

From Sustainable Urban Mobility Plans (SUMP) to Operational Energy Policies and Measures for the City of Tomorrow

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Abstract. Technology, mobility and the large availability of data have dramatically changed values, expectations, approaches and jobs as well as the ways of understanding, interacting, living and working of individuals and communities. Therefore a more comprehensive perspective and new ways of thinking, designing, planning and managing cities are urgently needed. Confronted with increased exigencies in the conditions of reduced resources and ever growing levels of complexity and instability, public administrations are desperately calling for help. Based on the innovations developed, tested and promoted in the framework of Civitas PROSPERITY European project (focused on enhancing the adoption and efficiency of Sustainable Urban Mobility Plans), the present contribution is extrapolating this experience offering insights on public capacity building and on the sustainable preparation and implementation of various urban policies and measures and especially of the ones regarding energy efficiency. The latter are being regarded from a comprehensive, integrated and inclusive perspective, being considered essential for the wealth of a city and of its inhabitants.

1 Context

Over the past decades, communication and information technologies knew an unprecedented advancement enhancing liberty as well as control, (long distance) transport democratised, life expectancy and population number increased, sharing economy raised, tangible and intangible assets multiplied, while values changed. On the other hand, migrations became more and more significant and frequent, social and cultural conflicts, disparities, hazardous events, insecurity and terrorism sharpened and, above all, consume, waste, pollution and pressures are ever more important (IPCC, 2014; WWF, 2018).

In this profoundly changed context, characterised by amplified instability, uncertainty (due to, among others, global volatility and technological advances, as explained by Lyons and Davidson, 2016), complexity and globalisation; traditional methods and instruments can no longer work properly, so public authorities and societies have to move on towards a new paradigm (Murray et al., 2010; Tosics, 2011; Boonstra and Boelens, 2011).

Rizzo (1989) observed that there is an undeniable relationship between the energetic flows and the way in which a city is designed, built, maintained and managed. He considered that it is when the levels of entropy are too high, that big changes occur, namely the shift to a different energetic model with the development of new

economic, social and political institutions. Furthermore he noticed that the ever increased amount of energy needed along the evolution of production activities, was not always accompanied by an equivalent augmentation of the productivity, but rather of a reduction of the work needed. According to Rizzo, a real evolution cannot be limited to the simple substitution of the manpower by advanced technological instruments, but should refer to the invention and application of technological systems that allow using better the same or a larger amount of work. Hence technology should allow advancing from a quantitative progress with elevated entropy to a qualitative one with low entropy, the energy making the difference between harmony and entropy.

Similarly, Alvarez Pereira (2017) noticed that despite our expectations that technology is going to solve all problems, today high levels of development imply large energy footprints, thus through their evolution people tending to destroy the material conditions of their own existence. For sure, nature is no longer an issue in this discussion as it will recover somehow, but it might be in a form no longer favourable to human beings (Rotaru, 2013).

In this context, energy (and especially its management) has always a crucial importance and its production, distribution and consumption are depending of the urban flows and land-use planning (spatial organisation). Therefore, these 3 issues (energy efficiency, urban mobility and land-use) have to be

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considered together, correlated, especially as they are all pursuing the improvement of the quality of life, the increase in efficiency and the reduction of negative externalities. As also noticed by Fresner et al. (2018) “individual sectoral plans dealing with energy, transport and mobility separately have often proved inefficient to provide effective, long-term solutions”. Hence there is a need of “working on those areas which are complementary in order to have the plans working together for the achievement of an overall strategic objective [...] and help different departments in local authorities share the same vision, work together and optimize the use of resources”. Moreover, according to the statistics and analysis published by the European Commission (2013c) and by the European Environment Agency (2018) based on Eurostat data, if in some other areas energy consumption could be slightly reduced or kept more or less at the same level, transport is the only sector where it augmented decisively and this trend is expected to continue. Between 1990 and 2016, there was a 34 % net growth in the energy consumption of transport in the EEA-33 (European Environment Agency, 2018). Despite the fact that cars became more energy efficient, the preference for bigger and stronger SUV (sport utility vehicles) is steadily growing. The saved energy due to more energy efficient current cars is compensated by an increase in the power of cars and in their use (faster cars and longer distances). Besides, better performing technology usually needs more energy to produce, operate and disable. In order to address the difficulty to decrease energy consumption in the urban mobility field, Lyons and Davidson (2016) analyse the possibility to limit the need of physical mobility (seen as only one of the means to accessibility) through spatial proximity and digital connectivity. Furthermore, they refer the Triple Access System (associating these 3 elements) as a “framework for policy and investment decisions that can harness flexibility and resilience”, that was used in the process of future mobility scenarios building conducted in New Zealand in 2014. This hypothesis has also served as one of the starting points for several Horizon2020 European like Civitas PROSPERITY and CREATE.

