructure able to dynamically evolve to over time to maximize the efficiency of the entire population of the different vehicle types. That means the same road or (carriageway) become a dedicated public transport lane for certain time band during the day. Dynamic preferred lanes have to be integrated with novel materials and technologies for lightning, pavement and signage to minimize the environmental impact of the entire systems. The different solutions developed by MPUs should be: <ul style="list-style-type: none"> <li>▪ Environmental sustainable;</li> <li>▪ Increase the traffic speed;</li> <li>▪ Distinguished by a high level of communication and interaction;</li> <li>▪ Low possibility of damage;</li> <li>▪ Economic convenient;</li> </ul> </li> </ul>
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**MILESTONE:** Delivery of operative plan attitude towards sustainable mobility plan. At the end of this section, MPU has to develop a plan of sustainable university mobility. First, a classification of stakeholders that could collaborate with the project is required. Then a set of proper goals have to be defined, along with KPIs and actions. Moreover, community communication activities have to be identified and assessed along with proper feedback loops in order to monitor and assess the implemented improvements to the SUMP and in order to understand the end users' future acceptance.

### 3 DO: IMPLEMENTATION OF PLANNED SOLUTIONS

Once the plan’s actions are defined, these have to be concretely implemented. Hence, a time plan has to be defined, role and responsibilities have to be assigned, budgeting and resources should be allocated and actions defined for a successful implementation of the SUMP’s measures. Hereinafter, we’ve reported on concrete actions linked to the communication within the project partners, to the Project monitoring, to the step-by-step project communication and future improvements and advances. These last mentioned actions are strictly linked with next section’s contents (4. CHECK AND ACT OF IMPLEMENTED SUSTAINABLE UNIVERSITY MOBILITY SOLUTIONS). Moreover, it should be underlined that this whole section is linked with subsection 2.1 STAKEHOLDER IDENTIFICATION AND INVOLVEMENT, since almost likely external resources are required in order to implement the CAMP-sUMP plan and hence competent stakeholders could be needed and involved.



### 3.1 PLAN IMPLEMENTATION

	<p>This phase is fundamental for the execution of the project, since it assigns roles and responsibilities to anyone who collaborates with the project and each action is divided in each operative task.</p>
<p><i>Objective of the action</i></p>	<p>This action determines a deadline for each action in order to avoid any postponement and delay. Furthermore, this action assigns roles and responsibilities to anyone who collaborates on the measure and each action is divided in operative tasks. Moreover, communication activities have to be run in order to inform the involved stakeholders. Finally, the plan's future improvements have to be considered in order to improve its effectiveness and potential corrective activities.</p>
<p><i>Responsible stakeholder</i></p>	<p>MPU and its collaborators to determine deadlines, roles, responsibilities, operative jobs, communication activities and plan corrections and improvements.</p>
<p><i>Other involved stakeholders</i></p>	<p>DECISION MAKERS (University services, city/transport authorities, etc. who help the MPU or receives, roles and responsibilities):</p> <ul style="list-style-type: none"> <li>- <i>Public authority</i>: Municipality, metropolitan city or other authority with planning competence on mobility services or other connected to (e.g. environmental, etc...)</li> <li>- <i>Public Transport operators</i>: operating at local level (bus, underground or other metropolitan services, bike sharing, car-sharing) or regional/national level (railway companies)</li> <li>- <i>Mobility agency</i>: cooperating with Public Authorities and Transport operators to plan transport services</li> <li>- <i>Private Mobility provider</i> (taxi or similar operators, bicycle fleets, car sharing): as alternative mobility to private and public mobility</li> <li>- <i>Other stakeholders</i> (infrastructure/network provider, ICT provider/Craft Associations/Other Associations/police/...): giving specific competence</li> <li>- <i>Private Carpooling services</i>: Principally operated by private travellers to less impact on congestion and environment</li> <li>- <i>Research and Academia</i>: to participate in the planning phase with algorithms or results of their research. Can be very useful as supporting entity to support surveys, analysis or other</li> <li>- <i>Financer</i>: as private financer of innovations, e.g. to set up mobility start ups</li> <li>- <i>Utility and infrastructure providers</i> (e.g. EVs, ...)</li> <li>- <i>Private companies</i>. Able to support the MPU in its decisions</li> </ul> <p>USERS (students, employees, visitors, etc. who should be informed about)</p> <ul style="list-style-type: none"> <li>- <i>Students</i>: main users of the transport services. Main target of the change of behaviour paradigm of sustainable mobility. They characterize for being flexible, smart and lack of financial means</li> <li>- <i>Employees</i>: as for students, but less flexible and with more financial means.</li> <li>- <i>Occasional workers</i>: occasional workers for maintenance or for meeting with Campus workers</li> </ul>

