REPORT ON IMPLEMENTATION OF PILOT ACTION IN IT: TRAFFIC FLOWS MEASUREMENT

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Content

1. Executive Summary

The pilot action implemented in Modena consisted in a new automated traffic counting sensor, for vehicle and bicycle counting. The sensor was installed by one of the most strategic places, by an important urban road with a new bikeway that connects a big residential district to the city centre: this itinerary is used by many citizens and by many municipal commuters during their home-work trips. The aim of the pilot action is to promote sustainable way of travelling and commuting among employees first and in general among citizens, giving evidence that the bicycle is a good way of transport for commuting in urban area. The sensor is recording data since November 2018 and it has attracted attention of local inhabitants and of employees: the data platform has been visited by 105 people and the sensor has registered almost 2 million passages (26% by bike). The cost-benefit ratio is evaluated quite good because the constant increase bike number could encourage the urban transport mode evolution. At the same time, the mobility office, in the frame of the WMP, provide for its own employees a new platform to monitor the way of transport they use for commuting, and trough the information given in the registration phase, the Mobility Manager can suggest them more sustainable way of transport or colleagues with which compose car-pooling crew.

2. The pilot action

The pilot action for the Movecit project, for the city of Modena, is the installation of a new automated traffic counting sensor, for vehicle and bicycle counting. It's considered a HARD measure: the sensor is an electronic device, physically installed on a lamppost.

The new counting section has been installed in a strategic location, i.e. along Via Emilia Est, which is one of the most important urban roads of the city, with a new and very used bikeway right next to the roadway: this itinerary is used by many citizens and by many municipal commuters during their home-work trips. The aim is to monitor the variations of car and bicycle traffic.

All the data from this new sensor, as for the existing ones, will have to be available to both the Municipality and the citizens, through an easily consultable web platform. Thus, the evolutions of car and bicycle flows can be analysed.

The sensor has been installed and managed by an external company (Wecity s.r.l.): the municipality select this company with a public procurement. For the municipality, the responsible for the pilot action is Mobility and Traffic Service.

All the data collected by this new sensor are referred both to employees and citizens: the sensor has been installed on a public bike lane, so it counts obviously all passages (vehicles and bicycles).

The counting sections in quite near the historical city centre, along one of the most important urban roads: the type of travel intercepted are mainly referred to commuting; a small part is referred to recreation, tourism and shopping trips.

The procedure that brought to new sensor installation was quite long and complex because we encountered difficulties in finding technological company able to satisfy our needs: the device must register and count continuously many data (vehicle/bike passages, 24/24h 7/7 days). In the same public procurement, we have requested also that the company publish all data in real time on a specific digital platform: this element is quite relevant to spread the information among the employees.

Following the selection of the company, the Mobility Manager, the mobility team, the stakeholders and the company itself spent many time discussing about the most efficient localization for the new device: in the end we vote unanimously for Via Emilia Est that is an historical road, that connects a big residential

district to the city centre and consequently it is used by many citizens and by many municipal commuters during their home-work trips.

The sensor has been installed and it is recording (and counting) since mid-November.

3. The aim of the pilot action

The sensor has been introduced to monitor the daily/seasonal variations of car and bicycle traffic on urban roads.

This kind of action has double goals: by one side the sensor collected data are a precious source of information to develop further actions (such as WMP implementation and updating); secondary, but not least, the data dissemination could be useful to increase the awareness about sustainable mobility issues. In Modena urban area there was two other sensors to count car and bicycle traffic flows on urban roads: this technology is useful to analyze punctual modal shift in order to help the Municipality defining policies to increase sustainable mode of transport, especially for commuting trips.

The city of Modena adopted its BikePlan on December 2016, it proposed several actions to promote bike use which include also a sensor net to count bike passages.

With this pilot action, the municipality aims to collect more real data from traffic flows on the main urban roads. This data helps the offices to define policies, initiatives, infrastructural project to increase the number of people that choose sustainable mode of transport for their urban trips (commuting).

With the first data collected through to the pilot action, the mobility office refined the Workplace Mobility Plan draft: all data about daily and monthly fluctuations helped us to better understand commuters' habits, and so, to plan specific actions to develop in the frame of workplace mobility management. The final version of the City of Modena Workplace Mobility Plan has been definitively approved by town council on 7th May 2019.

All the data have been shared with the municipal employees trough a new digital platform that reports in real time the counting: in this way the colleagues felt more involved in the analysis process and they could give suggestion to mobility manager in order to promote sustainable actions.

