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H2020 CIVITAS SUITS: SUPPORTING LOCAL AUTHORITIES' IMPLEMENTING SUSTAINABLE TRANSPORT MEASURES

- Invited lecture -

Key Words

Sustainable
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Capacity
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Abstract

H2020 CIVITAS SUITS (**S**ustainable **U**rbane **I**ntegrated **T**ransport **S**ystems: Transferable tools for Small to Medium local authorities) is a 4-year research and innovation action (RIA), entering its final 18 months. Its aim is to increase the capacity of Small-Medium (SM) local authorities (LAs) to develop and implement sustainable, inclusive, integrated and accessible transport strategies, policies, technologies, practices, procedures, tools, measures and intelligent transport systems that recognize the end-to-end travel experiences of all users and freight. The paper presents 4 case studies of sustainable transport measures implemented

during the project. Each comprises a brief description, analysis of aims and objectives, implementation requirements, scalability/replicability, target groups, challenges, financing and cost requirements, final outcomes/impact.

1. INTRODUCTION

The rationale behind H2020 CIVITAS SUITS was that SM cities are unlikely to have sufficient resources to develop, support and finance integrated urban mobility plans without a broad range of targeted capacity building measures. Rather than importing or adapting existing sustainable transport measures, or buying in expertise, cities should be supported in building up local capacity (in their governmental institutions, businesses and citizens) to grow, fund and implement bespoke and context sensitive sustainability strategies, appropriate to their needs.

In relation to sustainable transport, we argue that capacity building should embrace change, at individual, organizational and institutional levels. This includes providing knowledge, and know-how in latest transport innovations, mobility data usage, rules, regulations and citizen engagement processes. These directly impact on how the transport department goes about its business, enabling them to make better, more informed plans. To address this, SUITS developed training material in 6 discrete areas, which were identified as those in which there was a shortfall of knowledge (i.e. implementation of emerging transport technologies, urban transport safety and security measures for vulnerable users and urban freight transport measures; introduction of innovative transport schemes; data collection and analysis tools for integrated measures; innovative financing, procurement and business models).

This was accompanied by the application of a socio technical approach to the transport department in each city, to develop change visions, change agents and processes to increase their development as learning organizations, able to innovate and create transport solutions which will work for their local cities [1].

The paper presents four cases from the city partners (Turin, Rome, Kalamaria, Alba Iulia, Transport for West Midlands, Valencia; and follower cities of Palanga, Stuttgart and Dachau) in SUITS, to understand the context in which cities are working and their current efforts in sustainable transport development. Each case study includes a brief description, along with objectives and implementation requirements, scalability/replicability, target groups, challenges, financing and cost requirements, final outcomes/impact. These are followed by a discussion of the way in which SUITS outputs can influence the development of the transport measures.

2. THE CASE STUDIES

2.1. Midlands Future Mobility Connected and Autonomous Vehicle (CAV) Testbed (Transport for West Midlands (TfWM), UK

The CAV test bed aims to provide a real-world environment for testing of Connected and Autonomous Vehicles on 80 km (at a cost of £25.3m) of public roads (to be extended to 300km by 2020) in the West Midlands, thereby strengthening the West Midlands as a leader in the provision and testing of innovative technology and infrastructure projects, facilitating the development of connected and autonomous vehicles that are SAE Level 4+ autonomous, meaning that the vehicles can detect their surroundings without user input; informing the LA about what infrastructure change and investment is required for future mobility operations; providing insights into policy and regulations for CAV, ITS and mobility service provision.

Existing infrastructure has been supplemented by (e.g. lighting columns, gantries, communications links, urban traffic management and control systems, and data infrastructure) with deployment of CCTV to enable the monitoring of CAVs during on-road tests; road-side units to enable communication between test vehicles and road infrastructure; weather stations and global navigation satellite system (GNSS) correction equipment to provide additional required information to test facility users. The Testbed implements technologies based on European and International standards (e.g. ITS-G5, LTE-V2X, and ETSI) with the emphasis being on testing emerging standards to determine which are most appropriate for larger scale deployment. The target audience for the project is therefore automotive manufacturers (OEMs) and suppliers, local authorities, government and logistics operators.

The TfWM team have worked alongside those with experience in previous CAV and intelligent mobility projects, staff from LAs across the region with expertise in urban traffic control system is also essential, local academic and industry partners to successfully execute the project and ensure that it meets the user requirements, due to its innovative nature. One of the main challenges has been the need for a centralized data-hub and the identification of relevant, desirable data-sets provided in a suitable format, such as, TRO (Traffic Regulation Order) data, which defines any regulations and restrictions on named roads. Existing means of storing data vary widely across collaborating LAs, requiring standardization.