	<ul style="list-style-type: none"> <li>- <i>Non-University workers</i> (e.g. in case of start-ups, spinoff or other companies inside the campus): all other activities embedded in the Campus.</li> <li>- <i>Citizens</i></li> </ul>
<i>Way of proceeding</i>	<ul style="list-style-type: none"> <li>- <b>(Relevant to 1<sup>st</sup> Step) Deadlines:</b> the MPU with its collaborators determines a deadline for each action in order to avoid any postponement and delay.</li> <li>- <b>(Relevant to 2<sup>nd</sup> Step) roles and responsibilities:</b> the MPU with its collaborators assigns roles and responsibilities.</li> <li>- <b>(Relevant to 3<sup>rd</sup> Step) operative action and tools definition:</b> each action defined in action 2 <i>Plan of sustainable university mobility</i> is divided in tasks. Moreover, MPUs and its collaborators have to define proper tools, which have to be used during the project execution in order to ease the implementation of certain actions. ICTs and mobile-based applications represent valuable tools to facilitate the communication amongst the decision makers and the end-users.</li> <li>- <b>(Relevant to 4<sup>th</sup> Step) communication:</b> communication activities have to be run in order to inform the involved Stakeholders.</li> <li>- <b>(Relevant to 4<sup>th</sup> Step) Finally, future plan improvements</b> have to be considered in order to improve its effectiveness and implementation of potential corrective activities.</li> </ul>
<i>Target(s)</i>	<ul style="list-style-type: none"> <li>- Achieve deadline for each action in order to avoid any postponement and delay.</li> <li>- Assigned roles and responsibilities to anyone who collaborates with the project.</li> <li>- Achieve defined operative action and tools, which have to be used during the project execution in order to ease the implementation of certain actions.</li> <li>- Inform the involved Stakeholders by defining proper communication methods.</li> <li>- Ensure plan's future improvements and potential corrective actions.</li> </ul>
<i>Duration of the activity</i>	Depending on stakeholder availability. The duration is assessed about 4 months.
<i>Key elements of the activity</i>	<ul style="list-style-type: none"> <li>- <b>Define time plan:</b> MPUs have to analyse the project time plan to check if the work in progress is following the defined time-schedule. Thus, each action has to be finished within a deadline, to avoid any postponement and delay in the project program.</li> </ul> <p>The deadline definition has to be:</p> <ul style="list-style-type: none"> <li>○ Defined considering the prioritized actions;</li> <li>○ Clear for each action;</li> <li>○ Achievable;</li> <li>○ Compatible with resources;</li> <li>○ Accepted by stakeholders;</li> <li>○ Schematised with a PERT chart or Gantt diagram.</li> </ul>



- **Define role and responsibilities:** Anyone who collaborates within the project has to have a well-defined role. In this paragraph, the MPU gives specific responsibilities to particular person who has the required competences.

In the following, the representation and description of the RACI-VS's matrix help to meet this target. This definition can help MPU in the classification of specific roles.

Six different responsibilities have to be assigned for each activity.

- o Responsible is the person who associates the activity to people;
- o Accountable is the person who has the responsibility of results of the activity;
- o Consulted is the person who helps the responsible to accomplish the activity;
- o Informed is the person who has to be informed during the activity;
- o Verifier is the person who verifies that the responsible respects certain acceptance parameters;
- o Signatory is the person who approves the decision of the verifier.

Here there is an example:

	Director	Product manager	Project Manager	Technical Architect
Budgeting management	R	A		
Communication Management		C		V
Security control			A	I

The MUPs should assign a responsible person to each task of the SUMP project. MPU has to ensure that each task has a responsible person and these people have adequate competences and resources for a successful execution of the assigned activity. For each task a set of objective have to be defined distinguished by a clear contribution to the project final goals. Measurable KPIs should be adopted to ensure the efficient and effective execution of tasks.

- **Budgeting and resources:** MPUs have to consider the budget and resources to define achievable and realistic activities. Of major importance is the cost forecast to be ensure the successful execution of the planned activities.

MPUs should divide the project activities to be executed and assign them a cost, considering all the different resources involved. A proper budget should be:

- o As precise as possible;

