ACTIVITY 3.4.C

Local Implementation Plan (CDV)

POLICY LEARNING IN INFORMATION TECHNOLOGIES
FOR PUBLIC TRANSPORT ENHANCEMENT

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CONTENT

ABBREVIATIONS AND ACRONYMS

AP	ACTION PLAN
API	APPLICATION PROGRAMMING INTERFACE
AVL	AUTOMATIC VEHICLE LOCATION
AVM	AUTOMATIC VEHICLE MONITORING
CIS	CENTRAL TIMETABLE INFORMATION SYSTEM
EC	EUROPEAN COMMISSION
EETS	EUROPEAN ELECTRONIC TOLL SYSTEM
EU	EUROPEAN UNION
GLA	GREATER LONDON AUTHORITY
GNSS	GLOBAL NAVIGATION SATELLITE SYSTEM
GP	GOOD PRACTICE
GPRS	GENERAL PACKET RADIO SYSTEM
GPRT	GOOD PRACTICE ROUND TABLE
GPS	GLOBAL POSITIONING SYSTEM
ICT	INFORMATION AND COMMUNICATION TECHNOLOGY
IDOS	CZECH MULTIMODAL JOURNEY PLANNER
IFM	INTEROPERABLE FARE MANAGEMENT
ITS	INTELLIGENT TRANSPORT SYSTEMS
I2I	INFRASTRUCTURE TO INFRASTRUCTURE COMMUNICATION
I2V	INFRASTRUCTURE TO VEHICLE COMMUNICATION
IP	INTERNET PROTOCOL

JP	JOURNEY PLANNER
JPE	JOINT POLICY EXERCISE
LPT	LOCAL PUBLIC TRANSPORT
MRT	MASS RAPID TRANSIT
OGD	OPEN GOVERNMENT DATA
POI	POINT OF INTEREST
PT	PUBLIC TRANSPORT
RF	RADIO FREQUENCY
ROI	RETURN ON INVESTMENT
RTI	REAL TIME INFORMATION
RTPI	REAL TIME PASSANGER INFORMATION
RTTIS	REAL TIME TRAVELLER INFORMATION SYSTEMS
SME	SMALL & MEDIUM ETERPRISES
SUMP	SUSTAINABLE MOBILITY PLAN
TFL	TRAVEL FOR LONDON
TSS	TRAFFIC SIGNAL SIGNS
TSS2	TRANSPORT SECTORAL STRATEGY PHASE 2
TT	TIME TABLE
UTC	URBAN TRAFFIC CONTROL
V2I	VEHICLE TO INFRASTRUCTURE COMMUNICATION
V2V	VEHICLE TO VEHICLE COMMUNICATION

LIST OF FIGURES

LIST OF TABLES

1 INTRODUCTION AND OBJECTIVES

Mobility issues are increasingly important in today's fast-growing urban centres all over the world, but particularly in the European Union where 75% of inhabitants live in urban areas.

Current development of Information and Communication Technology (ICT) platforms as well as Intelligent Transport Systems (ITS) brought new possibilities for mobility issues.

As recommended by various initiatives and strategies promoted and supported through European Union programmes, most European cities and metropolitan areas solve these problems with an integrating approach, which aims at providing a policy plan for ITS deployment with efficient responses to intelligent public transport with information systems.

The INTERREG IVC supports a Regional Initiative Project called POLITE.

POLITE started in 2012 with duration of 3 years and the central issue addressed by the POLITE project is how to improve the knowledge in the field of policies concerning the development & management of travellers' information systems and how to introduce the concept of co-modality; specifically how to enhance the use and attractiveness of public transport by means of Infomobility at different geographic level (national, regional, local) in different European areas.

The aim of the project has been to achieve the above objectives by "policy-learning" when using Good Practices, that is the learning of how to shape future policies with tangible results in terms of new defined policies and targeted policy implementation plans for infomobility in all the involved sites more specifically comparing the AS IS with the TO BE policy situation for each POLITE site & and at EU level.

Against this background, the unique partnership of six partners from different geographic levels (national, regional, local) in different European areas in POLITE project has found a strong common interest in Infomobility.

Like a puzzle, Regione Calabria, Province of Ferrara, Reading Borough Council, Poland, Latvia and Czech Republic good practices and transfer sites fit together, with a communication support by POLIS.

Partners with different levels of ITS use and stimuli have come together to exchange and share good practices between regions and entities with more experience and those eager to adopt and use infomobility services.

The need for new infomobility policy solutions applies in different European areas. Especially regions, which depend on good internal mobility.

The thematic workshops and internal joint policy Framework have focused on the following themes consistently with the EC goals:

- Outlining specifications for ITS deployment in terms of geographic continuity, technological upgrades & joint standards.
- Promoting co-modality, i.e. the efficient use of different modes of transport on their own and in combinations, resulting in an optimal use of transport resources.

1.1 POLITE PROJECT AND COMPONENT 3

By means of Component 3 - Exchange of experience dedicated to the identification and analysis of good practices, "POLITE should result in improved policies, plans and programmes regarding public transport information systems in partner sites, through experiences exchange and competencies strengthening".

In Component 3, six of the seven POLITE partners are involved:

- P1 Regione Calabria (Italy) - transfer site;
- P2 Province of Ferrara (Italy) - good practice site;
- P4 Reading Borough Council (United Kingdom) - good practice site;
- P5 ILIM (Poland) - transfer site;
- P6 CDV (Czech Republic) - transfer site;
- P7 LatDEA (Latvia) - transfer site.

1.2 CONCEPT OF INFOMOBILITY

'Infomobility' refers to procedures, systems and devices based on Intelligent Transport Systems and Services (ITS) that improve the mobility of persons and goods by collecting, processing and distributing information.

Infomobility applications can be used both by the mobility operators and by the final users for all modes of transport. Infomobility services are dedicated to the dynamic management of public and individual transport, fleets and road accidents through real time information. Thanks to ITS, it is possible to have an integrated system of transport, where all elements are interconnected in order to obtain more efficiency, safety and environmental sustainability.

1.3 ABOUT THIS IMPLEMENTATION PLAN

Since Implementation Plans are meant to serve as roadmaps to transfer successful Good Practices from one partner to the others, thereby enhancing innovation and competitiveness of

the regions, IPs should fit in the overall innovation strategy of the target region and should be backed up by concrete policy support.

The document is aimed to participant of POLITE project as well as stakeholders who would be involved in preparation and implementation of policy in the field of Infomobility.

The Implementation Plan follows the previously finished POLITE work in the Component 3.

This final version was prepared after discussions and consultations with other partners during the Poznań meeting and workshop (July 2014).

The final Implementation Plan objectives to be covered are following:

- Identify the policy gaps;
- Identify where POLITE GPs can address the policy gaps;
- Identify the actions required to transfer the GP(s) – in whole or in part – to improve policy and address the policy gaps;
- Identify key transferability lessons learnt in the implementation plan process, which can be reported in the Final Technical Publication (“good practice guide”);
- Identify methods of monitoring success of the Implementation Plan.