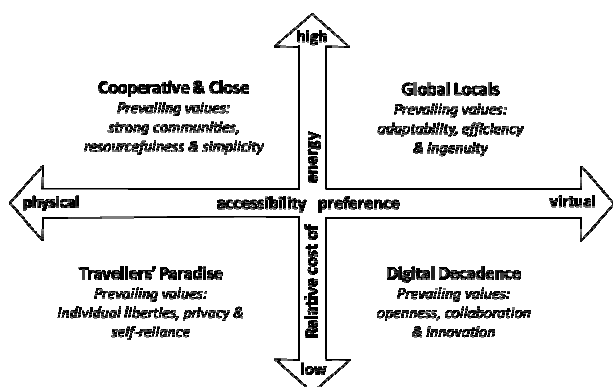


Fig. 1. The Triple Access System framing in 2014 the definition of 4 main scenarios for future mobility and society in New Zealand in 2042. Reinterpretation after Lyons and Davidson (2016, p. 109)

2 Civitas PROSPERITY - a resourceful experience

Started since September 2016, Civitas PROSPERITY is a 3 years research and innovation project developed in the framework of Horizon 2020 in response to the call “Mobility for Growth” (sub call topic of “Urban Mobility”) corresponding to the societal challenge “Smart, Green and Integrated Transport”. It focused on rendering the Sustainable Urban Mobility Plans (SUMP) an effective operational tool especially in countries, regions and cities where the essence and potential of this instrument were not yet fully understood and capitalised. Based on a comprehensive analysis of the urban mobility situation at national, regional and local levels conducted in the target countries (the results of which were presented in the framework of the European SUMP conference from 2017 and published on the project website), it supported the proposition of customised solutions best answering the various specific issues, but widely informed by the international experience and theoretical and practical advancements in the field.

Civitas PROSPERITY is considered a particularly resourceful experience as it enabled the development of a strategy for the optimisation of the SUMP that can be extrapolated for land-use plans and energy plans for their harmonization with the mobility ones in a first phase, in the preparation of the next steps supposing the integration of the objectives and actions from these 3 fields in an unitary system (plan or, in a later stage, 3D intelligent model). Moreover, if energy might seem something abstract for many, urban mobility is a really concrete daily issue for everybody, therefore analysing theories, decision making and measures in this sector together with their impacts can enable general understanding and orient other urban management areas.

Inspired by the philosophy of the SUMP as promoted at European level (European Commission, 2007; 2013a; 2013b) Civitas PROSPERITY rendered possible the development of a virtuous methodology of collaborative integrated planning possible to adapt to the various specific contexts while following the same core principles. It thus enabled public authorities solve their problems and regain legitimacy and acceptance, by re-establishing the connections with the other levels of governance and capitalizing the national and European exchanges with their peers as well as the genuine intelligence of local communities.

Despite the actual tendency of flattening hierarchies in favour of collaborative systems of governance (Folke et al., 2005; Boyd et al., 2015) that take advantage of a widespread network of subjects (citizens as sensors) in supporting central decision-making processes, there are a lot of missing connections preventing the various public and private initiatives and efforts reach their full potential. City planning and management in particular seem still tributary to traditional models (Rotaru, 2014). In this sense, one of the strongest outputs of PROSPERITY resulted from the fact that the exchanges were not limited to peers from different countries as in the case of most European initiatives, but it got involved

the representatives of the Ministries and high level authorities and focused on fostering communication between the ones making the rules (at national level) and the ones that have to interpret and apply them (at regional and local levels), thus facilitating a better adaptation of the dedicated legislation and support measures.