	<ul style="list-style-type: none"> <li>○ Always revised;</li> <li>○ Linked to the projects goals;</li> <li>○ Clear and understandable.</li> </ul> <p>MPUs should consult similar or horizontal projects to compare and improve their financial plan. Furthermore, planners should define every resources available to reach the targeted aims. Of major importance is the analysis concerning the assessment of which resource is already in possess of the MPUs and which one has to be obtained. The following resources have to be carefully assessed:</p> <ul style="list-style-type: none"> <li>○ Identification of the skills of the resources to involve (technical, financial, managerial, etc...);</li> <li>○ Financial capitals for infrastructure interventions, other technologies, soft interventions like mobile apps or web tools, researches and studies including interviews, communication activities and promotional campaign; equipment, tools and materials.</li> </ul> <p>MPUs have to assess the economic budget and resources available and their allocation to the managers that are responsible for the execution of tasks. The major decisions concerning the allocation of budget and non-financial resources of the project deal with:</p> <ul style="list-style-type: none"> <li>○ Identifying the different sources of budget and resources;</li> <li>○ Temporal distribution of available budget and resources and its matching to the project schedule;</li> <li>○ Allocation of budget and resources to project responsible and tasks;</li> <li>○ Forecasting of contribution of budget and resources to project goals;</li> </ul> <p>- <b>Define operative actions:</b> Every action defined in section 2.3.3 has to be analysed and divided in each single and operative work. A major help from a specialist is highly encouraged to develop activity. Furthermore, operative actions should be:</p> <ul style="list-style-type: none"> <li>○ Entrust to a specific manager;</li> <li>○ Allocated to a group of people in charge for them;</li> <li>○ Specific;</li> <li>○ Distinguished by expected results;</li> <li>○ Indivisible;</li> <li>○ Known by all the project managers.</li> </ul> <p>At the end of these steps aforementioned, MPUs can develop a PERT graphic to ease the comprehension of the current framework and environment, in order to fix efforts and link the responsible partners to perform the specific actions.</p> <p>- <b>Define tools, ICTs and mobile-based applications:</b> MPUs have to define proper tools that will be used during the project execution. Of major help is the association of specific tools to be adopted to ease the implementation of certain actions. ICTs and mobile-based applications represent valuable tools</p>
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	<p>to facilitate the communication between the project members and the end-users. Tools, mobile-based applications and ICTs , has to be:</p> <ul style="list-style-type: none"> <li>○ Simple to achieve;</li> <li>○ Simple to use;</li> <li>○ Understandable;</li> <li>○ Efficient;</li> <li>○ Cheap.</li> </ul> <p>- <b>Communications within the project partners</b> Project partners can use different ways for internal communication. Proper communication methods could increase and facilitate the knowledge of project partners. Some methods could be:</p> <ul style="list-style-type: none"> <li>○ Advertisements;</li> <li>○ Public events;</li> <li>○ Private emails;</li> <li>○ Meetings with specialized people;</li> <li>○ Meetings with stakeholders;</li> <li>○ Conventions and conferences.</li> </ul> <p>All these methods should be ease to be developed, immediate, efficient and right to the point. Operatively these activities refers to the third part of point 4. <i>Check &amp; act.</i></p> <p>- <b>Step-by-step project communication</b> This paragraph is essential to evaluate whether the CAMP-sUMP is obtaining success and it will be useful for End-users.</p> <p>A project communication plan is represented by a sequence of steps to be followed to communicate project events and changes to the end users. To implement a proper communication plan, MPUs have to:</p> <ul style="list-style-type: none"> <li>○ Define the categories of target groups;</li> <li>○ Define the communication topics;</li> <li>○ Define the communication budget;</li> <li>○ Assign responsibilities to people concerning communicate;</li> <li>○ Choose the communication tools to be used;</li> <li>○ Organise advertising, events and meetings.</li> </ul> <p>Operatively these activities refers to the third part of point 4. <i>Check &amp; act.</i></p> <p>- <b>Project monitoring:</b> The MPUs have to define a proper project-monitoring plan to have frequent and reliable feedback on the progress of the project execution. Among the several aspects related to an effective and efficient project monitoring, the MPUs should:</p> <ul style="list-style-type: none"> <li>○ Assess the tasks completed, in delay, on time and to be processed on weekly basis;</li> </ul>
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	<ul style="list-style-type: none"> <li>○ Update the project time schedule after relevant unforeseen events with a significant impact on the project;</li> <li>○ Monitor the financial performance of the SUMP project;</li> </ul> <p>Measure the working team performance and social dynamics. Operatively these activities refer to the third part of point 4. <i>Check &amp; act.</i></p> <p>- <b>Future improvements and advances:</b> MPUs should prepare future improvements to ensure the further development of the SUMP after the project end. This paragraph has to be clear and achievable, but always revised with corrective actions to ensure the highest quality.</p> <p>A particular method to implement this paragraph is a loop approach. When an action is finished and it does not meet the previously defined quality standards, MPUs have to understand the reasons for this nonconformity and intervene. Finally, the modification of the identified parameters should improve the action results in a feedback loop fashion. This last voice particularly refers to activities of point 4. <i>Check &amp; Act.</i></p>
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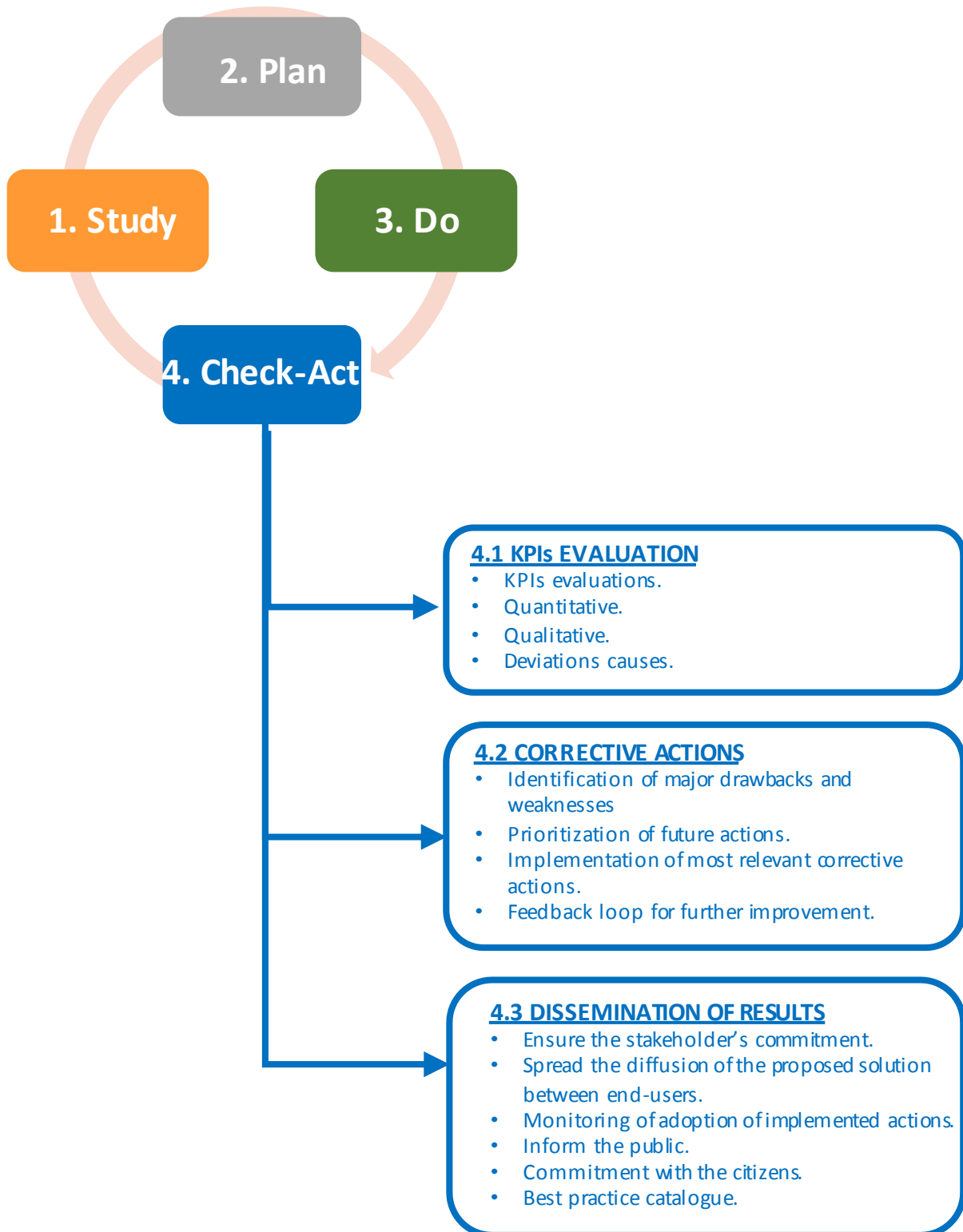
**MILESTONE:** at the end of this section the CAMP-sUMP plan should have been approved, hence resources, operative actions and related role and responsibilities are defined. Even communication actions in order to inform the project partners are operative. Moreover, further operative actions are set in order to receive feedbacks from the public (for understanding their acceptance about implemented measures) and in order to prepare corrective actions once feedbacks have been collected.