2 EXECUTIVE SUMMARY – CURRENT SITUATION IN THE CZECH REPUBLIC

Given the objective of this document, we focus on description of the part dedicated to preparation of innovative strategies and action plans in the field of information systems´ implementation in Czech cities and regions that are eligible for transfer of successful examples of good practice specified in the POLITE project.

Upcoming action plan of ITS development in the Czech Republic designates the CIS – Central timetable information system to be cardinal system in the segment of public transportation whose functionality can be considered very good and above-standard even when compared to others in the Europe.IDOS, its user interface, provides very comfortable, current and reliable access to information on public transportation possibilities.

Future potential of the system development depends considerably on the available funds, on the structure of these sources (public / private) as well as on the possibility to integrate this system with the information systems for individual transport.

Extension of the present CIS system with real-time information and its timely distribution to passengers by means of various ITS technological tools presents a separate segment that will require significant attention in the future.Therefore, it is a great benefit from a strategic perspective that the ČSN 01 8245 standard – Information systems in public transport - National real-time information system (CISReal) has been given effect as from June 1, 2014; this standard presents basic procedural and technical architecture and methodology for a functional system integrating real-time information on current operation of public transport systems into the existing CIS system.

Conceptually, it is thus the precious cornerstone of further both technological and procedural development.

Issues of the CIS / IDOS system being accessible and opened to other, non-public subjects remains a very important aspect in case of supporting the information system from public funds. Such a step can extend functionality and user attractiveness of the system significantly but, at the same time, it requires sensitive adjustment and definition of responsibilities and competencies in order to avoid misuse of information and undermining the quality of to the present day completely unique system at European level.

In relation to these issues, GPs have been selected in the POLITE project that describe the solutions that will be transposed to solution designs in strategic plans. They address especially solutions of open data, real-time information systems and related system of public transport vehicles´ preference at intersections.

The field of SUMP creation which is recently fundamental for overall concept of transport development in cities presents a special segment. Czech and Slovak cities intend to build their

strategic transport development plans according to this structure. In this context, it proves to be strategic to include the ITS development plan as inseparable part of these SUMPs.

It is possible to acquire high-quality data in order to create further SUMPs based on real indicators in case that a city has good ITS development plan and the systems are implemented in a way to ensure compatibility. These indicators can be also specified for the policy-makers who can make decision about changes and priorities in a given city or region based on this data.For example, co-financing of new information systems or implementation of new complex systems are considered. Therefore, we have also included GPs related to SUMPs implementation to the list of solution examples that we will draw upon.

The following subchapters describe current state of development in these fields.

2.1 SUMPs

The European Commission's Action Plan on Urban Mobility calls for an increase in the take-up of Sustainable Urban Mobility Plans in Europe. To meet this need, a new methodology for creating SUMP in relation to the Guidelines starts to be created by the CDV for Ministry of Transport.

This new methodology will be certified by the Ministry of Transport and will be incorporate chapter regarding to Infomobility plan.

CDV is currently developing SUMPs for city of Ostrava, Opava, Praha, Brno and Bratislava (Slovakia).

2.2 OPEN DATA

The issue of open data is relevant to the CIS and IDOS system. To set the financial plan for the system and prepare rules for opening data are the current priorities.

2.3 PRIORITY SYSTEMS IN THE CZECH REPUBLIC

The area of public transport priority systems in the Czech Republic is very actual for all of stakeholders that are somehow involved in the urban transport. Public transport in the Czech Republic has to deal with several problems such as insuficient financial support, increasing number of individual transport vehicles on roads (congestions), or low quality of roads. All of these aspects are the main reasons of decreasing attractiveness and quality of public transport in the Czech Republic. Providing priority for public transport at signalized intersections is an excellent way to reduce public transport travel time and increase schedule reliability, helping to make public transport more attractive for customers and less expensive to operate. This approach of increasing public transport attractiveness through priority systems is very actual in

the Czech Republic and this document will help stakeholders with the implementation process which is based on the chosen Good Practise from POLITE project.

Public transport priority systems have been implemented in bigger Czech cities such as Prague, Brno, Olomouc, Ostrava, and also in a few relatively smaller cities such as Liberec, Plzeň or Zlín.

There are two types of public transport priority systems which are used in the Czech Republic. Passive priority (bus ways, legislative restrictions,..) and active priority where public transport vehicles communicate with the traffic signal controller.

The current trend in the Czech Republic is to shift from passive systems to active ones, especially now when technology becomes less expensive and there are a lot of good and standardized examples, which we can follow. Also the fact that there is no space left for infrastructural work in the cities, is crucial now. It is almost imposible to rebuild new lanes for busses or create new segregated lanes for them. For those reasons, the best choise for Czech cities is to implement and develop active priority systems on traffic lights intersections for prioritising public transport vehicles. Nowadays, most of the above mentioned cities have an active priority system for public transport vehicles.

Certain common features can be identified in this field, such as insufficient funds for implementation, lack of clear strategic documents and missing plans for renewal and inspection of existing equipment, infrastructure, traffic signal signs and telematics devices.

3 IDENTIFICATION OF POLICY GAPS

In order to transfer selected GP to the conditions of the Czech Republic, it is necessary to define gaps in relation to creation of support policies for Infomobility development.

The proposal for ITS Action Plan for the Czech Republic was being created during formation of this document; the proposal identified the following issues to be solved:

- It is necessary to consider the interconnection of systems and information services for the purpose of ITS development.
- Semantic interoperability: well defined content of data and information exchange to be understood unambiguously by all participating systems.
- Organization interoperability: prepared action plans for development and modification of procedures and objectives of mutual cooperation based on compliance with standards and regulations.
- Legal (contractual) interoperability: development of applicable national and international legal framework so that electronic records are recognized as legally relevant.
- Conceptual interoperability: support of ITS development based on shared vision and common priorities of individual private and public subjects.

In relation to this document which declares transfer of successful Good Practices, it is necessary to increase up-to-datedness of the information provided within the CIS timetable by integration of real-time data and its timely transmission to the passengers.

The effort has to be put into creation of comprehensive nationwide system with high added value of targeted traffic information. It is also necessary to ensure non-discriminatory conditions and environment for processing, management and central distribution of this verified quality traffic data and telematics databases.

The following activities are crucial for creation of information umbrella over transportation processes:

- Maintaining of uniform content, format and structure of collected and transferred data so that various data sources can be used mutually in both national and international scale (so-called uniform information base);
- Use of approved technical standards;
- Ensure interoperability by means of coordination.

The following types of interoperability have to be considered in relation to the ITS development:

1) Technical interoperability: interconnection of systems and information services
2) Semantic interoperability: well defined content of exchanged data and information exchange to be understood unambiguously by all participating systems
3) Organization interoperability: based on mutually agreed procedures and objectives of various private and public subjects´ cooperation with the goal of continuous information support of passenger or freight transportation process
4) Legal (contractual) interoperability: development of applicable national and international legal framework so that electronic records are recognized as legally relevant
5) Conceptual interoperability: support of ITS development based on shared vision and common priorities of individual private and public subjects.