The project is still ongoing, but impact has included growth in knowledge in LAs about future mobility technologies and the policies that could support or regulate them. Later, it is expected that there will be a significant opportunity to collect data about the use and performance of the transport system. By facilitating testing of vehicles, the testbed could support faster development of new mobility technologies in the West Midlands region, and economic development by attracting companies researching CAV technology to the region.

2.2. Development and demonstration of smart technologies to improve traffic flow through Intelligent Variable Message Systems (iVMS) in Coventry, UK

Coventry, like many cities has invested substantially in traffic management systems, including seeking to utilize new technology. However there has been little attempt to integrate travel management systems and managed interventions within travel systems (e.g. to respond to major incidents). The latter tend to be highly reactive, 'blanket' in their communication to all users and require high levels of human intervention. The aim of the project was to develop, demonstrate and test new traffic management systems, based on innovative iVMS technology, on three main road routes into Coventry.

The iVMS project aimed to receive constant real time traffic and journey data from strategically placed street infrastructure (Automatic Number Plate Recognition, Bluetooth Radar, CCTV, etc.), 'connected vehicles' (including, potentially, their drivers / passengers smartphones) and utilize this data stream, through traffic prediction and simulation models, to manage the traffic system as a whole - provide live in-journey information and guidance to travelers on journey conditions, routes and alternatives

This started with a period of upgrade and development centred around the need for new ('on-street') traffic signaling and communications equipment and capability (ANPR, Bluetooth, loops detecting vehicles, cloud-based technology, etc.) covering main routes in Coventry with the existing Urban Traffic Control system (UTMC). Examples of infrastructure upgrade include the installation of ANPR cameras and Bluetooth Radar sensors and their integration with existing, and upgraded, communication systems. In order to improve the level of communication between on-street devices and the UTMC system.

Therefore, the key objectives of iVMS were to 1) Increase the effectiveness of traffic management in Coventry, leading to reduced congestion and associated economic and social benefits; 2) Encourage behavioural change by individual travellers in support of congestion reduction; 3) Provide an enhanced test bed environment for future development of vehicle technologies and transport systems. 4) By enabling economic and social benefits associated with congestion reduction, providing an innovative model for traffic management technologies for the city, and a 'test-bed' capacity for future trials of innovative technology, the project is expected to support further local economic benefit to the sectors, businesses and citizens of Coventry.

7 partners from academia, industry and the local council worked together to provide accurate, reliable and timely travel information to ensure that informed choices could be made about when and how to travel. This required significant investment in roadside infrastructure such as variable message signs (VMS), improved real-time communications (vehicle to infrastructure and vehicle to driver) within the transport system allowed a more efficient use of existing infrastructure assets reducing congestion. The combination of mobile phone App technology with the latest developments in user interaction allowed virtual Variable Message Signs,

or intelligent Variable Message Systems (iVMS), to be deployed anywhere on the network. Real-time information could be tailored to the needs of specific user groups – freight, commuters, businesses, etc.

Although the project created the capacity and tool to encourage behavioural change, this could not be measured within the lifetime of the project, and up take of the system was lower than expected due to shortfalls in marketing and incentivization. However, once comprehensive traffic management plans and strategies have been put in place, enhancements to the existing UTMC system and the development of the upgraded and integrated traffic management platform will provide a greater ability to manage traffic flows, including individual behaviour, on the corridors.

2.3. Online platform for real-time passenger and freight traffic visualization in Kalamaria, Greece

Kalamaria is one of the biggest municipalities in Thessaloniki's area. Receiving transit traffic from Thessaloniki center, airport and the ring road some main roads have heavy traffic throughout the day. One of the main goals is to decrease freight and passenger traffic through the optimization of the traffic flow to promote better living standards for the local community.

SUITS supported and trialed an online platform to collect anonymous localization data reporting on location, speed and direction of freight and passenger vehicles providing a reliable and detailed overview of the entire local road network. The platform, for example, shows the points where freight vehicles stop and roads which are used by specific types of traffic. This enables estimated arrival time, accurate routing, transport assessment and planning decisions. The key objectives of the trial within SUITS were to demonstrate the value of crowdsourcing data for SM authorities, provide a cost effective way of aggregating, analyzing and presenting anonymized passenger and freight data, and aid in transport planning decision making. Therefore, the target groups were logistics operators, last mile delivery companies, drivers, local citizens, local authorities, institutions, academics who could be interested in improvements of freight distribution and routes in city centre (and deployment of parking spaces), low cost capture and visualization of real-time traffic data.