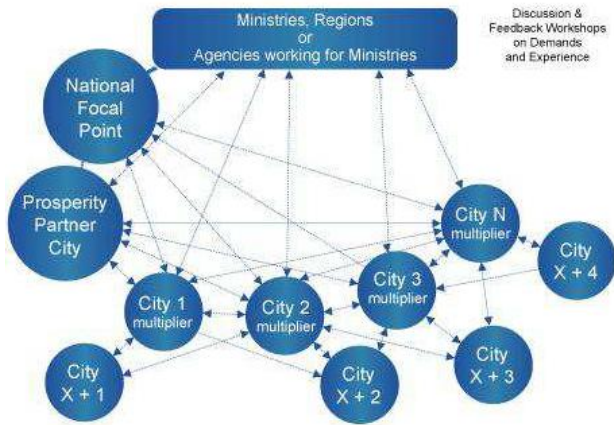


Fig. 2. The organisation of the national regular exchanges in the framework of Civitas PROSPERITY. Source: Civitas PROSPERITY <http://sump-network.eu>

In order to ensure the durability and the efficacy of those links between the various levels and professionals concerned, SUMP taskforces were created as permanent transverse national structures (formed of people from all the categories of stakeholders, functioning on a voluntary basis and meant to continue even after the end of the project) that gather information from the territory and advise the optimisation of the SUMP. In their framework there were produced or improved the SUMP national support programmes following a unitary structure advanced and validated in Flanders and in Slovenia (Demšar Mitrovič, 2017).

Like this, Civitas PROSPERITY succeeded to regularly bring together the policy makers and professionals working with those policies (through periodical face-to-face meetings – at least 2 per year and online exchanges: videoconferences and webinars). This enabled changes of attitudes and behaviours, losing the gap between the needs and demands of the local level, and higher administrative institutions supposed to prepare the ground and provide programmes to encourage cities design and implement SUMP. For example, in Romania, these exchanges brought a better awareness and capitalization of the relevance of functional connections over the urban mobility and development. Presently, at national level (Ministry for Regional Development and Public Administration) there are negotiations for the adaptation of the legislative framework in order to promote functional area SUMP beyond the administrative level ones. In this sense, significant help came from Flanders region which experience on this specific topic has been summarized into a dedicated innovation brief published on the project site in several languages. Additionally, efforts are being

made in order to provide specific guidance and requirements for the SUMP of small and medium sized cities representing the majority in Romania.

The actual challenges (uncertainty, acceleration of the rhythm of change, limitation of resources, abundance of information and huge increase in fashion generated demand responding to an artificially created need) were addressed through the adoption of the project anticipation theory. This resulted in the promotion of the advancement from the regime-compliant “predict and provide” approach to the regime-testing “vision and validate” one, explained by Lyons and Davidson (2016) and also endorsed through the CREATE European project.

The overall support offered to public administrations in target countries was completed through the organisation of tailor-made coaching sessions and national trainings (coordinated by European experts) with a strong operational component. These were given in national languages so that to reduce the barriers of understanding. The selection of themes was made depending on the demands in each country and the training modules were adapted each time to the local realities and involving participants in real case studies inspired by their daily work and challenges. These were complemented by open access webinars on the most demanded themes (<http://sump-network.eu/webinars/>).

The trainer/coach team was composed each time of both, experts and successful city representatives. The latter were involved because they “speak the language of cities” knowing exactly how public administrations are organised and which are their main challenges and tools. Compared to regular training approaches this has proven to be a new and more successful one.

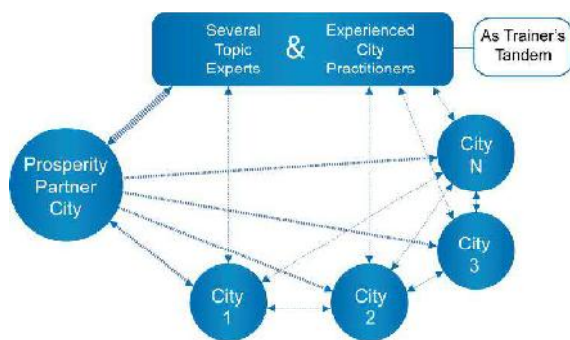


Fig. 3. Civitas PROSPERITY's training and coaching concept. Source: Civitas PROSPERITY <http://sump-network.eu>

Moreover, a network of cities was created including champion and follower ones. Selected best performing cities were acknowledged as champion cities and invited to share their experience on the occasion of the national promotion, training and coaching events, serving as reference and inspiration for the follower ones. Among the champion cities, Vitoria Gasteiz provided policy makers having supported and participated in the implementation of the Superblocks scheme at the core of their SUMP who advised their peers from follower

cities. A dedicated innovation brief was published on Civitas PROSPERITY website in 7 languages (with more translations in preparation). Furthermore, a project meeting and study visit were organised in Vitoria Gasteiz for local, regional and national level representatives in the project countries.

