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ABSTRACT

Intelligent Transport System (ITS) in the city and the metropolitan area should be linked to the Mobility Policy (MP) formulated and implemented for this area. On the one side, the implementation of the ITS is one of the MP tools. On the other side, the specific parameters of the ITS (algorithms, tools, efficiency measures) associated with the elements of MP such as its objectives, zoning, priorities. On the basis of the review of model components of MP and ITS the common elements and significant correlation are summarized. The theoretical considerations are supplemented with examples from Wroclaw. This article is a continuation of the author's work and thoughts published under the title of both issues. At their beginning the basic elements of MP and ITS are defined. Then, the ITS is described as a tool in the context of MP's objectives, zoning and priorities. Next, the ITS parameters such as algorithms, tools, efficiency measures are defined in terms of the MP. Later, the author summarizes the common characteristics and significant correlation between ITS and MP. This allows to provide dedicated solutions to Wroclaw. The summary of the article are desirable directions of integration between MP and ITS. The key issue is here the implementation of integration of management and development among MP and ITS.

Keywords: Intelligent Transport System (ITS), Mobility Policy (MP), integration of management

1. Introduction

As an Intelligent Transport System (hereinafter: ITS) I understand here an integrated set of solutions, tools and strategies to support and optimize the management of transport in the city and agglomeration. In particular, I focus on traffic management components, including usual vehicles or public transport means and using signaling. Signals are coordinated in routes or in areas and performing of specific priorities. Thus understood, the ITS was already presented, inter alia, in [1]. The subject of present article is not to discuss the individual components of ITS. I focus on the identification of the key links between ITS and Mobility Policy Mobility Policy (hereinafter: MP) will be understood (according to [2], [3]) as a continuation and development of the Transport Policy (hereinafter: TP). In MP it is necessary to not only change the terminology, but clear reformulation of the content of documents indicating a different point of view. This is mainly due to the approach of demand rather than supply, which basically represent key provisions of TP. Programs, activities and tools of TP related primarily to transport infrastructure and organizational activities on this infrastructure. Elements in the field of transport demand side occurred less frequently in the existing policies and instruments were not amplified to their implementation.

2. ITS as a tool of MP in the context of its objectives, zoning, priorities

The basic postulate for creation of MP should be targeting these documents to the transport demand. The objectives of the MP, the basic activities and programs are to affect human activity. The second important postulate, is to give the new documents appropriate degree of accuracy to allow the effective implementation of the recorded activities and to unambiguously assess of specific investments. Another important element is the territorial scope of the policy. Managing the mobility (or

transport) rarely can close within individual municipalities. The use of MP makes sense for larger agglomerations, which consist of a central site surrounded by neighboring municipalities (or counties).

It will be important distinction in the areas covered by the MP, to identify measures applicable for the zones and possibly differences in assessment methods appropriate to a particular zone. Zoning should be richer than in the previous TP, which occurred several types of concentric zones around the center. As one of the main objectives of traffic control in line with the MP (formerly TP [1]) should be adopted deliberate and conscious reduction of traffic mean not increasing the capacity and speed of the network and to maintain saturation for a long part of the day. This will include the introduction of effective priorities for other road users. This control strategy should focus on the so-called "inner zone" of the city where it is desired to achieve a large share of non-car travel.

3. Defining the parameters of ITS (algorithms, tools, efficiency measures)

The specific parameters of ITS such as algorithms, tools, efficiency measures are the results of the elements of MP. Specific objectives, the boundaries of the zones, the degree of priority should be a kind of hint to determine the detailed rules for the control of traffic. Among the possible solutions to choose the ones that are compatible with the MP.

Classification and nomenclature of zones proposed in [3] indicate the concentration on the demand side of transport and have the potentially large preference for ways to travel without the use of a car. The freedom of traveling by car exists only in the fourth group of zones. It is proposed to fitting into one of the four zones of the following areas:

- Zone 1 - Old Town area including the currently excluded from traffic or planned to shut down "walking zone", the local (residential areas) centers, "downtown mobility nodes", recreational areas;
- Zone 2 (a sort of a "cover" to zone 1) - major public transport corridors (basically the rail), the so-called main lines, all other "mobility nodes", "cul-de-sacs", insides of the settlements;
- Zone 3 - broad downtown (as an area of dense and intense development, normally closed by "inner city rings"), the zones of "speed 30", the other public transport corridors;
- Zone 4 - all other public spaces within the territorial scope MP, with the postulated lack of exemptions from the MP regulations any of the areas within the city limits, and even the inclusion of specific zones of areas neighboring communities relevant for urban mobility (and in justified cases, they may be included in the zone areas of higher order as 4 - for example, major public transport corridors and nodes outside urban mobility).

The specific efficiency measures of traffic management are recommended (such as presented in [4]). This will calibrate the ITS not only in terms of bandwidth, but for quality of the users in different groups. These topics will be developed on the example for Wroclaw - later in these article.

4. Summary of common features and significant correlation between the ITS and MP

Motivations for the compilation of the interdependence between ITS and MP are shown above. The need for integration is obvious. Specific solutions need to be adjusted to specific zones. There is a need of the MP zoning integration with concrete areas of ITS.

The specific recommendations can be selected (as in [1]).