Establish the SUMP creation methodology and include separate chapter on Infomobility alias action plans for ITS development into this methodology.

3.1 SUSTAINABLE MOBILITY PLANS

There was expressed a need to optimize processes of design and implementation of transport policies, by Czech cities. CDV is in a role of a leading actor in involvement of Sustainable Mobility Plan activities on a national level. Incorporating knowledge and experience reached by Santander in their SUMP, and ICT city infrastructure, into CDV plans measures to enhance the national methodology that is to be completed.

3.2 OPEN DATA IN PUBLIC TRANSPORT

The Czech Republic has outstanding operation of public transport. The data is collected on national level by a private company which is also the national multimodal journey planner provider. The service provision is funded by the advertisement on the web portal as well as in the mobile app. As such, the data is not open as the public sector does not pay for their collection and data processing (correction, timing, format, changes in timetables etc.).

3.3 BUS PRIORITY SYSTEMS

Public transport priority systems at traffic signal junctions in the Czech Republic are implemented in several cities and regions, but most of them have implemented their priority systems in the 1990s, therefore those systems are not using the high-end technology and techniques, which are now available.

One of the major problems in this area in the Czech Republic is the divergency of those systems. Some regions (cities) have implemented only priority systems for trams, other only for buses, some of them use for tracking purposes GPS systems, others infrared beacons. Communication technologies between buses and junctions and UTCs also differentiate among those systems (radio, IP communication, GPRS data, etc.). For those purposes there is a very strong need, in the Czech Republic, to integrate all of those systems in order to incorporate the public transport priority systems into more regions and cities.

In the area of public transport, most of the Czech cities can identify some common features such as lack of sufficient funds for development the public transport priority systems or absence of clear strategy plans.

4 IDENTIFICATION OF RELEVANT GPS

This chapter introduces three selected GPs to be transferred to the Czech Republic.

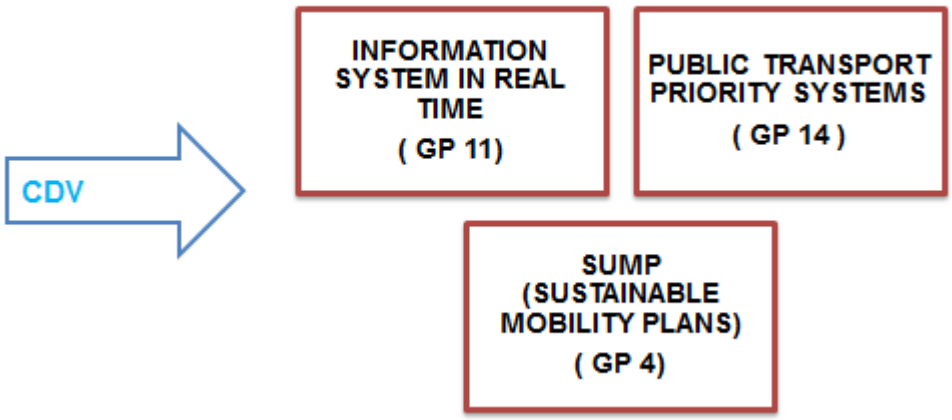

Figure 1: Good practices to be implemented in the Czech Republic

4.1 GP 4 – SUSTAINABLE MOBILITY PLAN - SANTANDER / SPAIN

Sustainable Mobility Plan (SUMP) in Santander has been developed during the last five years and tackles several aspects related to the public transport improvement. In some cases, the adopted measures involve new technologies, in some of them that are as political decisions or good practices in the management process. This process is complex and in a constant evolution.

SmartSantander infrastructure offers information about 2700 places in the city of Santander that were divided into following different categories: beaches, park and gardens, monuments, Points Of Interest (POI), tourism offices, shops, art galleries, museums, libraries, culture events agenda, shops, public buses, taxis, bikes, parking places, etc.

It allows a real time access to traffic and beach cameras, weather reports and forecast, public buses information and bike-rental service, generating a unique ecosystem for citizens and visitors when walking around the city.

4.2 GP 11 - OPEN PUBLIC TRANSPORT DATA - LONDON / UK

The London Datastore has been created by the Greater London Authority (GLA) as an innovation towards freeing London's data. Citizens are able to access the data that the GLA and other public sector organizations hold, and to use that data however they see fit – free of charge. The GLA is committed to influencing other public sector organizations into releasing their data here too.

Releasing data though is just half the battle. Raw data often doesn't tell anything until it has been presented in a meaningful way. Opening public transport data in London encourages the masses of technical talent to transform rows of text and numbers into apps, websites or mobile products which people can actually find useful.

4.3 GP 14 - REAL TIME IS & BUS PRIORITY - GREATER BRISTOL / UK

State of the art real time passenger information system which distributes up to the minute bus information between tracked buses and on-street displays in the Greater Bristol area. Information is also delivered to travel information websites and mobile phones.

In addition to passenger information, the system provides intelligent bus priority at signal junctions to give late running buses priority, via a link between the real time information and urban traffic control systems, helping to reduce journey times and ensure buses keep to timetable.

GPS technology is used to track the location of buses, forming the basis of a journey time prediction calculation from which the information is transmitted between the buses, a central system, bus stop display screens and traffic signals.

The system has been implemented throughout the West of England sub region, which has over 52 million bus trips every year.

The RTI system was first implemented for the Greater Bristol area in 1997 and has been significantly upgraded and expanded in subsequent years. The system comprises on-bus Global Position System (GPS) equipment which communicates via a radio base station with a central system server. The equipment is linked to the bus ticket machine to enable the predicted arrival time at each stop on that vehicle's route to be generated, which is then sent to the bus stop displays to provide a countdown in minutes to the predicted arrival time. This information is also sent to local travel information websites to provide the same information for a selected stop (whether or not it has an on-street display) so long as the route is operated by equipped buses.

The system allows Bristol's Urban Traffic Control (UTC) centre and bus operator's depots to monitor the location of all equipped vehicles and to identify early and late running services. Other features of the system include the operator's voice radio system and the ability to send an emergency alert from the bus driver to the depot.

The RTI system also includes the provision of intelligent bus priority at traffic lights, via a link to Bristol's UTC systems. This function helps to reduce journey times and ensure buses keep to the timetable by providing late running vehicles with priority at signal controlled junctions. The system works by the bus sending an identifying message to the signals on its approach, which the UTC system will then process and adjust the signal phasing accordingly. The system can be set to give different levels of priority, for instance to all buses or just to those operating behind

schedule. It is currently set up to provide priority to all equipped buses that are running late by 3 minutes or more. The signal phasing can be adjusted by the UTC system to either extend a green phase to allow a bus in a queue to progress through the junction, or to adjust the phasing of the lights to provide a green light to the arm with a late running bus sooner than would happen under the normal cycle. To operate correctly it is essential that the data relating to the timetable, route, bus stop allocation and the location of all stops served is correct within the RTI system

4.4 SWOT ANALYSIS

This SWOT analysis is the only and common one for all three Good Practices of CDV to be transferred into the Czech Republic. It addresses various aspects and relevant national legally binding documents that either already exist or are being prepared. It also identifies newly emerging opportunities that can be taken advantage of in both business and public sector activities related to ITS development in the Czech Republic.