## **4 MONITOR IMPLEMENTED SUSTAINABLE UNIVERSITY MOBILITY SOLUTIONS**

This section gives specific guidelines to the MPU for monitoring of the SUMP measures which would have been implemented and reporting on their progress. If the MPU finds out some deviation with predicted goals and targets (in others words the plan's impacts) the MPU would be in a position to provide suitable corrective actions, maintaining constant communication with the relevant stakeholders. Moreover, in order to promote the diffusion of project results (and hence increase the CAMP-sUMP acceptance) dissemination activities are implemented.

With more details, the first subsection *4.1 KPIs EVALUATION*, invites the MPU to collect KPIs' data and to analyse potential deviation causes. The second subsection *4.2 CORRECTIVE ACTIONS* exhorts the MPU to prepare corrective and its prioritising action in order to fill deviations happening during the plan's implementation, the corrective action and its prioritising are set after an evaluation based on the identification of major drawbacks, strengths, opportunities and weaknesses. hence, methods for collecting post-implementation feedback is required in order to check if the implemented corrective actions have produced the expected results or if further measures are required.

Finally, the subsection *4.3 DISSEMINATION OF RESULTS* invites the MPU to inform the public about plan's actions and related results, finally the MPU is exhorted to collect the whole CAMPs-MPU experience since its results can be used as a best practice or case studies for other sustainable urban mobility plans.



## 4.1 EVALUATION OF KPIS

The goal of this chapter is the action plan implementation and the assessment of results. KPIS are evaluated by comparing forecasted values with those resulting from the effective implementation of the measures, in order to compare the plan's objectives and obtained results based on technical, economic, social and environmental performances. This paragraph is connected with Section 2.3 *Community communication and involvement* and 3.1 *Plan's implementation* of this document. In general, it monitors the implementation of the plan and expected results (that can happen already during the implementation of the plan or at the end of implementation of the measures).

The comparison between the current and forecasted KPI values could result in two possible outcomes:

- ⊙ KPI value within the forecasted range. No gap between the forecasted and project implementation results.
- ⊙ KPI value outside the forecasted range. Gap between the forecasted and project implementation results. MPUs have to understand the possible deviation causes and develop potential solutions.

If gaps are modest, then the MPU and its collaborators should continue to monitor with the pre-set modalities, as it is possible that those gaps are due to particular temporary conditions.

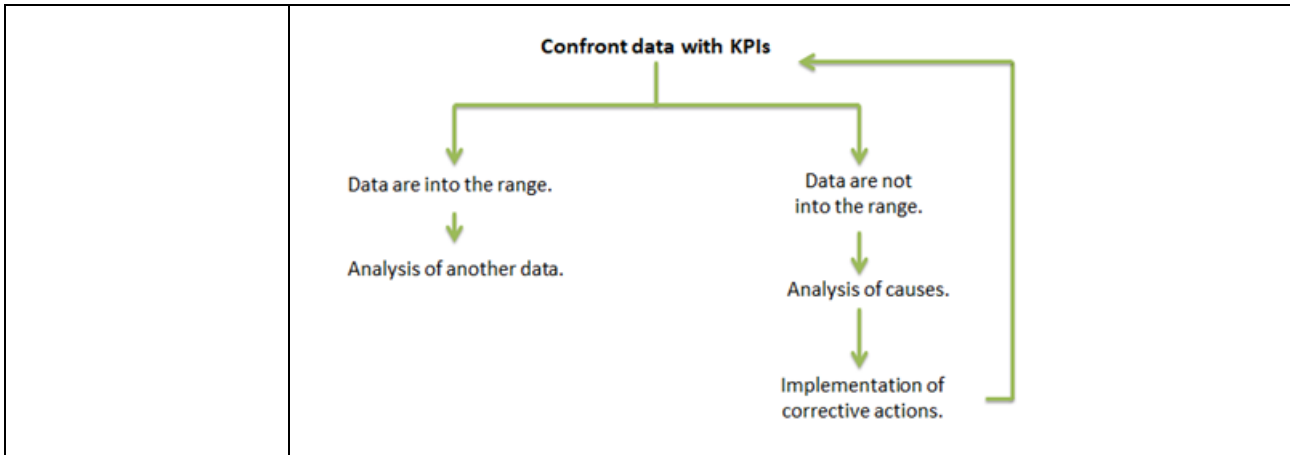
If gaps are strong, then mitigating measures should be implemented. Hence, the MPU and its collaborators should analyse the causes and eventually strengthen the monitoring through: potential responsibilities of failure to implement measures and revision of measures; potential responsibilities of already implemented activities with some mitigating measures to improve performance. In extreme cases where activities are ineffective, these should be stopped.