1. For public transport vehicles, pedestrians and cyclists are far more favorable shorter cycles of signals. Preferred is a cycle length of 60 s, in practice, a reasonable compromise, but it absolutely can be a maximum length of 80 s. Despite the possibility of modifying the length of signals by ITS in specific areas (subdivisions), the coordination of cycle length is needed. Accordingly to MP the coordinated zone length may have different values - lower in areas with higher preferences for public transport.
2. Location of public transport stops should be carefully considered, taking into account the assumptions and motion control capabilities, so as to form a convenient interchanges and ensure good accessibility. Best of all parties and, above all, at the moment directions of vehicles to stop. Preference is given to location of stops outside the intersections. Signaling modifications should be followed according to the movement of public transport vehicles.
3. Good effects lead to public transport routes, regardless of the overall traffic streets. The problem of traffic control is simplified if the proper oversight of conflict of laws relationships vehicles of various lines (including fleet management) and possibly the opposed pedestrian (or cyclists) traffic. The dynamic management of the fleet should be exhibited by the ITS primarily in the main line system.
4. The specificity of the movement in the centers depends on: short signal cycle, a short distance between the intersections between them the movement should be coordinated, the presence of large numbers, another contradictory relationship with priorities. In such a situation inefficient (if not impossible) becomes adaptive control (accommodated, acyclic). Better results are achieved through coordination of signals. This points to the need for flexibility in the control strategy in ITS.
5. Possible (and even intentional) is, however, motion detection and local influence on changes in signaling programs primarily in emergency situations or to link individual prioritization of public transport vehicles to the implementation timetable, extending the green signal for a large group of pedestrians, etc. Bind it should be of a dynamic real-time passenger information.

5. Solutions dedicated for Wroclaw

The concept of zone system expansion refers to increase their numbers and range. It is also important to move away from the concentric form to the "granular" form [3]. This is illustrated by an example from Wroclaw (Figure 1) where the previous three zones of TP are marked (areas of various shades of green) on the background of the city limits, the primary road network and rail- (green lines) or tram- (red lines) routes. Different types of zones should cover the entire area covered by the policy, so that there was no places for which does not specify any adjustments. The rules concerning the zones must interact with the terminology of MP and relate to transport demand side.

Fig. 1. Zones in previous Wroclaw Transport Policy [3]

An example of the application of the classification presented above for Wroclaw and the surrounding communities is shown in Figure 2. This figure is only a starting point for more detailed work - the zones are just examples, a complete map should be the result of close coordination between zoning of MP and urban development plans and the area of ITS. Areas classified as zone 1 highlights in purple - this is the Old Town and selected regional centers of a similar nature. Zone 2 (dark green) is a neighborhood of the main transport routes - whose exact location should result from the Transportation Plan and priorities addressed by ITS. Outline zone 3 (green) includes the above-defined areas. The remaining part of Wroclaw classified into zone 4 (light green). In addition, within the zone indicated selected suburban settlements (as an example take the principles MP also areas outside the city limits, and not the result of specific studies and analyzes). Beyond the borders of Wroclaw it is also possible to distinguish areas as zones 2 and 3.

In this publication does not provide a greater number of rules due to the space limit (they can be found for example in [5]).

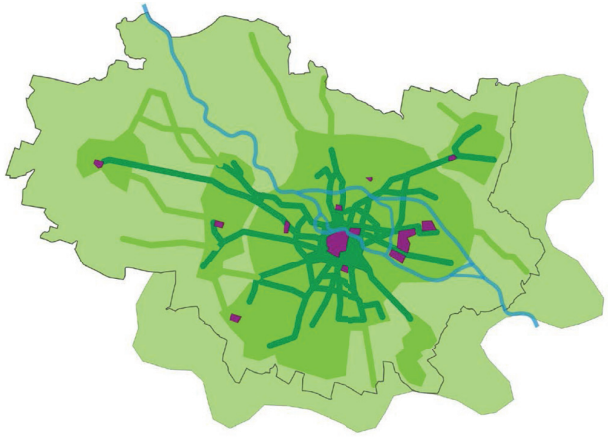

Fig. 2. Zoning of the city and its surroundings according to the logic of the MP - such as a preliminary proposal for Wroclaw [3]

6. Conclusion

The relationship between mobility and traffic management (traffic engineering) I was pointed out, inter alia, in [6].

Key words "traffic engineering" and "mobility management" are currently being expanded and non-dormant meanings. It becomes necessary to redefine them. Traffic engineering is a field of engineering dealing with the research process and the practical application of traffic knowledge in the planning, design, implementation and operation of transport facilities, especially the organization and land traffic management, water and air. The primary objective is to provide the traffic engineering on a system of safe, efficient and economical movement of people and goods while reducing the negative impact of transport on the resources of the natural environment and cultural heritage.

Mobility has a fairly narrowly understood, was associated with the methods of movement as a result of certain treated conditions and processes (without impact on the outcome in the form of mobility). Meanwhile, foreign studies of mobility (traveling behaviors) is widely understood as an element of human activity. Mobility is to provide travelers a wide choice of where to go to meet your specific needs. Provides travelers are many options for all types of destinations, including different motivations, as commuting to work, education and leisure purposes. The method of selecting the target and type of travel is possible through effective transportation network connecting many alternative destinations including time, convenience and cost of travel. Mobile traveler selects target, route and time of the travel according to the accessibility of the transportation system.

In view of the above, the shaping of mobility is an impact on these choices. I propose the term "shaping mobility" as a kind of extension, and that is to use the concept of "mobility management". Shaping is intended to include elements of education of users of the transportation system, influencing their traveling behavior by raising "awareness", "promotion" and the like. These goes conceptually beyond the scope of the word "management". Hence, the introduction of "shaping" seems to be justified.

Therefore, the Mobility Policy as a document of shaping the mobility should be closely integrated with the Intelligent Transport System.

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