The priorities of the POLITE project in the Czech Republic are highlighted in the summary.

4.4.1 STRENGTHS

The Czech government has approved „Transport policy of the Czech Republic for the period 2014 - 2020 with the perspective towards 2050“ (hereinafter as TP CR) in 2013. Fundamental Transport policy themes include use of ICT, ITS and GNSS, among others. Other specific documents of the „Transport sector strategies“ that define individual priorities have been elaborated as part of the Transport Policy. TP CR defines fundamental ITS fields and measures.

Legislation of an organizational framework exists for POLITE relevant areas: national TIC incl. its information sources and Central Information System of PT (CIS). The ITS Directive 40/2010/EU was transposed into Czech legislation (Act on road network traffic). Also, the INOTECH document was agreed by the government in 2008. It specifies direction of the ITS development in the Czech Republic for the multimodal transport.

Public transport has a rich tradition and the system of data transfer from transport operators to the central system (CIS JŘ) is very advanced in the Czech Republic. The legislation specifies liability of the transport operators to provide timetable data to the CIS JŘ in a clearly defined form and format which is controlled centrally before the registration. It is planned to open the whole set of timetable data in compliance with the PSI directive in the future. However, a clear business model of a long-term sustainability of such a system with regard to absenting financial support of the state is still missing.

Rules for the CISReal register and real-time public transport data exist as a technical standard with no legislative support. The regulatory conditions are being prepared and CDV is able to affect their form.

The European White Paper on transport (2011) states the requirement to „implement European-level procedures and mechanisms of financial support for preparation of urban mobility audits and plans and to create comparative overview of European urban mobility based on common objectives (Urban mobility observatory) in the Initiative 31, Urban mobility plans. The possibility of obligatory access shall be explored in case of cities of specific size on the basis of national standards based on EU directives."

CDV has taken advantage of its experience gained in the QUEST initiative (urban transport policy audits) and has created a national framework, methodology and a working group of interested cities in order to implement the SUMPs in the Czech cities. "Sustainable urban mobility plan is a strategic plan created in order to satisfy the mobility needs of people and enterprises in cities and in their vicinity and to provide better quality of life. It is based on existing practice and it considers integration, participation and evaluation principles in a due manner."

It is assumed that transport and urban planning are integrated. Urban development strategy projects into transport as well. Long-term sustainable mobility, sufficiently flexible for the needs of citizens and in compliance with urban and regional development plan, is the objective.

The CIVINET Czech and Slovak Republic is a network of cities with urban services; its secretariat is located at the CDV. Urban mobility plans being prepared are supportive in implementation of these plans and will be the main topic of the cooperation. Czech and Slovak international cooperation and activity coordination will be supported.

Amount of cities with a valid SUMP is one of the TP CR indicators. The CIVITAS secretariat mediates a dialog among local authorities, public administration and European Commission on the sustainable mobility topics with regard to the situation in the Czech and Slovak Republic.

The cities of Olomouc, Jihlava and Karlovy Vary are current members of the new CIVINET network; foundations, associations and initiatives in the cities of Žilina, Brno and Olomouc are its affiliates.

Opava, Ostrava and Brno have started to design their SUMPs in 2014 as the first cities. Sustainable urban transport planning focuses primarily on the citizens, not on transport itself.

4.4.2 WEAKNESSES

Coordination framework for connections at the borders of responsibility of individual ITS clients and operators is missing. Current implementation status is fragmented. The main institutional subjects do not cooperate enough with one another.

The legislation does not cover the ITS field as necessary so far. No rules and conditions are defined for tests and audits of devices, whole systems and provided services, including adjustment of certification and audit requirements.

There is no methodology for real-time data management in the public transport which is relevant to the POLITE objectives. The rules for the CISReal open data must be prepared so that they are compliant with international needs and commitments.

4.4.3 OPPORTUNITIES

Another two conceptual documents related to the TP CR will be created; it is possible to influence them at this point and the POLITE project will focus its interest and effort this way: Action Plan of ITS development (hereinafter as AP) and Concept of Public Transport in the Czech Republic (national Green Paper) that specify TP CR objectives of interest in greater detail.

The first stage of the AP preparation was related to identification of:

a) individual subjects´ and end users´ ITS demand and

b) of their opinions about the ITS development.

The second stage of the AP preparation has started in the autumn of 2014. It has focused on creation of the AP ITS document itself. The perspectives of various working groups (ITS traffic control, traffic prediction, passenger services, ITS support systems, increasing safety by means of ITS) are considered during its preparation.

AP takes into account the roles and competences of individual public administration levels in the fields of the road network management, traffic control and regulation, providing information to travelers as well as role and competence in the field of public transregional, regional and local transport.

It is also possible to offer the Czech ITS experience in foreign countries and to strengthen competitiveness of the Czech Republic. ITS in the Czech Republic can present particular benefit for national economy through increased efficiency of the transport system, traffic safety and fluency as well as reduction of costs and environmental impacts of the transport.

The opportunities are generally as follows: improvements in traffic conditions, costs reduction, traffic safety, pollution reduction and quality of public transport service.

The opportunities in the field of open data are to gain basic information on data accessibility areas and relevant data sources from the POLITE´s GPs and to explore the potential in the Czech Republic. Examination of regulative rules in this field and comparison with the rules in the Czech Republic look particularly interesting. Quality analysis of local data and the funding for making it proper (exact, up-to-date, reliable) seems like another object of interest.

To start a platform for open data in the Czech Republic environment, it is an opportunity to set up a working group: to start with public transport open data to investigate the potentials and obstacles of such a process. Focus on the outputs of the working group to contribute the item of open data to the regional development plan.

Analyse successful data sets, their technical side (format, reliability) as well as organizational support (provider requirements, city support). Select suitable data sets based on their quality and the scale of use. Work out a road map of possible regional implementation based on prioritization of ready local feeds, readiness of local data providers and the support of the city.

Opening of data brings new services and so new customers. It could bring the potential to see and compare the efficiency of provided services. This could raise the interest among the citizens to demand higher quality of the services and creation of new ideas and solutions to develop them.

Static data, real time data and historical data and processing applications could be very beneficial. To investigate the possibilities of historical data provision, particularly for Infomobility, is another opportunity.

The CISReal technical standard has been designed with the objective, among others, to be used in tenders to specify requirements for suppliers by means of compliance with the standard. The same applies for other ITS technical standards that have been already implemented in the Czech Republic. This will help contracting authorities participating in the tenders to become familiar with definitions of technical requirements for demanded ITS in their jurisdiction. To set a uniform benchmarking as a tool for potential demand party of the public sector would also present desirable opportunity.