<i>Objective of the action</i>	The aim of this section is to monitor the ongoing plan implementation in order to check if the plan's pre-set objectives are going to be achieved or if there are some potential gaps.
<i>Responsible stakeholder</i>	The MPU and its collaborators
<i>Other involved stakeholders</i>	<p>DECISION MAKERS (University services, city/transport authorities, etc. who help the MPU or receives, roles and responsibilities):</p> <ul style="list-style-type: none"> <li>- <i>Public authority</i>: Municipality, metropolitan city or other authority able to provide feedbacks (requested by the MPU) in order to evaluate the plan's effectiveness</li> <li>- <i>Public Transport operators</i>: operating at local level (bus, underground or other metropolitan services, bike sharing, car-sharing) or regional/national level (railway companies) able to provide feedbacks (requested by the MPU) in order to evaluate the plan's effectiveness</li> <li>- <i>Mobility agency</i>: cooperating with Public Authorities and Transport operators</li> </ul>



	<ul style="list-style-type: none"> <li>- <i>Private Mobility provider</i> (taxi or similar operators, bicycle fleets, car sharing): in order to provide feedbacks (requested by the MPU) in order to evaluate the plan's effectiveness</li> <li>- <i>Other stakeholders</i> (infrastructure/network provider, ICT provider/Craft Associations/Other Associations/police/...): giving specific competence and useful data for feedbacks</li> <li>- <i>Private Carpooling services</i>: Principally operated by private travellers to less impact on congestion and environment, useful data for feedbacks</li> <li>- <i>Research and Academia</i>: useful as supporting entity to support surveys, analysis or other</li> <li>- <i>Financer</i>: as private financer of innovations, e.g. to set up mobility start ups</li> <li>- <i>Utility and infrastructure providers</i> (e.g. EVs, ...)</li> <li>- <i>Private companies</i>. Able to support the MPU in its decisions</li> </ul> <p>USERS (students, employees)</p> <ul style="list-style-type: none"> <li>- <i>Students, University's Employees and non-University workers</i>: they are able to provide useful feedbacks from interviews or with other way of communication (provided or organised by the MPU)</li> <li>- <i>Citizens</i></li> </ul>
<i>Way of proceeding</i>	<p>This phase of the action plan process compares the plan's objectives and the achieved results. KPIs' achieved value are compared with the forecast ones. If strong deviations are recorded, the MPU with its collaborators have to find out the deviation causes and understand how to intervene to overcome the risk of implementing a non-effective action.</p>
<i>Target(s)</i>	<ul style="list-style-type: none"> <li>- Compare plan's objectives against the achieved plan's performance</li> <li>- Find out potential deviation causes</li> </ul>
<i>Duration of the activity</i>	<p>Its duration is comprehensive of the whole duration of the plan's implementation.</p>
<i>Key elements of the activity</i>	<ul style="list-style-type: none"> <li>- <b>KPIs evaluations:</b> This paragraph compares the objective and obtained plan's results concerning its technical, economic, social and environmental performances. In particular, the KPIs will monitor the implementation of the plan's performance and the verification in term of objective and goals related to the implementation of specific sustainable measures.</li> </ul> <p>The comparison between the actual and forecasted KPI values could result in two possible outcomes:</p> <ul style="list-style-type: none"> <li>○ KPI value within the forecasted range. No gap between the forecasted and actual project results.</li> <li>○ KPI value outside the forecasted range. Gap between the forecasted and actual project results. MPUs have to understand the possible deviation causes and develop potential solutions.</li> </ul>

- **Quantitative:** To evaluate the quantitative KPIs MPUs have to:
  - Evaluate which quantitative KPIs to monitor in each phase of the evaluation;
  - Analyse all the information about the actual university mobility scenario to offer quantitative data for the evaluation process;
  - Ask for missing information or data useful for the KPI evaluation process.
  - Check the integrity and thoroughness of the collected data to avoid any bias in the KPI assessment.
  - Be aware to invest sufficient resources to obtain the required quantitative data.
  
- **Qualitative:** MPUs should adopt qualitative evaluations for those aspects of the project which are difficult to assess through numerical information. MPUs should define a rigorous and schematic process to collect and evaluate the needed qualitative information to avoid any subjectivity in the monitoring and control process. Define proper alarms in order to inform automatically the project managers of huge and macroscopic problems measured through qualitative KPI.
  
- **Deviations causes** MPUs have to carefully analyse whether certain KPIs are out of range and the reason behind this unexpected situation. The following steps should be considered as an effective guideline:
  - Identify the KPIs out of range compared to the forecasted values;
  - Analyse how much these KPIs are out of the range;
  - Assess whether the project experienced unexpected events which altered the normal environment.
  - Define possible causes of experienced deviations. Some reasons can be related to time, resources or behavioural aspects.
  - Search for other possible consequences, which could potentially derive from the detected problems to prevent others.
  - Discuss the problems with other Decision makers supporting the launch and implementation of the plan.