Partner cities were meant to play the role of innovation labs, while the coaching sessions dedicated to them enabled knowledge transfer and work on specific local issues backed by a broader international perspective.

The different solutions applied in local situations allowed the distinction of promising innovations to be promoted (through the innovation briefs developed in this context). Their selection has chiefly considered the possibility to apply them in more economically developed countries as well as in poorer ones, the team being faithful to the conviction that inspiration can go in both senses. They are all available in English and different project languages on the Civitas PROSPERITY website (<http://sump-network.eu/tools-resources/>).

The promotion of adaptive flexible solutions and the long term thinking also guiding short and medium term actions resulted in the correlation of the various projects in the same field as well as in their harmonization with the measures in related sectors. For example, the project inspired the update of the SUMP of Făgăraș, the Romanian partner city, reorganised around 3 main interrelated projects aimed to restructure together the entire urban mobility system of the city, but also working individually in relation with the different energy and urban design measures. Those 3 projects were presented for being funded through the Regional Operational Programme and their implementation should start this year.

Additionally, a special topic, SUMP ambassadors, was launched including people who were successful in their urban mobility initiatives and willing to share their experience and possibly act as advisors. This enabled the dissemination of the endeavours of the ones that supported the preparation, promotion and implementation of the best SUMPs. <http://sump-network.eu/ambassadors>. Authentic role models, the SUMP ambassadors helped build confidence and inspired tailored-made good practices.

Successful urban governance is frequently a matter of communication, shared references and political commitment, issues at the core of this project. The methods and tools developed and tested through PROSPERITY proved effective in enabling national and regional public authorities benefit of input and feedback from all the ones affected by their policies and measures, and empower local authorities by providing them the context to express their needs and opinions and enhancing their capacity to better understand and apply the general guidelines, recommendations and rules (Prosperity, 2019). It thus demonstrated the value and sustainability of network thinking also in terms of governance.

3 Conclusions and ways forward

The principles that were validated through Civitas PROSPERITY for urban mobility management and can be extended to the other urban governance sectors are:

- 1) Enhanced connectivity / multilevel networks replacing strict hierarchies: horizontal (between peers) and vertical (between governance levels);
 - 2) Comprehensive perspective: multi-time scale correlation (long term perspective guiding short and medium term planning), spatial correlation (building – neighbourhood – city – territory) and broad assessment (of direct and indirect, internal and external costs and impacts)
 - 3) Function prevailing over administrative limits (principle validated through the positive impact of the functional area SUMPs tested in Flanders and Wallonia)
 - 4) Flexible / tailor-made approach: adaptation to the local context, integrating the existing practices and regulatory frameworks
 - 5) Extensive participation (and crowd sourcing): structures enabling people contribute (express and develop ideas together)
 - 6) Role models: champion cities and SUMP ambassadors
 - 7) Production of references: innovation briefs, applied research
 - 8) Experimentation / flexibility of thinking as well as of the infrastructure provided / place for creativity: partner cities as living innovation labs
 - 9) Shared strategic vision: interdisciplinary approach and correlation of the various sectors
 - 10) Inclusive approach: balanced development of all modes of transport, while favouring environment-friendly mobility and giving priority to more vulnerable users (children, seniors, impaired people)
 - 11) Political and inter-departmental buy-in: involvement of the political level and of the different departments directly or indirectly connected to urban mobility
 - 12) Collaboration with similar projects and capitalisation of the best practices: use of the SUMP European guidelines and contribution to their update;
 - 13) anticipative thinking: integration and further advancement of the “vision and validate” approach also promoted through the CREATE project in replacement of the traditional “predict and provide” theory (Jones, 2016a, 2016b).
- A novelty of PROSPERITY, the involvement of ministries and high level (national and regional) authorities proved to be very beneficial for the implementation and impact of the project rendering its proposals easier accepted and more proficient. This idea could be adopted in the fields of energy and land-use planning and further by creating a similar multilevel collaboration connecting not only the various authorities in one field, but also the different urban planning sectors (energy efficiency, urban mobility and land-use).

