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New framework for monitoring urban mobility in European cities

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Abstract

The Europe 2020 strategy (COM (2010) 2020 final) for smart, inclusive, and sustainable growth highlighted the importance of an innovative and sustainable European transport system for the future development of the Union. It also stressed the importance of addressing urban dimension of transport. A key issue in the changes is to understand that urban mobility must be handled as a part of a wider shift: namely within the sustainable city concept. Urban mobility have to serve Europe's urban areas develop along a more sustainable path (both environmentally and financially) and that EU goals for a competitive and resource-efficient European area are met. While the integrative target is clear, practical elements of the urban mobility development and decision making time-to-time reserve earlier approaches

The integrated decision making at local, regional, national or EU level have to be helped with a similarly coordinated data, statistical, monitoring and evaluation system of urban transport. This paper's aim is to set up a framework for monitoring urban mobility by a criteria set which helps determining indicators from general objectives through urban (mobility) objectives. Indicators set up this way should be suitable to benchmark and compare progress of urban areas across the EU, paying special attention to integrated approach while defining the methodology.

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1. Introduction

The Europe 2020 Strategy (COM (2010) 2020 final) for smart, inclusive, and sustainable growth highlighted the importance of an innovative and sustainable European transport system for the future development of the Union and stressed the need to address the urban dimension of transport. As referred in the 2013 Urban Mobility Package (COM (2013) 913 final) of DG Mobility and Transport (DG MOVE) of the European Commission, a Eurobarometer survey (Special Eurobarometer 406) investigated attitudes towards urban mobility. The survey showed that considerable differences exist across the EU. There is an increasing 'urban mobility gap' between Europe's few advanced cities and the majority trailing behind.

There is a need for reinforcing the support to European cities for tackling urban mobility challenges. A step-change in the approach to urban mobility is needed to ensure that Europe's urban areas develop along a more sustainable path and that EU goals for a competitive and resource-efficient European area are met.

While the European documents determine the main directions the urban development and mobility have to follow, in the detailed processes leading to the objectives sometimes there are steps that are still didn't change and partly or entirely reserved the past routines. One of those sections is the set of indicators used to evaluate the promotion of the new mobility changes. This paper aims at searching new, integrated sets of indicators to a sustainable mobility system that is well integrated into a sustainable city concept.

The further structure of the paper is the following: the next block introduces the context of monitoring urban mobility fitted into the SUMP process while the third part deals with the methodological details. Finally, further steps are mentioned towards an operating urban mobility indicator system.

2. Context of monitoring urban mobility in European cities

The White Paper on Transport 2011 (COM(2011) 144 final) states that the European Commission should establish procedures and financial support mechanisms at European level for preparing Urban Mobility Audits, as well as Urban Mobility Plans, and set up a European Urban Mobility Scoreboard based on common targets. According to the opinion of the European Economic and Social Committee an effective, efficient and sustainable transport policy should be based on ongoing monitoring of the results achieved and on swift adjustments of measures that are not working at local and regional level.

One of the interventions is the improvement of quality and availability of data and statistics for urban transport systems operations and decision making at local, regional, national and EU level. As a first step, the paper emphasizes the role of objectives in indicator set development.

As the policy objectives of urban mobility are complex objectives, the starting point of the paper is that the task is not simply to take over sustainable mobility tools and fit them into the urban environment, but rather starting from the requirements of the sustainable urban life and to serve it with suitable transport tools.

That is why the paper distinguishes the sustainable urban mobility approach (hereafter SUM: that is the mobility solutions of a sustainable urban system) from a traditional environmentally oriented transport approach. The latter is rather a traditional transport attitude plus an attention to environmental, energy and health factors; still not the sustainable urban area-based mobility approach.

The new approach is well represented in the concept of developing Sustainable Urban Mobility Plans (SUMP Guidelines (2014): thereafter referred as SUMP). The concept of SUMP considers the functional urban area and proposes that actions on urban mobility be embedded into a wider urban and territorial strategy. Therefore, these Plans should be developed in an integrated way: that means cooperation (a) across different policy areas and sectors (transport, land-use, health, etc.); (b) across different levels of government and administration; as well as (c) with neighboring urban and rural authorities.

Objectives formulated in SUMPs are subsequently locally oriented, in one city many ways different from those of other cities and necessarily the solutions are not easily comparable between cities.

Hence, what a program-level indicator should measure for evaluating SUMP implementation is not the content of the single measurements or the specific objectives to be achieved, but rather the degree of the policy integration: whether and to what extent the SUMP objectives (or part of them) are derived from the wider city development objectives.