## 4.2 CORRECTIVE ACTIONS

In order to correct detected Action Plan’s deviations, emerging from the monitoring of the selected KPIs, MPU has to implement proper corrective actions	
<i>Objective of the action</i>	<p>After the evaluation of KPIs, the MPU with its collaborators decide the most suitable countermeasure. In order to select the proper corrective action the MPU should follow a four step procedure:</p> <ul style="list-style-type: none"> <li>- Identification of major drawbacks and weaknesses;</li> <li>- Prioritisation of future actions;</li> <li>- Implementation of most relevant corrective actions;</li> <li>- Feedback loop for further improvement.</li> </ul>
<i>Responsible stakeholder</i>	The MPU and its collaborators
<i>Other involved stakeholders</i>	<p>DECISION MAKERS (University services, city/transport authorities, etc. who help the MPU or receives, roles and responsibilities):</p> <ul style="list-style-type: none"> <li>- <i>Public authority</i>: Municipality, metropolitan city or other authority.</li> <li>- <i>Public Transport operators</i>: operating at local level (bus, underground or other metropolitan services, bike sharing, car-sharing) or regional/national level (railway companies).</li> <li>- <i>Mobility agency</i>: cooperating with Public Authorities and Transport operators;</li> <li>- <i>Private Mobility provider</i> (taxi or similar operators, bicycle fleets, car sharing);</li> <li>- <i>Other stakeholders</i> (infrastructure/network provider, ICT provider/Craft Associations/Other Associations/police/...): giving specific competence and contributions;</li> <li>- <i>Private Carpooling services</i>: Principally operated by private travellers to less impact on congestion and environment. They can provide potential plan’s services;</li> <li>- <i>Research and Academia</i>: useful for supporting activities;</li> <li>- <i>Financer</i>: as private financer of innovations, e.g. to set up mobility start ups</li> <li>- <i>Utility and infrastructure providers</i> (e.g. EVs, ...)</li> </ul>

	<ul style="list-style-type: none"> <li>- <i>Private companies.</i> Able to support the MPU in its decisions;</li> </ul> <p>USERS (students, employees)</p> <ul style="list-style-type: none"> <li>- <i>Students and University's Employees and non-University workers</i></li> <li>- Citizens</li> </ul> <ul style="list-style-type: none"> <li>- NOTE: Even though decisions belongs to the MPU, Decision-makers and End-users have to be informed about the plan's changes and the MPU should consider their hints during its decision during the selection of proper corrective actions. If hints are refused, MPU has to communicate its decisions through the most suitable media (web, forums, etc.).</li> </ul>										
<i>Way of proceeding</i>	<p>According to the KPIs' monitoring plan and after the KPIs evaluation, the MPU is aware about what have not been working during the plan implementation. Therefore, now the MPU has to identify the major drawbacks and weaknesses, their reasons, the repairing responsible and then decide if strengthen efforts or provide new solutions.</p> <p>When proper corrective actions are identified, these have to be prioritised and then implemented. Finally further feedbacks have to be collected in order to monitor the effects of implemented corrective actions</p>										
<i>Target(s)</i>	<ul style="list-style-type: none"> <li>- Identify major drawbacks and weaknesses;</li> <li>- Prioritise future actions;</li> <li>- Implement most relevant corrective actions;</li> <li>- Activate feedback loop for further improvements.</li> </ul>										
<i>Duration of the activity</i>	The duration depends from the monitoring plan. It is strongly dependent from the type of corrective action to plan										
<i>Key elements of the activity</i>	<p>Four step procedure:</p> <ul style="list-style-type: none"> <li>- <b>Identification of major drawbacks and weaknesses:</b> MPUs have to identify which are mistakes, which determined the actual project situation. The following table is proposed to ease the MPUs in this procedure. It represents a suggestion to align the MPUs and stakeholders to share the same format of communication.</li> </ul> <table border="1" data-bbox="347 1541 1236 1684"> <thead> <tr> <th>Drawbacks</th> <th>Principal reasons</th> <th>Deriving weaknesses</th> <th>Responsible of repairing</th> <th>Action to implement</th> </tr> </thead> <tbody> <tr> <td>Delay of communication to end-users</td> <td>Lack of resources</td> <td>Delay of using by end-users</td> <td>CEO</td> <td>- Urge stakeholders;</td> </tr> </tbody> </table> <p>First column describes the problem raised. Second column the main cause for this problem. Third column seeks the consequences which derive from the aforementioned drawback. Fourth column assigns a responsible to ensure the improvement of the actual situation.</p> <p>The last column is probably the most relevant of the procedure since it suggests the action to be implemented, assigning roles, responsibility, times and potentially re-distributing resources. The MPU has to define at least one action to be implemented for each identified drawback. The decisional process that brings to formulate actions should follow a participative process. Hence, Stakeholders have to be informed and involved during the decisional moment. Their involvement should take different nature related to</p>	Drawbacks	Principal reasons	Deriving weaknesses	Responsible of repairing	Action to implement	Delay of communication to end-users	Lack of resources	Delay of using by end-users	CEO	- Urge stakeholders;
Drawbacks	Principal reasons	Deriving weaknesses	Responsible of repairing	Action to implement							
Delay of communication to end-users	Lack of resources	Delay of using by end-users	CEO	- Urge stakeholders;							

Stakeholders' skills and competences.