The city of Modena is currently completing the drafting of SUMP, so Movecit's pilot action could be useful also for FUA policies: the device location is very strategic because it intercept many passages on one of the main urban roads that connect the city center with the neighborhood and – far away – with other municipality; by this, the SUMP's and WPM's policies are extending referred to an extra-municipal area.

4. Implementation of the pilot action

The implementation of a sensor is useful to monitor the efficiency of infrastructural bike net and to increase the awareness both of citizen and employees. The stakeholders were also positively oriented to promote these devices on the urban roads: whereas numerous projects and experiences have confirmed that the dissemination of good practices among citizens represent a good lever to create more sustainable habits.

In order to obtain the new sensor to monitor the traffic flows, the municipality needed to plan the implementation and to provide a public procurement. The offices asked for the best offer on the market and after that it has been possible to implement the device. The technicians chose the installation point by one of the most important urban roads, where the municipality built up recently a new cycle lane

separated from the vehicles: this is a perfect situation to monitor the change of habits related to a transport capacity decrease for cars and vice-versa to bike spaces increase.

In our case, the implementation was quite simple compared to the planning phase. The device is quite small, and it has been attached to a lamppost. It's powered with solar panel and it works 24/24h 7/7.

The new device installation has been communicated and discussed with stakeholder during several meetings. At the beginning of the process we involve a first group of stakeholders for a recognition of the state of the art in mobility process: in this frame, we collect from them suggestions, opinions and useful knowledges, in order to implement an efficient model for mobility planning and strategic processes. The stakeholder supported from the start our idea to implement an innovative technology to collect more data from the territory, hopefully in real-time.

During following stakeholder meetings, the mobility head officer explained them the technological potentiality of the devices found on market: all the stakeholders were positively oriented so, the offices started the public procurement to implement the device. The stakeholders have been obviously involved also during installation phase, in order to share opinions about the most interest and efficient localization for the passages counting considering the specific characteristics of the sensor and of the bike net.

In the end, during last meetings about with the stakeholders about the WMP and the SUMP, the offices have shown the first data collected from the device: it was quite interesting for stakeholder to see real data about bike use on urban bike lane and how the municipality was using that data to refine the WMP.

Even employees have been invited to visit the data sharing platform in order to see how many people already use the bike along urban net usually as commuting way of transport.

Stakeholders and employees became in this way the first witnesses of the sensor functionality, so they represented the firs communication channel.

Even the SUMP contains the information about the sensor: in this way, the municipality mobility offices tried to promote this practice as a replicable action on several strategical point around the city.

The counting section is based on the "Motion Detection On Video" (MDOV) technology. This allows the detection of motion – people or object – from video recorded with IP cameras, analog or digital. After a brief "learning" phase, the algorithm can recognize, under specific lightning condition and angle, the different types of objects moving in the video (pedestrians, bicycles, cars, etc.), and provides as an output the counting of the objects class crossing a section during a certain period. An innovative feature of this typology of traffic counting sensor lies in the concept of "digital measurement line", i.e. the measurement section is virtually traced on the video, thus avoiding any physical intervention on the road, and allowing to change the counting section at any time (or adding more digital measurement lines using the same recording).

5. Monitoring of the pilot action

The indicators that have been monitored in order to understand the effectiveness of this pilot action are:

- Average number of bicycle passages per day, calculated for every month (starting December 2018 to May 2019) and average number of car passages per day; these indicators will not measure an actual effect of the pilot action per se (as no clear direct relation can be assumed between the installation of traffic counting sensors and modal split change towards cycling), but will constitute an interesting output of the more extensive combination of measures included in the WMP, promoting sustainable mobility;
- Number of visits to the web platform.

Such data and indicators are provided by the company that has been selected for the supply of the traffic sensor. The sensor will be recording for one year, so the pilot action will last also after the MOVECIT project end.

