Smart Governance in Urban Mobility Process

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Abstract. This paper is interested in the interplay between smart governance and urban mobility planning in the context of smart city. Mobility is one of the key urban domains, thus, it is crucial to analyze the governance models behind it, especially from two perspectives: participation of stakeholders and decision-making procedures. More specifically, this project takes a closer look at the European approach to rather top-down initiated Sustainable Urban Mobility Plans (SUMP) and analyses how they are designed and implemented in the Baltic Sea region, with an in-depth focus on the city of Tallinn where interviews with city officials and mobility stakeholders were conducted. The results indicate that the top-down approach has not been taken over effectively by the city officials and thus, creating the lack of ownership on the local level. The Tallinn SUMP involved key stakeholders into the planning process including satellite areas and various interests' groups. On the other hand, technology-enabled participation of citizens remains weak.

Keywords: Smart city · Urban mobility · Smart governance · SUMP · Participation

1 Related Work: Smart Governance and Mobility

The smart city governance as a term is evolving and there are several definitions among researchers and practitioners without widespread consensus (Bolívar and Meijer 2016; Ruhlandt 2018). Smart governance, as one key dimension of smart cities (Bolívar and Meijer 2016; Lopes 2017), helps to reshape administrative processes and structures across multiple city agencies (Alawadhi and Scholl 2016). Involving stakeholders is seen as a prerequisite to successful smart city initiatives (Alawadhi and Scholl 2016) that also can be more broadly conceptualized as smart collaboration (Viale Pereira et al. 2017). Tomor et al. (2019) define, based on the systematic literature review, smart governance as "*technology-enabled collaboration between citizens and local governments to advance sustainable development*," applied as a working definition in this analysis.

In the case of urban mobility, the main challenges have been related to the growing demand for passenger and freight transport due to urbanization, resulting in increased congestion, pollution and quality of life (Kiba-Janiak and Witkowski 2019). In Europe, this has triggered the European Commission (EC) to promote the concept of Sustainable

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Urban Mobility Plans (SUMP), especially for the capital city regions. According to Maria et al. (2018), SUMPs are not new in Europe but go back decades and have several precedents in larger countries like France, UK, Italy and Germany; the aim of SUMP is to propose a strategy to reduce the increasing dependency on private cars and thus also reduce Carbon dioxide (CO2) emissions; these plans are usually designed for ten to fifteen years.

Several authors propose methodology for SUMP, analyse specific cities and/or propose integration models for multilevel transports system planning (Maria et al. 2018; May 2015; Okraszewska et al. 2018). Zawieska and Pieriegud (2018) take more global perspective on sustainable governance of transport systems and they investigate CO2 emissions for different potential scenarios in the case of Warsaw (Poland) using the United Nations' ForFITS model and also evaluating the additional impact on CO2 in the case of mobility. According to Zawieska and Pieriegud (2018), meeting the reduction targets set by European Union 2011 whitepaper (precedent of SUMP guidance) is challenging. There is also a question how SUMPs contribute to broader key societal challenges such as the United Nations Sustainable Development Goals. In general, SUMPs are non-existing concepts in the most European member states (Arsenio et al. 2016).

In the context of central-local government collaboration models, May (2015) has developed recommendations that enable governments to support their cities in developing SUMPs based on the EC guidelines and tested them against current practice in six European countries (Belgium, France, Germany, Italy, Netherlands, Norway and UK) resulting in 9 recommendations in 20 criteria. As there is limited literature on the topic, Maria et al. (2018) propose a methodology to evaluate SUMPs from the cost-effectiveness perspective (in the case of Burgos, Spain). Another group of authors (Okraszewska et al. 2018) propose that the process of SUMP should be involved into a transport modelling framework. They analyse the efficacy of the Multilevel Model of Transport Systems for the SUMP process, considering behavioral aspects, and test it empirically in the city of Gdynia (Poland).