End-users' involvement should be mostly advisory (with events, meetings, forums, interviews, etc.). Decision-makers instead collaborate more closely and strictly with MPU due to their resources and competences. Indeed, the MPUs have to convene the Decision makers in order to discuss about possible corrective actions and eventually select what to implement. For each corrective action, competent Decision-makers have to be involved. Even though decisions always compete to the MPU, the Decision-maker involvement is crucial since they can provide resources and competences. When decisions are selected the MPUs have to communicate to the public (End-users) its decision through media (web, forums, meetings, events, etc.) in order to collect their opinion. If in this place, there are some disagreements the public is allowed to make observations. Then, if MPU decides to refuse them, it has to communicate by motivating its decision.

- **Prioritization of future actions** MPUs have to define a priority for all the identified corrective actions. The corrective action importance is typically determined by:

- Time needed to react;
- Availability of intangible resources (e.g. competences);
- Budgetary requirements.
- Persons to involve in the process

To properly tackle this issue, MPUs have to:

- List the corrective actions considered essentials;
- Decide which elements have to be considered to classify the action and asses their level of importance;
- Define a list of corrective actions to implement considering their importance ranking as well as the time, competences and budget constraints.
- Define mandatory actions to execute respect to the total identified

- **Implementation of most relevant corrective actions:** Considering the classification proposed in the previous step, MPUs have to implement the identified corrective actions. For each action to be implemented MPU has to carefully assess:

- Time, competences and budget constraints;
- Consequences to the scheduling of the other project activities;
- Potential reactions of end users.

It is essential for the MPU to ensure the quality of the project despite the implemented corrective action. A final revision for each of these actions is required to avoid a slight improvement of a certain project KPI compared to a huge worsening of other KPIs.

- **Feedback loop for further improvement:** Every implemented action has a reaction. Thus, a feedback loop is required to keep constantly monitored the modified elements of the SUMP.

After the implementation, the corrective actions evolve along with the project context and environment. Whether the identified KPI gap is overcome, no further activity is required. Otherwise, the corrective loop starts again from the beginning.

### 4.3 DISSEMINATION OF RESULTS

<i>Objective of the action</i>	The last activity of the Action Plan to develop a SUMP is the dissemination of the achieved results. Aim of this section is to suggest a procedure to be followed to maximize the impact of the implemented action aimed at a sustainable university mobility.
<i>Responsible stakeholder</i>	The MPU and its collaborators
<i>Other involved stakeholders</i>	<p>DECISION MAKERS (University services, city/transport authorities, etc. who help the MPU or receives, roles and responsibilities):</p> <ul style="list-style-type: none"> <li>- <i>Public authority</i>: Municipality, metropolitan city or other authority.</li> <li>- <i>Public Transport operators</i>: operating at local level (bus, underground or other metropolitan services, bike sharing, car-sharing) or regional/national level (railway companies).</li> <li>- <i>Mobility agency</i>: cooperating with Public Authorities and Transport operators;</li> <li>- <i>Private Mobility provider</i> (taxi or similar operators, bicycle fleets, car sharing);</li> <li>- <i>Other stakeholders</i> (infrastructure/network provider, ICT provider/Craft Associations/Other Associations/police/...): giving specific competence and contributions;</li> <li>- <i>Private Carpooling services</i>: Principally operated by private travellers to less impact on congestion and environment. They can provide potential plan's services;</li> <li>- <i>Research and Academia</i>: useful for supporting activities;</li> <li>- <i>Financer</i>: as private financer of innovations, e.g. to set up mobility start ups</li> <li>- <i>Utility and infrastructure providers</i> (e.g. EVs, ...)</li> <li>- <i>Private companies</i>. Able to support the MPU in its decisions;</li> </ul> <p>USERS (students, employees)</p> <ul style="list-style-type: none"> <li>- <i>Students and University's Employees</i></li> <li>- <i>Citizens</i></li> </ul>
<i>Way of proceeding</i>	This phase takes the whole plan duration and activities related to stakeholder communication about plan implementation and achieved results and share the plan's achieved experiences through media in order to foster a sense of belonging among stakeholders. Furthermore, at the end of the plan's implementation this phase collects the best practices developed during the project.
<i>Target(s)</i>	<ul style="list-style-type: none"> <li>- Ensure stakeholder commitment;</li> <li>- Spread the diffusion of the proposed solution between end-users;</li> <li>- Monitor the implemented measures;</li> <li>- Commit citizens;</li> </ul>