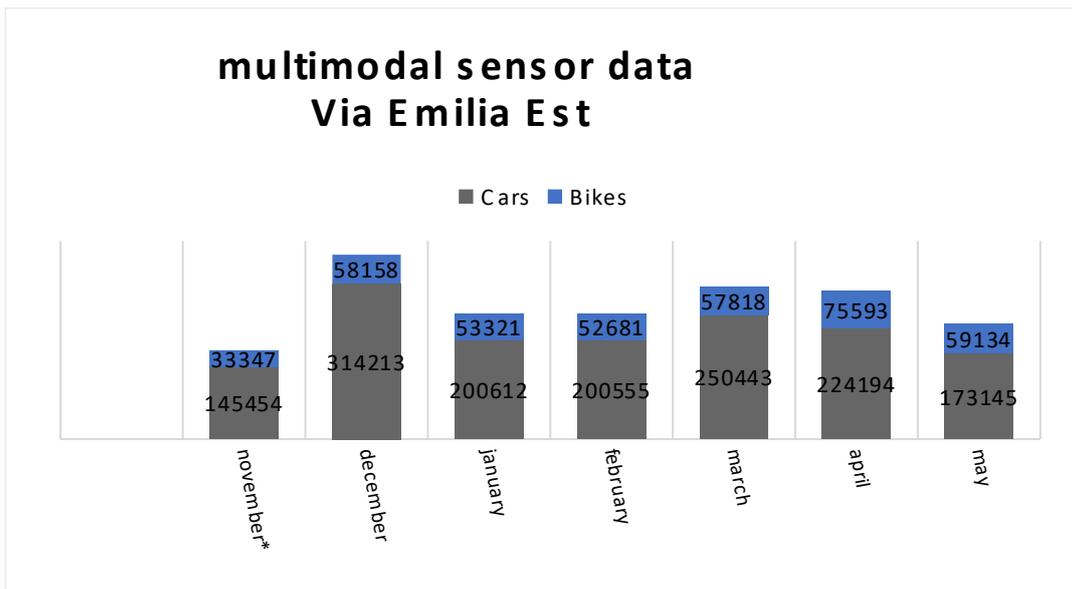## Punto di rilevamento Via Emilia - Modena
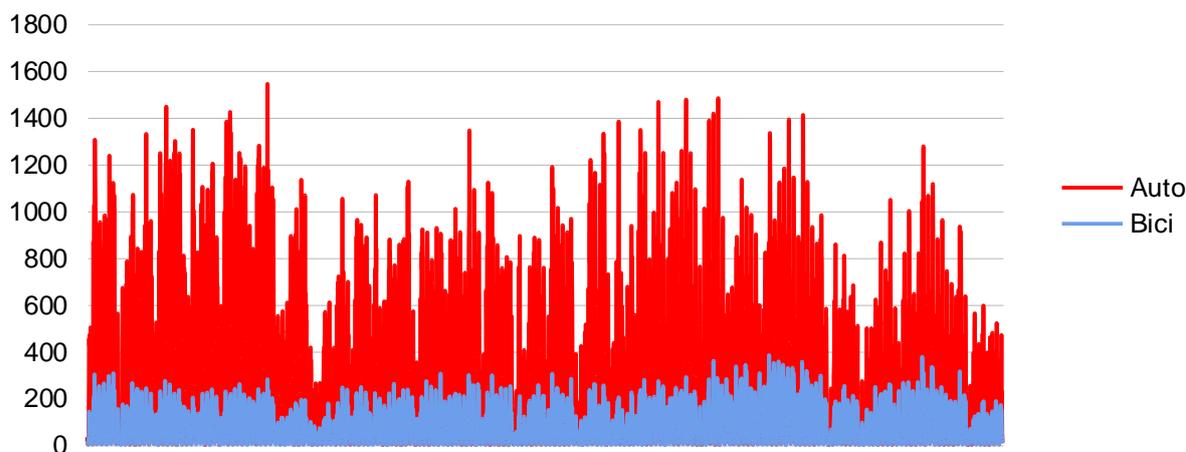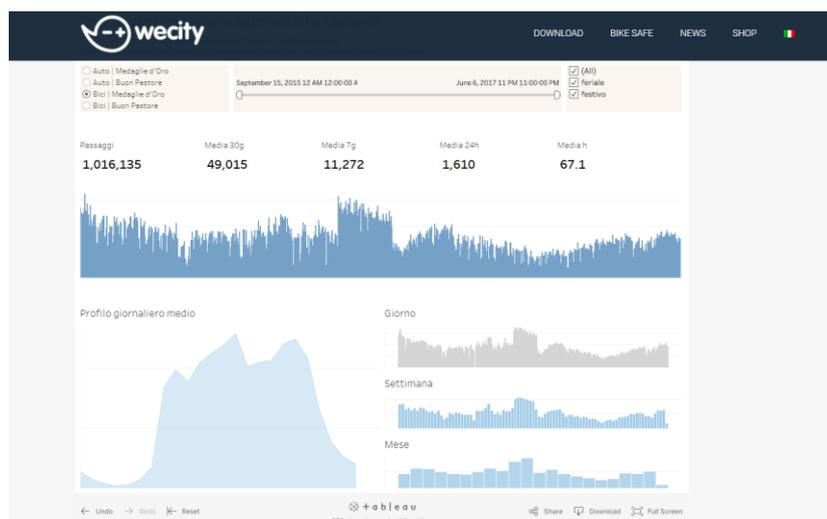