An improvement of ITS services in public transport can enhance perceptions in the area and to attract more users of public transport as a genuine alternative to individual transport. The supply shall be focused, besides regular population, on marginal groups (children, senior citizens) or groups with special needs (various categories of handicapped people, mothers with baby carriages) as well. Support for using public transport by cyclists in a certain daytime or on certain days can also help to limit the amount of individual car trips if high-quality and accessible traffic information is provided in advance.

Capability of the SUMP is in citizens´ acceptance awareness enhancement. Well-prepared SUMP means opportunity to apply successfully for co-funding from European funds. Horizon 2020, CIVITAS, Smart Cities, ROP etc. seem to be suitable opportunities in the nearest future.

4.4.4 THREATS

If infrastructure administrators and managers of individual transport modes do not succeed in prove positive impacts of ITS, then they fail to vindicate the requests for investment and operating means from the public funds.

As a result, there is a danger of further decline of the infrastructure´s utility value with subsequent decline of safety and fluency, increase of accidents and congestions as well as transport costs incl. externalities.

There is insufficient state support by means of setting requirements for the ITS: research, development, test run, purchase, operation and further development. There is another danger of fragmentation of individual public administration components´ activities at different levels: state, regions, municipalities. There are dangers of incompatibility, absenting interoperability, low reliability and safety of the provided ITS services.

Cooperation of public and private sector in the field of national ITS development is not satisfactory to utilize potential of Czech manufacturers and service providers; it is necessary to specify conditions of the cooperation development in order to preserve future competitiveness of Czech suppliers in the ITS market.

The selection of high-quality (not the cheapest, which is usual) supplier and its solutions in the field of ITS is endangered as a result incorrectly set rules for the tenders contracted by the public sector. This poses a threat for carefree, smooth and reliable long-term operation of the interoperable ITS.

Interruption of the SUMP preparation or of cities´ activities in the CIVINET network would endanger the sustainable mobility policy. The vision of integrated development of regions and cities, land use and transport planning towards sustainable mobility and quality of citizens´ life would be endangered at the same time.

Unprepared SUMPs, as well as insufficient utilization of European funds, poses a threat for development of the infrastructure necessary for sustainable mobility and cities in general. Also, harmonization of European and national conditions and requirements is necessary; currently, there are contradictions among them that might cause that already used EU funds will have to be returned along with related penalties.

Poor security of sensitive data and its upgrade can endanger the ITS operation. The importance of data authentication, authorization and verification as well as access to data in general are underestimated. It is necessary to prevent misuse of the data and to develop its protection.

Underestimated difference of the initial conditions between market leaders side and SMEs can endanger existence of the SMEs as a result of high costs required for mandatory implementation and operation of the ITS service(s).

Growing costs of public transport can discourage its passengers, in the worst case back to the individual transportation.

POLITE priorities specified

- To influence the form of the national Action Plan of the ITS development and its Implementation Plan in relevant aspects to make it coherent with the existing Czech Transport Policy and the POLITE project outputs.
- To influence the form of the Concept of Public Transport in the Czech Republic (national Green Paper) in relevant aspects to make it coherent with the existing Czech Transport Policy and the POLITE project outputs.
- To influence the form of the national SUMP framework and the CIVINET secretariat activities in relevant aspects to make it coherent with the existing Czech Transport Policy and the POLITE project outputs.

5 ITS POLICY IN THE CZECH REPUBLIC

5.1 OVERVIEW

Transportation policy is basic strategic document of the Czech Government for the transport sector; Ministry of Transport of the Czech Republic is responsible for its implementation. Current „Transport policy for the period 2014 – 2020 with prospective towards 2050“ has been approved at the Czech Government meeting on June 12th 2013.

Main objective of the Transport Policy is to create conditions for the development of high-quality transport system based on taking advantage of technical, economical and technological attributes of individual transport modes as well as on the competition principles with regard to its economical and social influences and effects on the environment and public health. The main objective is followed by specific priorities of sectoral and sectional nature.

Transport sectoral strategies, the 2nd phase (hereinafter also TSS2 or Transport strategies) define rules for efficient and high-quality operation of existing transport infrastructure and include principles for setting priorities of the development projects being prepared while taking into account specific financial amount available. The document presents a basic concept of the Ministry of Transport which specifies priorities and objectives in the field of transport and transport infrastructure in the medium term by 2020 and generally in the long term up to 2050.

In relation to ITS, it deals especially with the implementation of the European Electronic Toll Service (EETS), with providing of the toll system’s continuous function after termination of the contracts with current general contractor on January 1st 2017 and with execution of so-called priority actions specified by the Directive 40/2010/EU. Actions aimed at coordinated ITS implementation and exploitation on European level are as considered priority for ITS development in transport sector strategies while the Roads Act sets the duty of the ITS service provider to use only such ITS components that are compliant with the European Commission specifications. In the context of Czech road and highway network, the ITS development in the following period will be focused on:

- Data collection;
- Traffic information and traffic management provision;
- Electronic Toll System;
- Interoperable eCall service.

It is necessary to dispose of wide range of data which is already available today thanks to operated ITS in order to fully integrate all the transport modes along with the option of optimal interconnection and co-modality support.

It can be declared that available traffic information is currently not fully exploited on the secondary level. Traffic information and control functions are primarily linked to public transport dispatch centres and ticketing systems and they are usually used solely for the purpose they have been designed for. The examples of other uses comprise providing information to passengers, vehicle circulation planning, tracking of vehicles in the infrastructure, passenger ticketing etc. Only rarely, we encounter other uses and analysis of the data which is generated and subsequently stored by these systems.

Therefore it is necessary to design and especially to implement the processes related to thorough analysis of all available data and to ensure interconnectivity of the collected data and information among individual systems and subsystems by means of created standardized formats.

It can be achieved much deeper relations between data and new, currently unknown methods of development strategy planning and designing can be found by this approach.

Benefits:

The cities can consider the ITS development plan to be another plan in the urban agenda or incorporate it as inseparable part of sustainable mobility plan. It is therefore necessary to point out that this approach is not new but that it builds upon already existing individual plans that lack emphasis on complexity and extensive utilization of available data for creating plans based on real data.

So-called infomobility solution includes various benefits that comprise the following issues:

- Data accessibility improvement for better planning options

There is a broad consensus that creation of the ITS development plans contributes to building of more complex and more compatible systems. That can be expressed by improvements such as real-time data available from information systems in public transport vehicles that enable better schedule adjustments based on real travel time or solution of transfers in transport nodes.

- Reduction of the environmental burden in cities
- Reduction of the economic costs of system equipment.

5.2 POLITICAL ISSUES

ITS systems in the Czech Republic are not well connected on an information level in many cases. Currently, a huge amount of diverse data exists while there is data with similar content collected by public administration organizations, in some cases. It is necessary to set a uniform data format in order to use and share data from various databases and to link them with other ITS applications and public administration’s information systems.

It is also necessary to mention that current system of public transport organization in the Czech Republic is adjusted in a very sophisticated way, especially thanks to the legislative support.

Predominant part of the transport services is not provided commercially at the operators´ full business risk, it is ordered within the frame of so-called public services in passenger transport in the sense of the European Parliament and European Council regulation no. 1370/2007 and the Public Service Act.