May (2015), when analyzing the size of cities of SUMPs, claims that since the EC guidance paper was published (European Commission 2013), the number of cities preparing for SUMP increased substantially. May (2015) covers the preparation of this guidance both at an European level and also at national level in Belgium, France, Germany, Italy, Poland, Scandinavia, Spain and the UK and identifies the weaknesses in the preparation of SUMPs and reviews the research which has been undertaken to overcome barriers. It is also important that having a SUMP is linked to future European Union funding into cities, which is seen as one of the key top-down initiated triggers.

Conceptually, there seems to be no direct link between smart cities and SUMPs, although there are several attempts to link these indirectly. One approach is proposed by Melo et al. (2017) that see urban traffic management systems as digital solutions that can transform cities to smart cities. The authors also develop a performance evaluation of re-routing for all types of vehicles in the case of city of Lisbon and analyse this from the urban network level. That type of digital tools can be enabled in order to reduce congestion that is one of the key goals of SUMPs. When linking the SUMP to digital methods and Intelligent Transport Systems (ITS), Cledou et al. (2018) claim that smart mobility initiatives require specialized and contextualised policies addressing the

needs and interests of many stakeholders involved. They propose a global taxonomy for planning and designing smart mobility services. Docherty et al. 2018 in parallel propose a model for smart mobility governance based on the public value theory.

1.1 Key Characteristics of the SUMPs in Europe

According to the EC, Sustainable Urban Mobility Planning is the most important topic in the Urban Mobility Package (European Commission 2013). The SUMP concept foresees that plans are developed in cooperation across different policy areas and sectors, across different levels of government and administration and in cooperation with citizens and other stakeholders.

The EC has actively promoted this concept for several years with pre-developed guidelines, which provide local authorities a framework for the development and implementation of such a plan. However, Member States (central governments) need to promote those practices at national level and to ensure the right legislative and support conditions for their local authorities.

The EC plans to continue to support the development of SUMPs through funding instruments and is continuously expending its SUMP-specific information hub Eltis urban mobility observatory (www.eltis.org). According to the Eltis city database tool, there are over 400 SUMPs published online from different European countries.

According to the EC concept for sustainable urban mobility plans, the key characteristics of the SUMP are:

- A SUMP has a central goal improving accessibility of urban areas and providing high-quality and sustainable mobility and transport to, through and within the urban area. It regards the needs of the 'functioning city' and its hinterland rather than a municipal administrative region. The plan is accessible and meets the basic mobility needs of all users;
- A SUMP presents, or is linked to an existing, long-term strategy for the future development of the urban area and, in this context, for the future development of transport and mobility infrastructure and services.
- A SUMP equally includes a delivery plan for short-term implementation of the strategy. This should also include timetable (3–10 years) for implementation as well as a budget plan.
- The development of a SUMP should be build on a careful assessment of the present and future performance of the urban transport system. This is expected to involve suitable performance indicators, specific performance objectives and targets.
- A SUMP fosters a balanced development of all relevant transport modes, while encouraging a shift towards more sustainable modes. The plan puts forward an integrated set of technical, infrastructure, policy-based, and soft measures to improve performance and cost-effectiveness with regard to the declared goal and specific objectives. This includes, among others, a plan for improving public transport and also non-motorised transport.
- The development and implementation of SUMP follows an integrated approach with a high level of cooperation, coordination and consultation between the different levels

of government and relevant authorities. The Local Planning Authority is expected to put in place appropriate structures and procedures.
- A SUMP follows a transparent and participatory approach.
- The implementation of a SUMP should be closely monitored.
- Local Planning Authorities should have mechanisms to ensure the quality and validate compliance of the SUMP with the requirements of the concept.