Therefore this paper pays special attention to the integrated approach while selecting suitable indicators for policy objectives, expressing that SUMPs are about fostering a balanced development and a better integration of the different urban activities, including mobility modes. This planning concept highlights that urban mobility is primarily about people; emphasizing citizen and stakeholder engagement, as well as fostering changes in mobility behaviour.

We took note of the DG Regional and Urban Policy Guidance Document on Monitoring and Evaluation (European Commission 2015) relating the definition and use of the indicators, because a great share of urban mobility investments will be financed from Structural and Investment Funds, and it seems plausible to harmonize urban mobility indicators

with those used in European Regional Development Fund and Cohesion Fund operational programs of the Member States.

The integrated decision making at local, regional, national or EU level have to be helped with a similarly coordinated data, statistical, monitoring and evaluation system of urban transport. It is necessary to set up a framework for monitoring urban mobility by a criteria set which helps determining indicators from general objectives through urban (mobility) objectives. Integrated approach applied results help better understanding the quality of urban mobility related to city development. Indicators set up this way should be suitable to benchmark and compare progress of urban areas across the EU, paying special attention to integrated approach.

The construction and hierarchy of the indicators have to follow the hierarchy of the objectives and goals of the SUM, therefore it is necessary to distinguish between output indicators relating to actions, and result indicators pointing to higher level program objectives linked to those policy interventions. But while the Guidance relates to indicators monitoring the performance of development programs and plans, the SUM indicators also have to evaluate the state of the art of the transport systems in different cities.

All these above approaches of the monitoring system can be fitted with the SUMP approach of mobility planning. In the same time at the selection of the indicators it is a frequent intention that majority of the urban mobility indicators must be ready-to-use and existing. The intention is understandable from practical points (costs, availability, comparability etc.). In the same time the majority of the existing and frequently used transport indicators are the product of an earlier period. That is why many of these indicators refer to the supply side of the transport activity, to the technical features and to those values important for the providers rather than for the costumer, the user. User/costumer-oriented, demand-side oriented and integrated transport performance is not properly estimable with the use of old indicators developed for traditional transport approaches.

Knowing the indicators available through Eurostat's Urban Audit and being aware of the difficulties of developing further indicators through official statistics channels, still the need to develop alternative sources and methods emerge. Considering all points, a compromise is necessary to mix both existing and new indicators.

Based on a previous survey and learning from the results of Cost-SHANTI (Armoogum et al. 2014) and EPOMM-TEMS (EPOMM Mobility management 2013), the paper accepts a voluntary and accessible system. This system must be patient with cities that at the moment define indicators in a less uniform form or based on a less sophisticated and uniform methodology. On the other hand the system should be open to the suggestions of the participants' initiatives relating to introduction of new indicators. The system must help to direct the attention on targets that were not measured earlier.

There is some indicator pools collected in related projects and in database:

- Indicators indicated in the selected Sustainable Urban Mobility Plans,
- The indicators defined within the EcoMobility SHIFT (2013) project for assessing, auditing and labelling the transport performance of cities,
- EPOMM-TEMS (it collects data relating to the four components of the modal split (ped/cyc/PT/car), involving successfully the cities (targeting especially those bigger than 100 000 inhabitants),
- The KPIs across the main policy areas of traffic efficiency, pollution reduction, road safety, social inclusion and land use within the CONDUITS project (2011),
- ESPON TRACC (2012),
- European Air Quality Database,
- Non-transport oriented sustainable city indicators: The Global City Indicators Facility, EUROSTAT indicators (Sustainable Development Indicators and Urban Audit),
- Liveability Rankings: Economist Intelligence Unit and ARCADIS Sustainable Cities Index (SCI) (2015) sources including the United Nations, World Bank, World Health Organization, and International Labor Organization).

3. Methodology

The Figure1 flow chart represents an overview of our methodology on indicator set development.