In the Czech Republic, the authorities in charge are the Ministry of Transport (interregional transportation), regions (regional transportation, regional transport services) and certain municipalities (local transportation, municipal transport services).

Region-wide integrated transport systems based on complicated clearing of revenues from individual operators´ sale of tickets have been created in many regions as a result of the effort for better interconnection of railroad, urban transportation and regional buses.

The above mentioned facts affect crucially the options to implement ITS systems of required quality and standard with emphasis on the system interoperability.

This can result in the integration of the whole public transport system and the interconnection of ticketing and multi-modal information systems.

Unfortunately, there is currently an insufficient political support to develop nationwide integration concept in the Czech Republic.

In this context, it is also necessary to mention the fact that this issue is also related to the tariff fragmentation related to setting the price per traveled zone. This issue could be also solved by the system centralization on a higher level.

Besides the tariff integration issue, there is an ongoing diligent effort to solve the system issues related to the concept of so-called “intelligent ticketing“ which shall result in improvement of public transport services (in the future based on e.g. so-called multi-modal ticket) and finally in its higher general attractiveness. It deals primarily with creation of uniform technical basis for public transport ticketing which is related to increasingly frequent passenger ticketing by means of card systems, mobile phones etc. The amount of various card applications is increasing and this is an obstacle for both passengers and ticketing systems. Therefore still stronger need for a uniform standard for public transport ticketing devices emerges.

Intelligent ticketing is related to the issues of information systems and interconnectivity of these systems by means of the national timetable information system (CIS timetable). CIS timetable includes public railroad timetables as well as approved timetables of public bus lines.

The objective is to focus the development of these systems to an end user and to grasp his needs related to functionality and simplicity of provided application and service.

Well-adjusted multi-modal system allows us to keep current passengers on using the public transport systems and to prevent outflow of the passengers to individual transport. This outflow could be then caused by poor service link-up, incorrect information or misadjusted price.

For a passenger awareness of a nearly real-time situation on a selected route, it is essential to have well adjusted provision of correct information during all stages of a journey – both from technical aspect related to static data and from organizational aspect related to dynamic data. Based on this information, passengers can select their route or possibly choose from several alternative routes.

In order to achieve this, it is necessary to have the data available for transfer in a uniform format, according to the approved standards and ideally, these standards can be incorporated in a legislation guideline which is enforced at a national level. Interconnection and coherence of this data can be handled by a superordinate central entity that can collect this data from their individual providers and redistribute it upon request. Such system is not financially demanding and it still allows certain extent of specification for individual autonomous systems for various transport operators or integrated systems.

All the data collection processes have to be protected especially against misuse of the data. At the same time, there is an important question related to openness of this data and ensuring accessibility to their users. It is essential to assure correctness of this data by some well-adjusted commercial/legal model so that the set route selection algorithms are not misused to favor any operator.

Implementation of real-time information seems promising from the perspective of further development of related applications. It also means to take centralized records of traffic closures and to interconnect geographic data on the locations of stops and stations.

5.3 IDENTIFICATION OF USER NEEDS

The above mentioned implies that the primary objective is to support creation of strategic policies that will provide conceptual support for continuous equipping of the public transport systems with the ITS that will be able to transfer data in a uniform standardized format, ideally in real-time to a centralized data system.

Traffic information from the centralized data system thus can subsequently provide information support for creation of overall concept of efficient transportation plan that clearly demonstrates proper operation of interregional or intermodal connections.

Although the importance of using up-to-date traffic information for partial switch from individual to public transportation is emphasized, actual application facilitating this switch (interconnection of up-to-date traffic information and public transportation timetables information) is completely

missing. Needs of individual participants of the process along with expected benefits for interested groups are listed below.

5.3.1 PASSENGERS

Matiur Rahman states in his the scientific article, that timely and reliable information on public transport line timetable is the factor that 35% of passengers mention as the most important one for selection of the transport mode.

This factor determines the following priorities towards the passengers. The main objective is to provide such public transport services that the passengers are motivated to use them and do not switch to competing transport modes. We enumerate the policy implications within the context of this document:

- To improve provision of travel information across the whole system and to provide realistic, reliable, accurate and especially timely information;
- To improve the ticketing system so that the passengers can choose alternative tariff in the context of journey planning from point A to point B;
- To improve adherence to the timetables that respect the passengers´ mobility requirements.

5.3.2 PUBLIC SECTOR

Team of experts states in its study (Guidelines for ITS in urban areas) a discussing plan of the ITS implementation into the public transport that the roles of public and private sector shall stay closely related in these cases when no commercial neither economic model for funding of data transfer administration and state-level database system operator is specified autonomously.

The public sector shall become the operator in these cases automatically and authorize a private organization to manage these systems. Complex data can thus be provided to broad expert public if the funding is ensured. This approach would enable creation of a wide spectrum of applications for various purposes (statistics, real-time applications, diagnostics etc.). The above mentioned implies that the public sector shall especially find suitable means of funding of the data collection and management; public sector shall also be interested in creating the ITS implementation plan and create incentives for specification of methodologies and acceptance of standards. As a result, the situation can be subsequently improved in these aspects:

- Optimization of transport serviceability in the regions and improved quality of the provided public transport services;
- Reduction of the environmental impact;

- Provision of information to the passengers about exceptional events including efficient suggestions of alternative solutions in cases of accidents, significant delays, missed connections etc;

- Increased control of efficient spending of regional or state subsidies for public transport system operation.

5.3.3 PRIVATE SECTOR

The private sector is represented in the process by the commercial subjects that are responsible for actual implementation of the systems. We discuss the supplies of separate components, subsystems and complex systems that generate data as a result. Stable commercial environment with clear business rules is created when the standards come into existence. Significant increase of competitiveness and improved quality of the provided services being provided are the main results of the system´s set up in this way.

On the other hand, the commercial subjects shall be enabled to access the complex data (timetable data, real-time vehicle operation data, historical vehicle operation data, vehicle occupancy etc.); they could create competitive applications related to them. However, this approach is feasible only if there is a business model funded by state (or possibly by another entity established for this purpose) while database management and maintenance is provided by the private sector. In this case, the data can be public but strict security and quality regulations for the information provided by the third parties must be observed. Any access to the data then must respect specified mobility policy. Obviously, it is questionable whether e.g. occupancy data of individual connections (vehicles) shall be available to all the subjects who wish to use it or whether such rules shall be set that would specify strictly what subjects are allowed to use data of this kind and under what conditions they can do that. Efficiently adjusted PT system for the commercial subjects ultimately brings the following benefits:

- Competitiveness of even starting subjects;

- Equal conditions for all interested subjects;

- Data access option – possibility of development of unique, original applications and SW;

- Possibility of penetration to foreign markets.

5.3.4 ROAD TRANSPORT OPERATORS

An operator operates its services on the basis of approved timetable or timetable flexibly modified by the dispatch centre, conditions of carriage and tariff. There is a likelihood that the proportion of delayed or overtaken vehicles will be reduced if the optimization measures are implemented. Better quality of services can be thus provided to the passengers.