1.2 SUMPs in Helsinki and Riga

The European Baltic Sea Cities of Helsinki and Riga have developed their SUMPs earlier than Tallinn, although with limited focus towards smart governance. In the case of Helsinki, the need for joint planning of transport system and land use with the need for participatory decision-making tool is emphasized, although not entirely applied. In the case Riga, the process has been more top-down, led by the Ministry of Transport, with international mobility experts involved. However, there is no specific focus on how to involve citizens into the process using the technology.

The Helsinki Region Transport System Plan (HLJ) was published in 2015 and it is a long-term strategic plan that represents the common will for transport policy and the development of the transport system in the region. The plan has been prepared in close cooperation with the regional land use plan (MASU) developed in accordance with the Letter of Intent on Land use, Housing and Transport (MAL) in the Helsinki region. The goals of HLJ are based on MAL goals and they emphasize the accessibility of the region, flow of traffic as well as social, economic and ecological sustainability. The HLJ is a plan whose environmental impacts have to be assessed as stipulated in the Act on the Assessment of the Impacts of the Authorities' Plans and Programmes on the Environment (SEA Act 200/2005). Assessments have been conducted throughout the HLJ and MASU process as part of the planning.

According to the HLJ 2015, measures derived from the policies effectively address challenges in different parts of the region within the limits of funding available. The key is to make the region more effective and competitive by utilizing the existing structure to the full and investing in the public transport trunk network and its service level. Measures are primarily targeted to support a more coherent urban structure and they are expected to improve the overall performance of the transport system and support land use development in which construction is primarily concentrated in the broad main center of the region and in the existing and emerging rail corridors. The use of the transport system is made a more responsible by making efficient use of traffic management tools and examining vehicular traffic pricing as a steering and financing tool.

The HLJ and MASU together are expected to contribute to socio-economic efficiency, accessibility of the region and more coherent urban structure with improving overall accessibility. Prior to 2025, the accessibility is expected to improve in particular along the existing rail corridors. By 2040 the improvement in accessibility is expected to spread quite evenly across the whole region. However, new developments have been located in areas with no competitive public transport supply in both the metropolitan area and the surrounding municipalities. In future, more attention should be paid on utilizing areas with good accessibility in particular when planning beyond 2025.

The preparation of and negotiations on the next MAL Letter of Intent are a vital part of the implementation of the transport system decision. The various parties are expected to promote measures set out in the transport system decision and the Letter of Intent and make provisions for planning and implementation conformable with them in their own financial and operational planning. The HLJ also states the need to consider developing transport system planning into a continuous process. The joint planning of transport system and land use and decision-making need to be even more closely coordinated and tools for them developed together regardless of the future administrative model or organizational structure.

The mobility plan and action program for Riga and Pieriga was published late 2010 by a consortium of international consultancies for the Ministry of Transport of Latvia (Ministry of Transport Republic of Latvia (2010)). The Riga SUMP is meant to create an overall framework in which all existing and new plans for construction and improvement of the traffic and transport system in Riga and Pieriga are evaluated and prioritised. Professional expertise and ideas of the consultant team have been combined with existing plans and information in the development. The plan provides solutions for the traffic and transport problems which the Ministry of Transport of Latvia is facing, contributing to spatial, ecological, economical, social and institutional optimization.

The Riga and Pieriga Mobility Plan (RPMP) has the following overall goal: 'To determine a vision and necessary actions in order to promote unified transport system development in Riga and Pieriga, thus improving accessibility of the territory'. The RPMP objectives are:

- to make effective use of the existing transport system of Riga and Pieriga and prefer soft measures (management, organisation, ITS) over hard measures (infrastructure development) where possible;
- develop an efficient, attractive and competitive public transport system, with priority for electric and railway modes;
- to create a coherent network with clear road and street classifications and prioritisation of modes, by eliminating bottlenecks in the road and street network;
- increase the level of road safety, without hampering accessibility;
- provide multi modal accessibility to different places;
- ensure good and reliable connections between the Riga Freeport, Riga and other national and international (TEN-T) transport infrastructure networks;
- ensure good and reliable connections between the Riga international airport, Riga and other main regional centres in a sustainable way.

