Andree Woodcock, PhD[1]
Email: A.Woodcock@coventry.ac.uk
Anne-Marie Nienaber, PhD[2]
Email: ab4938@coventry.ac.uk
Olympia Papadopoulou, PhD[3]
Email: olympia.papadopoulou@lever.gr
Miriam Pirra, PhD[4]
Email: miriam.pirra@polito.it
[1] Centre for Arts, Memory and Communities, Coventry University, UK
[2] Centre for Trust, Peace and Social Relations, Coventry University, UK
[3] Lever Development Consultants S.A, Greece
[4] Transport Systems Research Group, Politenico di Torino, Italy

OVERVIEW OF H2020 CIVITAS SUITS: SUPPORTING LOCAL AUTHORITIES' DELIVERING SUSTAINABLE TRANSPORT MEASURES

- Invited lecture -

Key Words

Sustainable transport; Capacity building; H2020 CIVITAS SUITS; Crowdsourcing; Organizational change

Abstract

H2020 CIVITAS SUITS (**S**ustainable **U**rban **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. This paper provides an overview of the three core pillars of our capacity building approach; data collection; capacity building and organizational change

1. INTRODUCTION

H2020 CIVITAS SUITS recognized that small – medium local authorities (SM LAs), citizens and stakeholders have shortfalls in capacity which limit the extent to which they can act as 'equal partners' in the development of sustainable transport. This places them at a significant disadvantage in challenging, leading, promoting or implementing new sustainable transport measures, to the detriment of the social and economic well-being of their cities. It has targeted 4 key areas:

1.Capacity gaps in S-M local authorities' knowledge and work practices which may have arisen due government and economic cutbacks, re-organization, changing technology (e.g. open data), new business entrants, shifts in mobility, changing expectations of citizens and new directives (e.g. in terms of financing and procurement). Significantly these impact at individual, organizational and institutional levels, all of which need to be recognized to make transport departments resilient and responsive to new challenges.

2. The need for integrated urban mobility planning of both freight and passengers based on the capture and use of information relating to the diversity of active, private, public, shared and multimodal forms of transport, journey types and travelers/freight.

3.The need to exploit future transport technologies to improve transport efficiency and enhance quality of life, such as traffic management and control systems, real time travel and to create real opportunities for citizen engagement.

4.The need to maximize the effectiveness and sustainability of transport measures through transferable best practice (e.g. in terms of evaluation metrics), new funding models and create sustainable opportunities for new business entries, e.g. in areas of user focused end to end services deployment of new forms.

2. THE SUITS' APPROACH

As a Research and Innovation Action, SUITS has been funded for 4 years (2016-2020) to develop validated, practical and replicable tools and methods in relation to:

1. Cultural and behaviour change from a socio-technical, perspective at individual, organizational and institutional level;
2. The collection and use of real-time, open source and legacy data to inform urban mobility plans;
3. Addressing requirements of vulnerable and hard to reach groups;
4. The integration of freight and passenger information and measures;
5. Increasing the appreciation of the wider benefits of sustainable transport to citizens and cities by all stakeholders in the transport ecosystems;
6. Sustainable and innovative financing for new transport measures;
7. Compliance with new procurement directives;

8. Development of appropriate evaluation methods and tools for sustainable transport and mobility needs.

The paper provides an overview of three key areas of work in relation to data, capacity building and organizational change.

2.1. Data integration and crowdsourcing approaches in Kalamaria and Torino

Gap analysis performed in the 9 local authorities in SUITS (Alba Iulia, Coventry, Erfurt, Kalamaria, Palanga, Rome, Stuttgart, Torino and Valencia) showed the need of increasing information about freight flows, O-D, the traffic matrix (i.e. transport patterns and demand characterization (e.g. purpose of journeys, frequency and type of freight loads, vehicle propulsion systems, fleet characteristics or passenger satisfaction data) and active mobility (especially about bike trips and infrastructures).

Being able to capture as much data as possible does not guarantee that the information will be valuable, accurate and useful. Data analysis methods allow local authorities to interpret data gathered in order to assess the current situation, support decision making and evaluate future effects of these measures. Mobility data collected in cities is habitually used to calculate performance indicators, which allow the quantification of the added value generated by the application of a (set of) mobility measure(s). KPIs are crucial for the assessment of current situation of urban mobility, but even more to be able to compare evolution over time (e.g. when introducing some measures).

To demonstrate the value of mobility data, and how crowdsourcing could be used to by LAs, for example to develop and evaluate performance against KPIs (Key Performance Indicators) and visualise /analyse data, 2 pilot trials were held [7].