Data !5/11/2018 - 31/05/2019

With the first data recorded we started to analyse the punctual modal split trend. In the previous image is shown that the bike has been quite used also during winter season (except from December, around 20%). A very positive data has been registered in April: the total number of passages is very similar to the previous March, but we can see an important bike number increase. Unfortunately, May was continuous rainy and colder than average, so conditions were quite hard to travel by bike.

multimodal sensor data
Via Emilia Est

■ Cars ■ Bikes

Month	Bikes	Cars
november*	33347	145454
december	58158	314213
january	53321	200612
february	52681	200555
march	57818	250443
april	75593	224194
may	59134	173145

* November started recording 15th, so the bar is referred on half period.

The web platform for data consultation has been visited by **105 people** since November 2018 (Til 31/05/2019).

The total cost of the sensor installation and data providing service has been EUR 14.993,80 (tax included).

The cost-benefit ratio is evaluated quite good because the device works continuously, and its efficiency is high. Even the number of bike passages is satisfactory: the constant increase bike number in encouraging for the urban transport mode evolution.

The sensor has been introduced to monitor the daily/seasonal variations of car and bicycle traffic on urban roads. This kind of action had double goals: by one side the sensor collected data are a precious source of information to develop further actions, secondary, the data dissemination could be useful to increase the citizens' awareness. Whereas numerous projects and experiences have confirmed that the dissemination of good practices among citizens represent a good lever to create more sustainable habits.

6. Conclusions

The positive aspect of this pilot action is the scientificity of data collected: these data represent a solid analytic basis to support policymaking in mobility field. A negative aspect is that the device is referred to all citizens and not only to municipal employees. For this, the Municipality chose to implement also a new platform to help the communication between the Mobility Manager and all employees about commuting: trough this tool, the Mobility Manager can give customized suggestion to each colleague.

Many employees are counted daily by the sensor. Many colleagues asked for other devices on their own itinerary, in order to see the average number of transits. This represents an important goal because it means an increase of consciousness and a better involvement of employees in the mobility evolution.

About the platform, many employees are already registered and waiting for customized suggestion by Mobility Manager.

The hardest part of implementation of the new sensor was the need for a public procurement: it was a quite long process, more than expectations, so the data collection hasn't started since November 2018.

The data provided by sensor are very important and relevant to support mobility policies. It's very important for municipality to invest more economic funds to implement a higher number of devices in order to investigate many crucial points of the city. If specific and relevant sections of the transport network are considered, traffic counting, when repeated for enough years, can provide precious information on the traffic trends of a city, on its modal split, on the seasonal or daily distributions and on the infrastructure usage. Further, if counting is available for enough years and in a sufficient number of sections, they can be used to build the origin-destination demand matrix, which can be used as a tool for any action and investment plan as a support for decisional processes.

It is also clear that the communication process is essential to increase the awareness and the consciousness of citizen.

SWOT matrix

S -	W –
- All the data collected are real scientific data in real time: this element is very important for the municipality that, using those data, can develop more efficient mobility actions, both for its own employees (WMP) and for citizen (SUMP). - By the consultancies on digital platform employees feel part of the analysis - It's very simple to read and to disseminate data and graphics	- the process to find the right technology and to carry out the company selection is a quite long and complicated process - the system is not focused only on the employees
O –	T –
- the data dissemination can increase consciousness both in employees and in citizens - the devices can be implemented in other municipalities and public institutions and the data can be shared and compared for similar context	the system is quite expensive: many funds are needed to build up an efficient net with many detection point

Starting from the assumption that the communication process is essential to increase the awareness and the consciousness of citizen, is relevant to invest on it.

Working on own WMP and policies for its own employees, make the municipal the first test-case for its territory: it's very important that the municipality has the role of guidance in mobility issues. Surely the experience of Modena could be replicated in other town/countries.

The technology innovation helps Modena's pilot action to be a modern tool, on which the municipality can base its mobility policies, both for its own employees (WMP) and for citizen (SUMP).

To conclude, our experience with application of the pilot is quite positive and it even motivated some employees of the municipality to use the bike to commute. The pilot is even in line with the city long-term strategy to be a local leader regarding sustainable mobility and increase of consciousness, we can say that Modena is an example of a city which directly supports sustainable policies for its territory, starting from its own employees.