2 Research Method

This is a qualitative case study of the city of Tallinn (capital of Estonia) SUMP process based on the document analysis (both public and internal documents) coupled with expert interviews (both face to face or online) of the key stakeholders, see annex 1. Conceptually, the design-reality cap method is applied, developed by Richard Heeks which is mainly used in the field of e-government, with some modifications for this research paper. In the context of this analysis, the "Design" means the model or conceptions and assumptions

built into the project's design (*ex ante*) and the "Reality" represents the actual realities of the situation (*ex post*). The success and failure therefore depends on the size of gap that exists between 'realities' and 'design of the project'. The larger this design-reality gap, the greater the risk of failure. Equally, the smaller the gap, the greater the chance of success. According to Heeks (2003), seven dimensions – summarized by the ITPOSMO acronym – are necessary and sufficient to provide an understanding of design-reality gaps:

- Information
- Technology
- Processes
- Objectives and values
- Staffing and skills
- Management systems and structures
- Other resources: time and money

3 The Case of Tallinn SUMP

3.1 SUMP Design

The Tallinn SUMP was initiated under the EU-financed project, Finest Smart Mobility. According to the initial project plan, the Tallinn SUMP is a pre-requisite for future transport infrastructure projects in the Tallinn capital region, as the EC plans to demand SUMP-s for all future Cohesion Fund investments. When preparing the SUMP, public sector officials were expected to analyse the mobility needs of their region and have set the sustainable transport priorities for its transport investments. As the SUMP design includes review phase after implementation, this is expected to guarantee the continuity of the mobility planning in the Tallinn capital region. In addition, Tallinn planned to learn from Helsinki region mobility plan process (HLJ (2015)), where already second SUMP was approved before Tallinn started its process. The Tallinn SUMP was expected to be a role-model process for other Estonian cities and urban regions, as all of them have to start to prepare for the future EC transport infrastructure and mobility investments requirements (where an existing and high-quality SUMP is a key element). Importantly, stakeholders and participants were expected to be invited to the process of developing the plan and various digital technologies were planned to be applied. In addition, the approval of SUMP in the city councils of participating municipalities ensures that commitments are followed in the activities phase of the SUMP.

Interestingly, the Tallinn Region mobility plan was planned to be harmonized with the Helsinki Region transport strategy and plans. This was supposed to allow for planning and management of international aspects of the traffic as well as cross-border traffic between the countries and regions. Issues like intensive goods and truck traffic through both cities and Estonian private car approaches to Helsinki airport in Finland were planned to be addressed jointly.

The Tallinn SUMP had an initial timeline:

- Sept 17: Mobility Surveys (planning, procurement, surveys, conclusions).

- Dec 17: Introducing the Tallinn capital region mobility scenarios to stakeholders.
- March 18. Consultations with Helsinki, Vantaa and international transport stakeholders; negotiations of the investment plan of SUMP with neighboring municipalities of Tallinn.
- June 18: Public hearings of Tallinn Region Mobility Plan, preparations to discuss the SUMP in the councils of participating municipalities.
- Dec 18: Tallinn Region Mobility Plan discussed in the councils of participating municipalities with the aim to start with first activities in 2019.
- April 19: Tallinn Region Mobility Plan 2025 is accepted in the city council.

3.2 SUMP Reality

According to the final publication of SUMP, introduced publicly April of 2019, the city of Tallinn contributes to 50% of total mileage, CO2 emissions and traffic accidents in the entire Estonia. This trend is projected to increase as the population of Tallinn is foreseen to increase 9% by 2035 whereas the Estonia in general does not grow in population, rather is projected to decrease. The key challenges are related to increased costs of mobility, deepening dependency from private cars, too high risks of injuries of pedestrians and cyclists and negative health impact due to congestion. Most importantly, if no strategic decisions are made, CO2 emissions are expected to continue that are already now 40% above the Estonian target for 2030. In this light three scenarios were modelled until 2035 (with results on the Fig. 1):

1. **Business as Usual (BAU 2035)**

   - No major intervention and change in policy.
   - Number of private cars continues to grow.
   - Need for major investments into roads.
   - Financial Penalty for missing CO2 target is unavoidable.