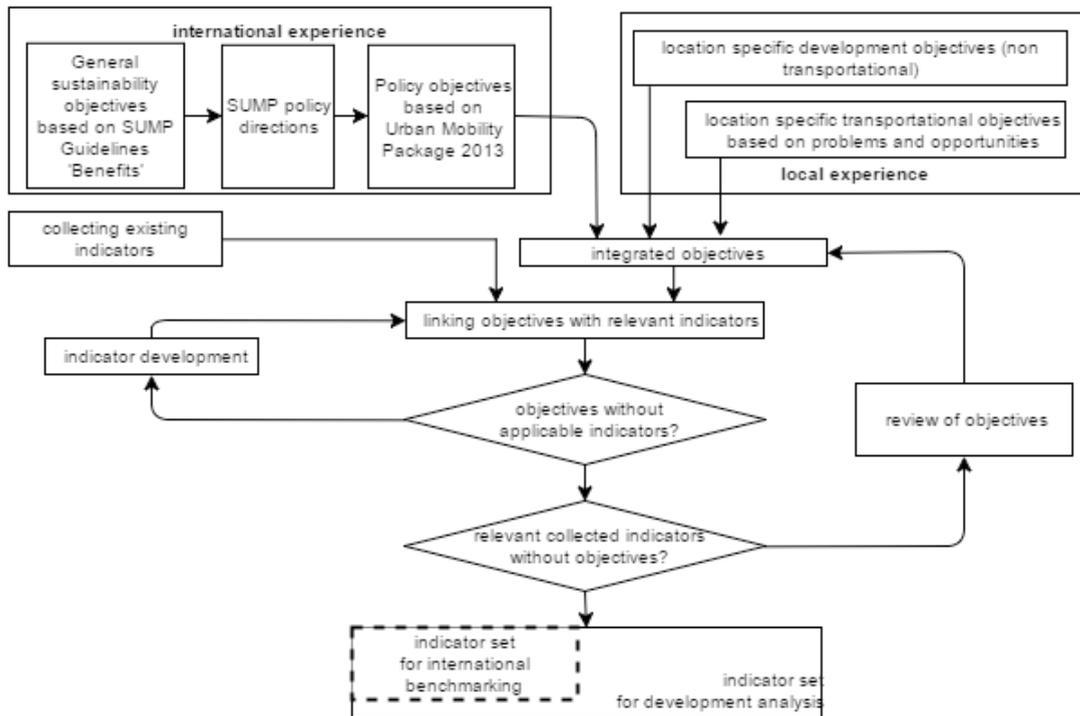


Figure 1. Flow chart of indicator set development

The collection of SUM indicators need to be carried out following a top-down approach. In order to capture the integrated approach of SUMP, a three level set of objectives system has been elaborated (1) general objectives, (2) sustainable city objectives and the more specific (3) sustainable urban mobility objectives.

The general sustainability objectives are defined as a mix of liveability, health, social equity, environmental quality and viable economy aspects. Many of these aspects can be found among the enlisted benefits of SUMP (SUMP Guidelines p. 11-12.), that are: (1) quality of life, (2) economic benefits, (3) better health and environment, (4) improving access, (5) effective use of limited resources, (6) winning public support, (7) preparing better plans, (8) fulfilling legal obligations, (9) using synergies and (10) new mobility culture.

At a next step the sustainable city level objectives are considered. While the goals of SUMP in a specific city can rely on the international experiences and practices of cities already far-gone in the field of implementing SUMP; and also can be built on local transport-based problem solutions, as a third leg the SUMP have to contribute eminently to the policy development objectives of a given city. These parts of the SUMP are locally oriented, can be different from those of other cities and are necessarily not easily comparable between cities. What an indicator can measure in such cases is not the outputs and results of stand-alone interventions, but rather the degree of the policy integration: whether the goals defined in the SUMP (or part of them) are derived from wider city development objectives or are just limited to the transport aspects.

In order to capture the role and function of the SUMP, further sub-levels of principles are needed for the selection of indicators. Based on the 2013 Urban Mobility Package (COM (2013) 913 final) there are different kinds of integration that offer a framework of these city objectives: “The SUMP concept considers the functional urban area and proposes that action on urban mobility is embedded into a wider urban and territorial strategy. Therefore, these Plans should be developed in cooperation across different policy areas and sectors (transport, land-use and spatial planning, environment, economic development, social policy, health, road safety, etc.); across different levels of government and administration; as well as with authorities in neighboring areas – both urban and rural. – SUMP are about fostering a balanced development and a better integration of the different urban mobility modes. This planning

In that context, the progress towards the achievement of each policy objective can be described with different indicators. For example, for measuring the achievement of the policy objective of “Increasing the modal share of walking, cycling and public transport”, both the reduction of indicators “Average rate of motorization” and “Percentage of journeys to work by car” can be used. The selection of the suitable indicator depends on, which benefit wanted to capture: the first indicator may be more appropriate for measuring progress towards “Creating economic benefits”, while the latter one may better intercept the benefit of “Contributing to better health and environment”.

The same indicators may also be used for different types of objective-benefit mixes. For example, the indicator “Modal share of sustainable transport modes” describes well the benefit of a SUMP with regard to its “Contribution to better health and environment” linked to the policy objective of „Increasing the modal share of walking, cycling and public transport”, however, the same indicator may also be a good tool to measure the benefit of “Saving costs” with regard to the policy objective of “Reducing emissions from transport”.