	<ul style="list-style-type: none"> <li>- Disseminate and share experiences;</li> <li>- Collect plan's best practices.</li> </ul>
<i>Duration of the activity</i>	This plan's phase takes the whole plan duration time
<i>Key elements of the activity</i>	<ul style="list-style-type: none"> <li>- <b>Ensure the stakeholder's commitment:</b> Spreading the project partial and final results to the stakeholders (End-users including Citizens, but also Decision-Makers not directly involved in the daily activities for the implementation of the plan) is mandatory to ensure their commitment. The MPUs have to keep the stakeholders updated concerning the SUMP development during the entire project duration and obtain from them continuous contribution and support. The typical information that have to be provided to the stakeholders deal with:             <ul style="list-style-type: none"> <li>o The produced deliverables/results;</li> <li>o The financial effort for the project by steps;</li> <li>o Clearly, present the changes obtained compared to the scenario monitored before the start of the implementation.</li> <li>o Keep the process living and continuously plan future meetings and actions beyond the time horizon of the plan (long-term sustainability of the plan)</li> </ul> </li>   <li>- <b>Spread the diffusion of the proposed solution between end-users:</b> The most relevant population to inform about the project results and the developed solutions for the mobility services are the end users, e.g. students and university members. The information process should focus on the benefit that can be obtained adopting the developed solutions and the massive diffusion of such information. MPUs could adopt the following suggestions to maximize the information spread:             <ul style="list-style-type: none"> <li>o Use mobile apps to promote and illustrate the new offered services and how to use them;</li> <li>o Organize events, meetings or seminars to increase the commitment on the project and create a community of potential end users;</li> <li>o Create mailing lists and news feeds for project updated during the following months;</li> <li>o Use the social media connected to the categories of users</li> <li>o Inform university administration to facilitate the procedures required by the end user to adopt the proposed solutions.</li> </ul> </li>   <li>- <b>Monitoring of adoption of implemented actions:</b> The MPU has to define a proper plan to keep the implemented solutions constantly monitored and measure their adoption between the end users. This activity enables to assess whether some activities required additional resources to be invested to ensure the required results.</li>   <li>- <b>Inform the public:</b> The population affected by the mobility solutions developed through the SUMP has to be informed about the project. In particular, the MPU has to inform them about the time schedule before the start of the project , the potential benefit they can obtain and the possible difficulties to be encountered. This activity is to be planned in collaboration with public authorities and private</li> </ul>

	<p>business operators. The dissemination of the SUMP results and the new mobility experience facilitate the transition towards the developed solutions. MPUs should exploit social media to facilitate the sharing of such experiences and create a sense of belonging to a community distinguished by positive values</p> <ul style="list-style-type: none"> <li>- <b>Commitment with the citizens:</b> Obtain the commitment of citizen for a SUMP project is of major importance to facilitate the evolution process towards a sustainable mobility. The MPU has to presents in details the potential advantages the citizen can obtain from the developed mobility services. This activity is to plan in collaboration with public authorities and private business operators.</li> <li>- <b>Best practice catalogue:</b> The last step of the dissemination phase deals with a collection of the best practices developed during the entire project duration. The MPU has to catalogue them considering the four pillars and the identified cross cutting focuses.</li> </ul>
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**MILESTONE:** Quantitative and qualitative reports about project results and explanation about deviations’ causes. Reports of the kick-off, mid-term and final dissemination activities focused on ensure the adoption of the proposed solutions and the commitment of the citizens and stakeholders. Finally reports about plans dissemination in order to provide best practices to other planners and practitioners.

## ASSESSMENT OF THE ACTION PLAN DURATION

The presented Action Plan presents 4 sequential Sections, namely Study, Plan, Do and Check & Act. From a temporal aspect, each Section can start immediately after that the previous one is finished. This criterion does not have to be considered for the Check & Act section. Indeed, this duration is comprehensive of the whole duration of the action plan, since the activities involved are highly integrated with different portion of the Action Plan.

The following table summarizes the duration of each Section of the Action Plan, their activities and the entire plan duration. However, the quantitative evaluation of the activity duration is an estimation of the expected duration. Indeed, this value is highly dependent by the features which distinguish the considered University and SUMP. Thus, the MUP which adopts the proposed Action Plan should consider these durations as a proper but indicative estimation.

As shown below, the Study section is the most time consuming one with an expected duration of 10 months equally distributed between the different activities. The Plan section is distinguished by the remarkable duration of 8 months. Between its activities, the “community communication and involvement” has approximatively the duration of the whole plan implementation as it constitutes a monitoring and information activity. The Do action lasts about 4 months, whereas the Check & Act section is comprehensive of the whole duration of the action plan, since the activities involved are

highly integrated with different portions of the Action Plan. Finally, considered the presented framework, the developed Action Plan has an estimated duration of about 22 months.

Section	Activity	Duration
1-STUDY SOCIETAL TRENDS AND URBAN MOBILITY SCENARIO	1.1 DECARBONISATION AND AIR QUALITY	1
	1.2 LOCAL GEOGRAPHICAL AREA DYNAMICS	3
	1.3 DEMOGRAPHIC CHALLENGES	2
	1.4 DIGITAL SOCIETY	2
	1.5 SHARING ECONOMY	2
	<b>total</b>	<b>10</b>
2-PLAN OF SUSTAINABLE UNIVERSITY MOBILITY	2.1 STAKEHOLDER IDENTIFICATION AND INVOLVEMENT	2
	2.2 DEFINITION OF GOALS, KPIs, ACTION PRIORITISING	3
	2.3 COMMUNITY COMMUNICATION AND INVOLVEMENT	<i>Approximatively the whole duration of the plan implementation as it constitutes a monitoring and information activity</i>
	2.4 FEEDBACKS ON PLAN'S ACTIONS	3
<b>total</b>	<b>8</b>	
3-DO: IMPLEMENTATION OF PLANNED SOLUTION	<b>total</b>	<b>4</b>
4-MONITOR IMPLEMENTED SUSTAINABLE UNIVERSITY MOBILITY SOLUTIONS	4.1 KPIs EVALUATION	<i>Its duration is comprehensive of the whole duration of the plan's implementation.</i>
	4.2 CORRECTIVE ACTIONS	<i>The duration depends from the monitoring plan. It is strongly dependent from the type of corrective action to plan</i>
	4.3 DISSEMINATION OF RESULTS	<i>This phase takes the whole plan duration and activities related to stakeholder communication</i>
	<b>total</b>	<i>Its duration is comprehensive of the whole duration of the action plan</i>
<b>ACTION PLAN - TOTAL</b>	<b>Total</b>	<b>22</b>

Duration of each Section of the Action Plan and their activities.