2. **Public Transport Prioritization (PT 2035)**

   - Priority of investments is to improve accessibility and service quality of the Public Transport.
   - Planning hubs for better links between different modes.
   - Prioritising public transport on main directions in city center.
   - Improving walkability and cycling opportunities

3. **HELSINKI SUMP projected to TALLINN (HEL 2035):**

   - The SUMP goals of neighboring capital city of Finland (Helsinki) projected to Tallinn

In order to analyse the SUMP process in the context of smart governance and the ITPOSMO framework, interview results are presented below (see annex 1 for interviewed stakeholders A-E).

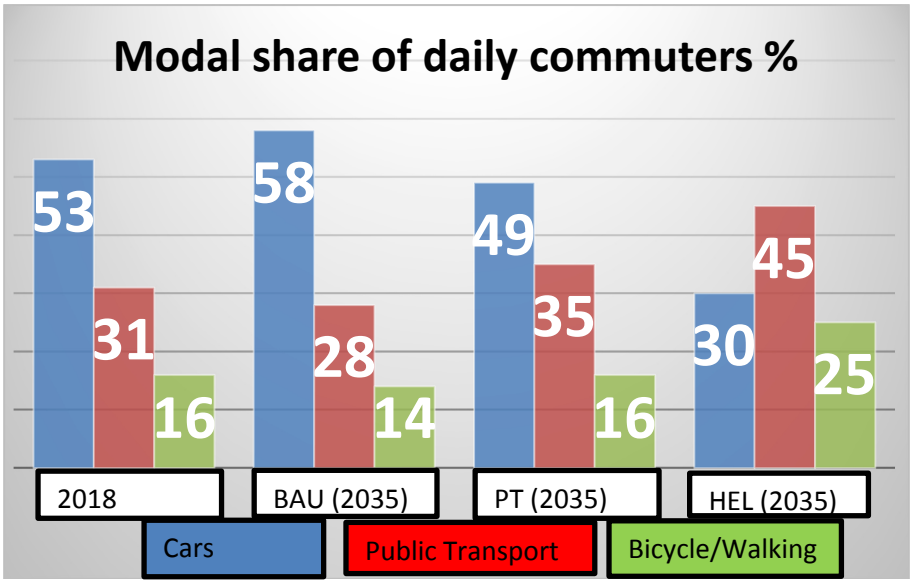

Fig. 1. Tallinn modal change in the case of different scenarios. Source: Tallinn City/ Pirko Konsa presentation.

- **Information**: urban mobility information was central to the SUMP planning; therefore, various mobility data was gathered, including typical daily routes of citizens (e.g. home to kindergarten to work), means of transport (public transport, car, walking/cycling) and also other aspects (e.g. parking) (D). The SUMP utilized some digital data-collection tools (e.g. mobile positioning for tracking urban mobility, people-tracking sensors in Public Transport), although some remained unused (satellite-based parking lots mapping) (A). On the other hand, there was no digital decision-making tool applied before the final stage when the process was sent to the local council in Tallinn (where all decisions are open for online consultations and later published online). Therefore, during the preparation period, the information stayed within the core project team, although it should have been more widely spread (C).
- **Technology**: the initial aim was to provide a decision-making tool based on the measurable mobility indicators (A; B; D), which did not succeed fully. More broadly, the Tallinn SUMP wanted to provide novel technologies for mobility (e.g. electric or hydrogen buses, local electricity generation) and for the infrastructure (if there is not fast public transport or network of pedestrian/bicycle roads then citizens will use cars instead) (E) – which both remained mainly at the "wishful-thinking" level. It is also important to note that the city of Tallinn has been piloting automated shuttle buses (Soe, Müür 2020; Soe 2020)
- **Processes**: Tallinn SUMP included too complex decision-making process with vague responsibilities (A; B). In theory, the process was well planned but it lacked political and high-level ownership and strategic management competences (C). It was also stated that there was too limited involvement of key city departments and stakeholders (D).