It is of utmost importance to use further guiding principles than just the urban mobility policy objectives, for the selection of suitable indicators. Otherwise (1) the mobility policy objectives might be described by too general indicators and in an incomprehensive way, (2) the coverage of the mobility policy objectives by indicators might not catch every aspect of the concept of sustainable urban mobility, (3) the selection of indicators might focus on the availability of existing indicators and data, instead of deriving indicators from the objectives themselves.

As an overall guiding principle, the suitable indicators are selected by capturing the essence of the policy objectives independently from the fact whether indicators are already in use for the targeted phenomenon or not.

An important pillar of selection of indicators is the development of new indicators, if no existing indicators can be matched with one of the above mentioned set of objectives, benefits and SUMP-specific principles. The elaboration of these new indicators have to follow the principles above.

The existing indicators will be selected as suitable ones if:

- The indicator is a result indicator (thus, it is not an output indicator, capturing an action only, but rather the outcomes of an action, including the impact of the action),
- The indicator is SMART (Specific, Measurable, Achievable, Relevant, Time-bound)
- The indicator is user-friendly: Simple (non-composite) indicators, Self-explaining, and as such clearly understandable.

It is necessary to involve a few region-specific indicators to include into the pool, furthermore, in the case of suitable indicators, those cities that have no access to indicator data yet, should be encouraged to collect new types of data for the sake of proper monitoring their SUMP.

The selection of the indicators will be based on:

- statistical validation, and
- stakeholders’ consultations.

Finally, at least two indicators need to be identified for each of the cells of the matrix: one indicator better capturing the general urban mobility policy objective and another one better capturing the SUMP specific (integrated) contents of objectives. Moreover, some cells may also be completed with region-specific indicators.

This indicator set is adequate for better evaluation of urban mobility and transport objectives and results in countries with diverse economies and societies because it takes these differences into consideration. This set is applicable for the evaluation of state and progress in several aspects of urban mobility and sustainability. It is relevant in all EU cities in general making them comparable, and it is also related to local specialties.

4. Further steps towards an operating urban mobility indicator systems

Determination of the methodology of our framework is an approach (with both theoretical and practical bases) towards an operating application of urban mobility indicators. Further steps, which were not intended to be described in details in this paper, may discuss the institutional operation of this system, as well as the definition of user’s needs. Raw data collection is also a topic to be evaluated, where a deeper examination should cope with automated systems (e.g. connection with Eurostat). However, in the beginning manual data collection seems unavoidable (at least from municipalities from the underdeveloped regions), therefore engagement with data providers is essential in order to reach a wide support for the application.

Further task will be a harmonization process of the selected suitable indicators with those similar indicators that are already collected by some cities. There are significant and substantial differences that make comparison of surveys from one country to another and even across time within one country somewhat difficult. For example countries, where an established tradition of transport data collection exist, where use different methodologies and preserve the longitudinal comparability of survey results in time series of their own countries would show no willingness to change their system of collection.

An output harmonization is proposed instead of input harmonization which is a more considerable way of achieving comparability, as the survey collection process is largely determined at the level of individual cities. While input harmonization aims to achieve standardized measurement processes and methods and comparability is realized through standardization of definitions, indicators, classifications, and technical requirements, output harmonization uses different ones possibly derived from non-standardized measurement processes. Thus, only the statistical outputs can be specified, leaving it to the individual cities to decide how to collect and process the data necessary to achieve the desired outputs.

5. Conclusions

The strategy for smart, inclusive, and sustainable growth highlighted the importance of an innovative and sustainable European transport system for the future development of the Union and stressed the need to address the urban dimension of transport. The European documents determine an integrated approach of the urban development and urban mobility and serious steps have been taken in order to unify the systems of data, statistics, evaluation, monitoring and indicators. However, the consequences deriving from the integrated approach and their tracking through indicators and monitoring still raise issues and leave questions open ended.

This paper highlights the levels of evaluation that belongs to urban (sectorial, territorial and modal) integration, and points out what kind of indicators (new and already existing) should be related to that and how. It is important to have available data, but the collection of new data fitting the new aims, and the creation of new indicators are necessary, too. Besides the output indicators, there must be more attention given to program-level result indicators pointing to higher aims.

Regions with different levels of development need to be compared regarding the correspondence (and its extent) between their set of urban development goals and their transport measures. Therefore, comparability has to be provided within this frame, which requires a paradigm shift. In support of the new approach (sustainable city, suitable sectors including transport) the evaluation of results and the related database must change as well. This integrated approach has to be applied while planning, and has to be realized through feed-back, evaluation, monitoring and in the selection of the indicators too.

The paper emphasizes that the previous monitoring methods have to be complemented by the measures of sectorial integration. This process should answer the question whether the transport development corresponds (and to what extent) with the integrated urban development targets and the transformation of urban functions.

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