If the standards are implemented, it is possible to operate in a territory managed by other integrated transport systems and to stay “visible“ for the passengers on the electronic panels at the stops, terminals or train stations. The passengers can also access the updated information for searching in their hand-held devices. The operators can be sure in this way that the information on service operation is available to the passengers at particular places in particular time.

Another advantage of the measure implementation is that given operator´s driver is always informed about the delay of the connecting services or if these services will wait for his delayed vehicle.

5.3.5 COMPREHENSIVE USER NEEDS ANALYSIS

According to the European Commission´s analysis and opinion polls within the Eurobarometer programme [8] which is in progress since 1973. The 2010 results allow the conclusion that the Czech Republic is very specific within the EU from the PT perspective.

Public transport in the Czech Republic is being used for the mobility purposes by the biggest proportion of citizens from all the EU countries. The polls indicate that it is 37% of the travellers. In contrast, European Union average is 22%, as you can see in the **Chyba! Nenalezen zdroj odkazů.**.

Figure 2: Percentage of travellers using PT as a main mobility mode, source: [7]

However, the Czech Republic is the last in the EU in another monitored detail – it has the lowest proportion of the car users who would increase frequency of their PT trips after certain improvements.

The cited opinion poll results implicate that the highest proportion of individual transport users state a lower comfort, closely followed by an insufficient network of connections and their low frequency as the reasons for selection of individual vehicles. 64% of all polled individual transport users even state a low reliability and 43 % an insufficient awareness.

Interesting fact about these surveys is that insufficient awareness is the only indicator which is below the EU average. There is a possible explanation that the Czech Republic is one of the

few EU countries that have succeeded in integration of all planned (static) timetables to a single platform (CIS JŘ). This data is used in the IDOS application.

Complete results of the conducted survey are in the table 1 below.

Reason	%	Evaluation by the EU
Lower comfort	76	Above the EU average
Insufficient connection network	75	Above the EU average
Low frequency of the connections	72	Above the EU average
Low reliability	64	Above the EU average
Too expensive tickets	57	Above the EU average
Insufficient awareness	43	
Security concerns	41	Above the EU average

Table 1: The reasons stated by the Czech Republic citizens who prefer to use individual transportation exclusively, source: [7]

Another part of the survey was focused on searching reasons for use of the PT services. The results are listed in the figure 3 below. Absence of a car and economic issues are the main reasons for PT use. Other reasons (comfort, time aspect and health issues) are rather minor.

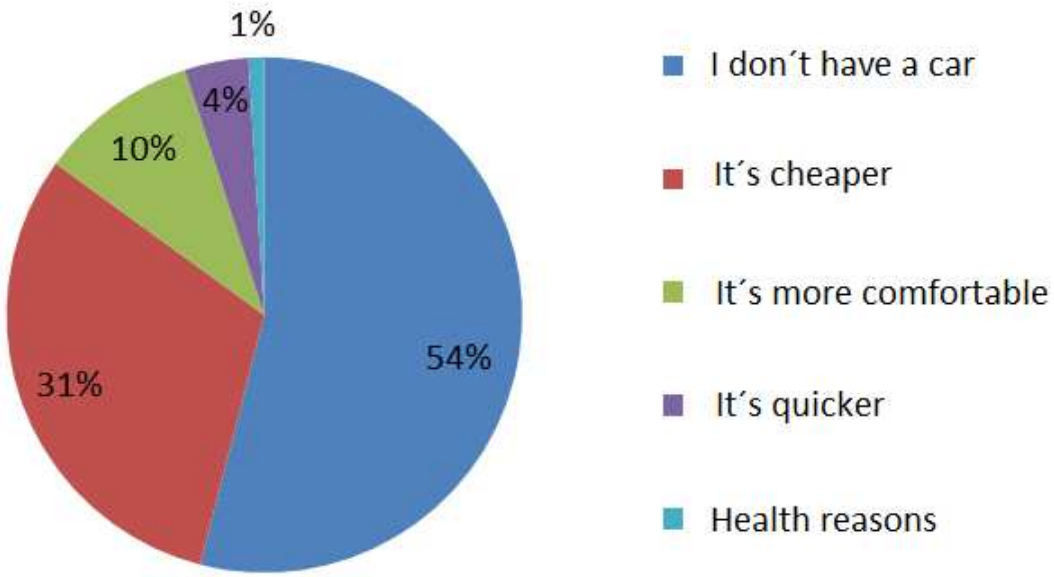

Figure 3: The reasons for PT use stated by the passengers in the Czech Republic

As the next step of the survey, the inquirers were especially interested in possible reasons that would result in change of individual transportation users´ preference.

The reasons such as easier transfers (33%), more attractive terminals and stops (24%) and better awareness (22%) are of interest in the context of this document. The indicator of the preferred ticket form in the integrated transport system is very interesting as well. Such a solution requires the process of standardization and subsequent certifications as the very heterogeneity of formats and individual solutions is its biggest obstacle.

Reason	%	Consent proportion
Easier transfers	33	Lowest in the EU
More attractive terminals	24	Lowest in the EU
Better awareness	22	Lowest in the EU
On-line ticket	10	Lowest in the EU
Integral ticket in the integrated transport system	31	Lowest in the EU

Table 2: The reasons that could, under certain circumstance, result in the change of individual transportation users´ transport behaviour towards the PT preference, source: [7]

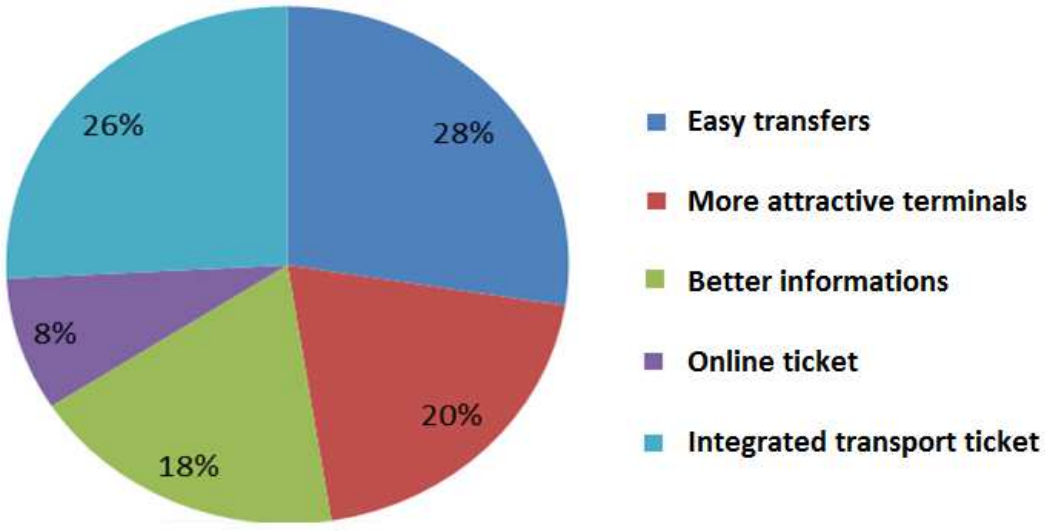

Figure 4: The reasons for PT use stated by the passengers in the Czech Republic

5.3.6 CONCLUSIONS OF THE CONDUCTED SURVEY IN RELATION TO THIS DOCUMENT

There are many interesting indicators to be found in the Eurobarometer results. Public transport in the Czech Republic hovers on the imaginary edge despite the fact that there is the highest proportion of PT users, in the Czech Republic. However, some of the indicators are alarming. It will be very difficult to attract new passengers, especially in urban areas. Rapid reduction of public transportation´s travel times in cities and increased PT prioritization (priority at the traffic signal signs, priority lanes, increased amount of the services etc.) can be the reasons for such a change but the recent decreasing trend of PT users´ number indicates rather the very opposite. The results also implicate that certain potential for PT users´ growth still exists in individual regions and urban areas.