- **Objectives and values**: The key objective was to provide a mobility strategy for the entire region (A; C) with a focus on environment-friendly goals (walking, bicycling and public transport) and multimodality (B). More specifically, it aims to attract approximately 50 000 car drivers to use other means of transport (E). The Tallinn SUMP is seen as a long-term visionary agreement how to organize urban mobility with smaller environmental footprint, in the city where population increases (E). Importantly, urban transport is not a stand-alone process but closely integrated within the city (e.g. kindergartens, waste management, recreational areas, office spaces etc.) so it needs to be openly discussed and agreed upon (C; D).
- **Staffing and skills:** According to one respondent, the biggest miscalculation was the assumption that one lead expert can coordinate the full process that triggered a need to change the strategy and add more people to the coordination and analysis team (A). Importantly, the role of the government was underestimated (C, E) – they are be the ones to make larger investments into infrastructure and new technologies.
- **Management systems and structures**: According to several interviewed experts, the City Council was effectively involved in the last stage; it was also good to have morning seminars, although there was too limited involvement of stakeholders, and also limited use of digital technologies for the involvement and decision-making purposes. It also came out that city and government executive decision makers should have been more involved (e.g. Mayor's office, department heads). It was commonly stated that there were too limited Steering Committee meetings and open discussions with stakeholders (A; B; C). Despite of the lack of strategic management, the wish was to bring the mobility management on a new qualitative level via internal process innovation (B, C). Unfortunately, city decision-makers did not have a clear ownership in this process, only last period a Deputy-Mayor was briefed once in three weeks (C).
- **Other resources**: There was too strict timeline – it took Helsinki 15 years and now it was expected Tallinn to deliver a strategic mobility plan in 2 years. In addition, there is too big internal planning fragmentation – there are also other mobility related action plans (parking, bicycle roads, car logistics etc.) (A). The SUMP is also linked to the EC funding in the new period – cities without SUMP might have difficulties (B; D).

4 Conclusions

This paper is analyzing the governance processes within urban mobility strategy setting, with additional interest in the application of ICT-enabled tools. The European Commission has initiated Sustainable Urban Mobility Plans initiative from the top-down approach with a claim that future mobility investments are directed only towards cities with accepted SUMPs. This also triggered a development of SUMP Tallinn – the case this paper was interested in. As a research approach, an ITPOSMO framework was applied, that has been used within the e-governance projects evaluation. The data was collected via document analysis of the project files and by conducting expert interviews with the key actors in the process. The results indicate that the SUMP Tallinn was planned with wide stakeholder involvement including the use of digital tools. The reality, however, was different – most of the activities remained within the small project team with too limited internal (political and top-level involvement from the city executives) and external

involvement (neighboring regions, central government, companies, NGOs, universities, and most importantly, citizens). In addition, the adaption of digital tools for analyzing the mobility of citizens, remained significantly weaker than planned (e.g. instead of validation and GPS data positioning of mobility of people and parking spaces, most data were gathered via traditional telephone mass surveys and physical observations).

5 Annex: List of Interviews

1. A, SUMP Project Manager, City of Tallinn, 8.5.2019
2. B, SUMP Project Manager, Road Administration, 20.5.2019
3. C, Head of Strategy, City of Tallinn, 15.5.2019
4. D, Head of Department, City of Tallinn, 20.5.2019
5. E, Outsourced Mobility Expert by the City of Tallinn, 21.5.2019

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