As a low-cost solution, the implementation requirements were simply the installation of GPS trackers in vehicles. Usage of digital technology devices (phones, tablets, PCs etc.) and management of traffic data from platform users. This is potentially an extremely important way for SM LAs to gain the mobility data they need, with SUITS demonstrating the feasibility and number of vehicles needed to provide accurate data and ways to overcome technological, anonymization and barriers to adoption.

2.4. Intelligent public transportation provided by the Public Transport Company STP Alba and Orange Romania

Alba Iulia Municipality aims to become the first smart city in Romania. Since 2017, the “Alba Iulia Smart City” project has implemented over 100 smart city solutions in partnership with over 30 companies. Some of which are in the mobility area and are relevant also to project SUITS, such as

i) the free WIFI in the buses initiative by Orange Romania in Alba Iulia which has led to the installation of smart public transport solutions, including Wi-Fi access to secure Internet for passengers and real-time access to information related to GPS positioning, speed and direction of movement in 15 trial buses. The free WIFI solution aims to provide a professional service dedicated to public transport, providing high-speed Wi-fi during the time spent by travelers on the bus. It aims to motivate citizens to use public transport by providing them with access to online content whether they are on their way to school, work etc

uRADMonitor solution integrated by Orange on the Alba Iulia Smart City platform to monitor which areas of the city have low air quality due to traffic jams. Environmental sensors have been installed in 15 buses of STP Alba Iulia, equipped with Internet connectivity or access to LoRaWAN. The data provides information about the level of pollution in the city and the surrounding area. They are transmitted in real time to a dashboard accessible from any Internet connection, providing real time information about the level of pollution and changes in pollution over time and location. This can be used to formulate citywide policy.

The key objectives of these and other projects in Alba Iulia are to 1) increase effectiveness of public transport at Alba Iulia and AIDA through introducing better services and encouraging the use of public transport, thus reducing congestion; 2) contribute to development of smart cities, eg in area of smart mobility; 3) encourage youth and other groups to use public transport and change mentality from car-oriented to sustainable transport oriented; 4) provide an enhanced test bed environment for future development of vehicle technologies and transport systems and 5) reduce the level of pollution from car transport by monitoring, analysis and impact studies. Hence the solutions target local citizens, Public Transport providers, drivers, and local authorities. Knowledge gained in Alba Iulia can contribute to knowledge about how to improve freight distribution, develop urban logistics plans, and supervise/regulate private carriers activities.

The main problems which have been faced have been to record the quality of air and the main pollutants within the city to show what the effect of these have been in terms of health, and the effects of car dependence on the quality of the city environment. Although Alba Iulia has been recognised as having one of the best public transport systems in Romania, people are reluctant to leave the perceived security of their cars to switch modes. Improving the services provided by public transport is seen as a possible way of encouraging modal shift.

The two solutions have had a positive impact of Alba Iulia, contributing to a behavioural change with citizens being provided more attractive public

transportation, high quality Internet in transit; better communication with the municipality about mobility issues and through e-Alba Iulia and Civic Alert applications, better air quality and less congestion. Using the city apps the administration can better measure the pulse of the city, bus surveys show passenger profiles and intelligence can be fed into transport planning. The Public Transport Company Alba Iulia now has a cloud based platform from which can be used to gather statistics on passengers and wifi use, Details of the configuration and operation of the equipment in public transport; monitor the fleet in real time, control connection settings, use a captive portal, create questionnaires and generate targetted banner advertising campaigns.

3. DISCUSSION

The SUITS project aims to support SM local authorities in their planning, implementation and evaluation of sustainable transport measures through a capacity change programme to transform, traditionally conservative, closed and male dominated departments into ones that are more diverse, open and innovative; who are not afraid to work outside their silos, consult with the public, or be innovative. We support this with a set of learning modules, to support staff who may be unfamiliar with latest financing and procurement legislation, the use of real time data or latest transport technology.

All the case studies demonstrate that there is a need for such outputs. All LAs were engaged with latest technology, implementations, using and combining data sets and engaging/changing behaviour of citizens. They needed to work across boundaries and institutions, and persuade operators, drivers and citizens to use new systems and travel in new ways. The case studies show variable levels of success in uptake and user engagement, but they have all provided valuable and transferable experiences to staff and citizens engaged on them, and to other LAs who need to create employees, organizations, cities and citizens who are more sensitive to the need to prioritize smart and sustainable lifestyles,

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REFERENCES

- [1] O. Papadopoulou, A. Founta and A.-M. Nienaber, "Building small-medium local authorities' capacity to implement transport measures: focus on procurement and behavioural change," in CIVITAS Forum 2019, Graz, Austria, 2019, 24th October.