The Torino pilot addressed the KPI, ‘‘Delays in road traffic and in public transport during peak hours compared to free flow travel” by measuring the way in which congestion selectively affects different traffic streams, with special emphasis on light duty vehicles, according to the specific service points that need to be reached in the city and of the time of the day / day of the week in which such trips are taken. This was achieved by combining three datasets 1) light and heavy vehicle flows on major arterials entering the city; 2) traffic flows on the whole network; 4) GPS traces of logistics vehicles; 4) shopping survey and observational data. Data fusion methodology was developed through specialised scientific software, namely QGIS (https://www.qgis.org) for the analysis and visualisation of spatial data such as GPS traces and road network graphs, and R (https://cran.r-project.org/) for statistical computations of the KPIs. The software is open source and freely usable, thus making the proposed SUITS method fully reproducible without any barrier.

The Kalamaria pilot addressed the integration of passengers and freight using 4 data sets relating to 1) traffic design; 2) passenger data; 3) logistics vehicles; 4) and large goods vehicle data,

However, SM LAs may not have appropriate datasets or skills needed to work with such tools. SUITS has therefore proposed the use of crowdsourcing mobility traces is a scalable and sustainable means of collecting such data.

A popular and preferred format for recording and storing crowdsourced traces is GPX, or "*GPS eXchange format*", which is an XML file format for storing coordinate data. It can store waypoints, tracks, routes and traces in a way that is easy to process and to convert to other forms. Millions or billions of GPX trace files can be uploaded by individual contributors (citizens, logistics or transport operators) and be made available from global Open Data Repositories (as open, big data) for further exploitation. Within SUITS, SBOING developed a suite of tools to facilitate the flexible collection and selection of crowdsourcing traces in SUITS' Data Repository (https://dare.suits-project.eu/tools).

The scalability and sustainability of the use of crowdsourcing for urban traffic management was tested using SBOING's sbCarNavi® app as a fleet management platform to automatically records the vehicle's route as soon as the driver runs it on the vehicle's console. This generates real-time traffic data for the city and allows the fleet operator to monitor its vehicles (see MyPolisLive.net).

This work has demonstrated the strength of combining datasets for developing KPIs and the potential of crowdsourcing for smaller SM LAs. All SUITS outputs have been documented [8] and LAs are free to use the resources on the websites. Further support is also offered through SUITS' capacity building program.

2.2. Capacity Building Programme (CBP)

Working extensively with the transport departments of partner cities (Alba Iulia, Transport for West Midlands, Kalamaria, Turin, Rome and Valencia and follower cities of Dachau, Stuttgart and Palanga) SUITS has determined firstly existing gaps in knowledge and secondly what changes need to be made within the organizations for them to work more effectively, apply, use and measure the impact of capacity building measures. This has confirmed that LAs face many challenges developing sustainable urban planning measures and deploying innovative mobility solutions and technologies. Despite comprehensive EU Guidelines, LAs may struggle to perform exhaustive preliminary analyses, develop SMART goals coupled with long-term vision and impact assessment. Furthermore, substantial drawbacks occur in the implementation phase, particularly in terms of improving conceptual planning processes and establishing sustainable financing schemes. This derives from the lack of appropriate expertise and organizational structures which impede innovation and barriers to interdepartmental working needed for smart city development.

Requirements analysis and reviews of existing guidelines, has led to the development and implementation of 6 tailorable modules, especially designed for SM LAs which aim to 1) increase the capacity to develop and implement sustainable, inclusive, integrated and accessible transport; 2) support development of SUMPs by transforming them into learning organizations and 3) increase

resilience and responsiveness of transport departments to new challenges and changes.

The 6 modules relate to:

1. Implementation of emerging transport technologies
2. Introduction of innovative transport schemes
3. Implementation of urban transport safety and security measures for all users
4. Implementation of urban freight transport measures
5. Innovative financing, procurement and business models
6. Data collection and analysis tools for integrated measures

Each module includes a Facilitator Guide, appropriate training material delivered either as classroom courses or e-learning modules. The courses have been structured in order to clarify the value of measures for SM LAs, analyse successful case, present innovative financing and procurement procedures tailored to topic requirements as well as tools and guidelines for the enhancement of measures' implementation and user engagement.

The CBP has been assessed piloted with SUITS cities. In the next 12 months, all material will be released (in Italian, Spanish, Portuguese, Greek, Lithuanian, German, and Romanian) as the SUITS Capacity Building Manual and Toolbox (freely available to the Open Research Data Portal and to the CIVITAS Urban Mobility Tool Inventory).

2.3. Organizational change

As a CIVITAS project SUITS supports the view that Sustainable Urban Mobility Plan" (SUMP2.0) is an important part of sustainable urban transport innovations. A SUMP is a strategic transport plan that helps cities to deliver on their sustainability objectives by outlining the city's transport and mobility measures. Not all cities, and especially SM cities, have the resources to develop such wide scale plans [1].