Besides the essential contribution in terms of methodology and process management, distinguishing through the extensive involvement of all governance levels (and especially of the high level authorities) as equal partners in the process of improving the sustainability of the management and functioning of cities, an essential output of PROSPERITY was represented by the innovation briefs. The latter stressed some key elements to be capitalised for advancing towards more liveable cities. Veritable flexible “recipes”, they contain all the necessary elements to be easily adapted and implemented in various contexts. Their content and impact going beyond the urban mobility, they play the role of interdisciplinary references possibly nurturing multiple sectors of city management.

However, in order to attain their full potential, the collaborative structures (like the SUMP national taskforces and the SUMP national programmes) and mechanisms advanced in this context have to be applied at a larger scale (more cities and countries) and refer to all urban planning fields.

As demonstrated through PROSPERITY (Civitas Prosperity, 2019), this integrated approach proposed to connect the various scales (micro - building, meso - neighbourhood and macro - city) and also for some sectors already exercising reciprocal influences one upon another, can reduce the energy needed thanks to a better correlation of efforts that are concomitantly responding to multiple needs and / or lead to the simplification of processes.

In Romania, a first step has been done through the inclusion of the SUMP as a compulsory component of the city land-use and spatial development plan (the so-called General Urban Plan), complemented by efforts to correlate the various time spans of the different urban planning documents. What limited the success of this initiative was the absence of adapted evaluation, approval and monitoring procedures. There are still no specific performance / quality indicators (besides the administrative compliance request) and the commissions are not kept to include urban mobility professionals.

Meanwhile, the Sustainable Energy Action Plans (SEAP) compulsory for all the signatories of the Covenant of the Mayors for Climate and Energy are of a more recent date and less known and connected to the other planning documents, even if following the same principles as the SUMPs and highly influencing cities’ sustainability.

In order to overcome this retard, it would worth further investigating the possible transverse connectors, like for instance the systems allowing fast transmission of information and energy and enabling important economies. Lighting systems for example can play such a role and ensure the link between the different urban planning sectors as they can capture and transmit information (such as traffic data) and energy besides their basic role (networked / connected lighting systems).

Together with circular economy, multi-functionality enables the more efficient use of resources, partially regenerated through creativity, thus contributing to the reduction of energy consumption, waste and entropy.

However, this kind of arrangements demand advanced vertical (across management levels) and horizontal (between various sectors) collaboration.

Therefore, for all these connections and processes work properly, efforts are also to be made for the development of the collaboration culture still missing in many contexts and particularly in public administration because of its more rigid nature and elevated inertia (Ritchie, 2014).

The progressive integration of the idea of BIM (Building Information Model) requested more and more often for public projects has opened new perspectives. In the building sector, the correlation between the various disciplines is obtained through the architectural and technical synthesis that consists in the superposition of the different plans (architecture, structure and various networks) in order to define the necessary reservations and identify and solve the eventual conflicts. BIM not only facilitated the significant optimisation of the entire building process, enabling as well important economies over the entire lifetime of an edifice, but also changed the way of working imposing collaboration as an indispensable approach.

A very complex tool following the same principles as an SUMP, BIM radically changes the design and management of systems for which it is used, requiring different levels of cooperation. Similarly to the way BIM gathers and connects the various specialities intervening into the construction (and management) of a building, it could also serve for the integration of the various urban plans and strategies in an unitary system, allowing their real time correlation through fast identification and solving of the various conflicts and thus enabling significant economies (of energy, time, work load etc.). This organisation could then further evolve into a living urban management 3D model integrating and better optimising all the information actually contained in the various city plans and strategies (updated in real time). Besides providing the advantages of an economy of scale, such a model would help adopt a preventive and proactive attitude instead of a reactive one. Through the easier and faster elimination of conflicts before they start having negative consequences, it can simplify procedures, limit the negative impacts and enhance the positive ones in the conditions of reduced consumes of energy. Some very incipient steps in this sense have already been done with the development of the traffic model associated to the SUMP, the use and impact of which is however still very limited.

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