Therefore, SUITS' outputs support cities developing sustainable transport measures. The nature of the organizations (i.e. local authorities) responsible for the design and implementation of transport measures is a key factor in the in the design and implementation of sustainable transport measures.

To do this, the transport departments in LAs must increase their organizational capacity. Many are already facing extremely challenging situations, affecting and disrupting their business model and institutional logic, which threatens public sector employees. Organizational change is a necessity, driven by socio-political-environmental and financial imperatives.

In the context of transport and mobility, the technology is already in place, it is the employees in local authorities which need to be considered as without their support and knowledge sustainable transport measures will not be implemented. Employees have to be willing, able and motivated to deliver against sustainability targets. To do so requires them thinking and working in new ways, with new teams, using new information and supporting technologies which they are unfamiliar with.

By bringing technological/technical and social/behavioural change together, organizations can achieve better operational performance. Recognizing the importance of these two facets of change, SUITS is demonstrating how a socio-technical approach to change in LAs underpins implementation.

A learning organization is one "skilled at creating, acquiring, and transferring knowledge, and at modifying its behaviour to reflect new knowledge and insights" [4, p.3]. It is characterized by establishing and communicating a clear sense of direction and purpose; empowering employees at all levels; accumulating and sharing internal knowledge; gathering and integrating external information; challenging the status quo and enabling creativity [5].

SUITS has developed, in consultation with its city partners an 8-step approach to transforming traditional transport departments in to learning organizations. The steps are outlined in Table 1. All cities are working through, and supported in, working through the stages, with action learning sets, joint city workshops, regular exchanges with the Coventry team and feedback reports. Cities are now entering steps 7 and 8 of the cycle, with the whole socio – technical approach due for completion and write up in 2010.

Table 1. 8 Steps for organizational change

Step 1	Understanding the urgency for organizational change
Step 2	Creating a guiding coalition
Step 3	Developing the change vision
Step 4	Communicating the change vision
Step 5	Empowering broad-based action
Step 6	Generating short term wins
Step 7	Consolidating gains and producing more change - Evaluation
Step 8	Adopting new approaches in the organizations

3. DISCUSSION AND CONCLUSIONS

SUITS is one of a number projects which aims to support local authorities in the development of sustainable transport measures (www.eltis.org). Such projects can proceed with or without a SUMP. SUITS outputs are supportive of, and feed into the SUMP 2.0 planning, but do not require LAs to have one to use the outputs.

There has and will continue to be massive investment in different forms of sustainable transport projects and development of new transport technologies. Having worked on SUITS for 3 years and FP7 METPEX prior to this [3], it is difficult to underestimate the challenges which cities face – in gaining investment, choosing the right technology, the right transport measure, in working with new concepts and in engaging the public and convincing them to switch transport modes. Although painful, with so many pressures, LAs need to buy into and use the resources

provided by projects such as SUITS, to make sure that they make the right decsions for their city and their citizens.

Technology and large infrastructure projects continue to attract the largest funding, the biggest headlines, but they have been shown to not provide equal benefits to all citizens, or even be value for money. LAs are often left to struggle with obsolete technology, disruptive technology which may decrease inclusivity and cause extra problems [2].

The heart of sustainable mobility debate does not lie with open data, CAV or electric vehicles, at its heart are those who deliver the service in the city and those who have to use it. H2020 CIVITAS SUITS has tried to address these needs, but future funding calls need to continue to ensure that people and LAs are placed at funding.

ACKNOWLEDGEMENTS

H2020CIVITAS SUITS project has been funded by the European Union's Horizon 2020 research and Innovation programme under grant agreement no 690650. The views expressed are those of the author

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.

[2] A.Woodcock, S. Spundflasch, F. Rudolph, K.Glainsor, K.Fadden-Hopper, K. Miller- Crolla, "Maas implementation; Local authorities' perspectives?" in CIVITAS Forum 2019, Graz, Austria, 2019, 24th October.

[3] M. Tovey, A. Woodcock and J.Osmond (Eds) *Designing Mobility and Transport Services: Developing traveler experience tools*, Routledge, 2016

[4] D.A. Garvin, "Building a learning organization," *Harvard Business Review,* July-August, 1993.

[5] S. J. Shin, F.Yuan and J. Zhou, J. "When perceived innovation job requirement increases employee innovative behavior: a sensemaking perspective," *J. Organ. Behav.* 38, 68–86, 2017.

[6] M. Pirra and M. Diana, "Design of demo of data collection, architecture of the system and analysis methodologies," D8.3, H2020 CIVITAS SUITS.