However, there is also the risk that the users can stop using PT easily. Constant increase of the provided services´ quality must be stressed permanently so that the PT can compete with the individual transportation. Otherwise there is real danger of passengers´ outflow and of starting long-term downward spiral with vast, maybe even irreversible negative consequences.

The results confirm the above mentioned presumption, that by introduction of innovative technologies, we enable increase of service quality primarily in the areas listed as the reasons for possible change of travel behaviour – especially the shift from individual to public transport.

The implications of the POLITE project are its policy recommendations. These include, inter alia:

- Increasing reliability of public transport system – long-run and in-depth analysis of chronic delays or early arrivals can provide efficient regulation of timetables; it also allows for taking strategic transport measures that enable more fluent transportation in general (e.g. better adjustment of control plans, construction of ring roads, bottleneck detection etc.). It is also possible to gradually eliminate the phenomena related to failing connections etc. by means of analysis.

- Increase of passengers´ awareness – with proper set of regulations and standards, it is possible to attain the state with complex real-time vehicle traffic data available on a single platform. This information can be provided to passengers while planning their route or even during travel. Newly emerging applications will enable to suggest alternative connections in case of unexpected events etc.

- Facilitation of transfers up-to-date information on vehicle traffic will be always available when using connection transfer and also, applications will guide passengers through unknown environment in the close future.

- Improved equipment of terminals and stop points – awareness of passenger movement and of utilization of individual stops or terminals will allow for investors to constantly

improve the environment of waiting areas that are to be equipped with modern technologies, such as internet connection, electronic displays to inform about current delays of individual connections or about surroundings of a stop or terminal (shops, cafés, food etc.).

5.4 DEVELOPMENT AND IMPLEMENTATION PROCESS

Development and implementation of the ITS development plan in the field of public transport, aimed at improved mobility planning, shall be understood as innovation cycle that keeps on repeating in the sense of continuous improvement strategy. That happens particularly because of the continuous need for system equipment renewal.

Considering that the telematic systems develop dynamically, it is necessary to set up this innovation cycle according to the needs of a given city.

This document structures the ITS development plan's cycle into 5 separate segments.

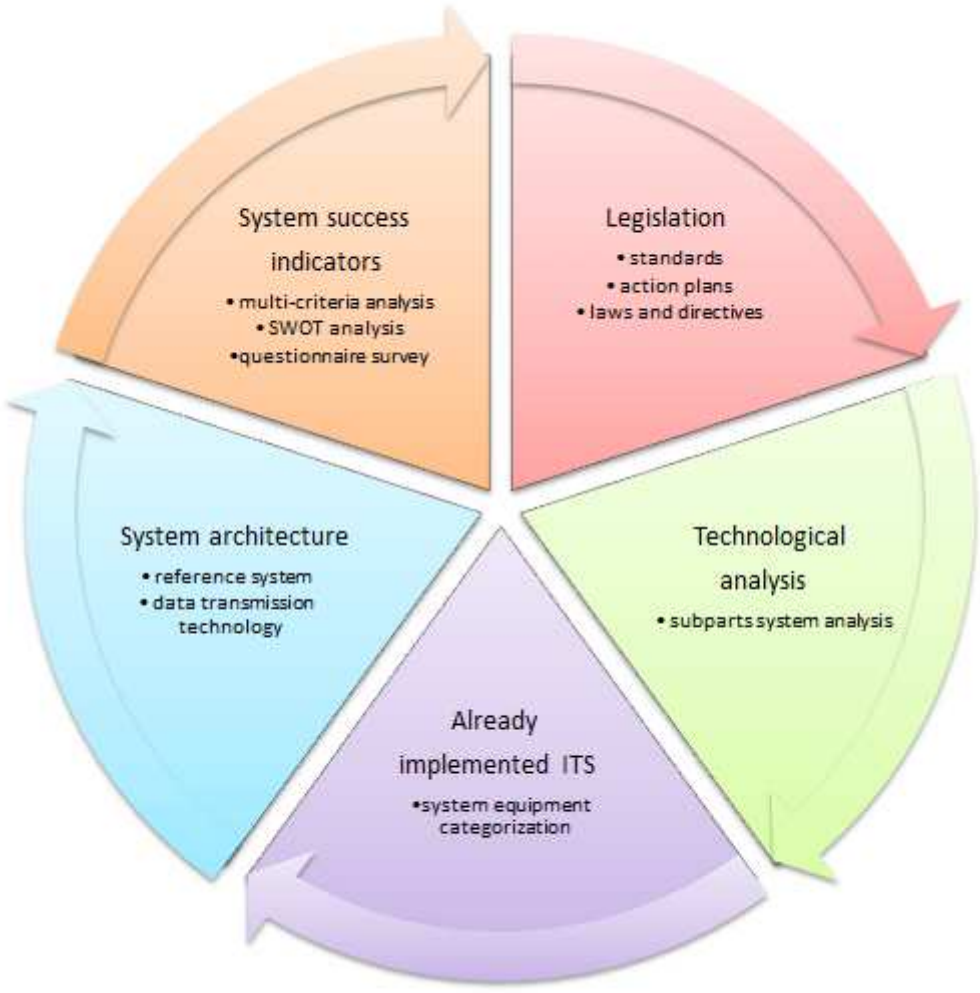

Figure 5: 5 segments of the ITS development

6 IMPLEMENTATION PLAN

This part presents methodical procedure for potential development of intelligent telematic systems in public transportation focused on transportation planning optimization and on enabling creation of sustainable urban mobility plans (SUMPs). The methodical procedure has been processed at the conceptual level and it provides manual for addition of ITS related sub-section into sustainable urban mobility plans. The above mentioned implies that the solution aims to present the methodology that will describe conceptual steps for equipping public transport systems with ITS able to transfer data in standardized uniform format, ideally in real-time to centralized data system.

6.1 SUB-THEME: SUMPS

6.1.1 WHAT ARE SUMPS?

Sustainable urban mobility plans (SUMPs) are European urban tools for better co–mobility development, pollution reduction and transport optimization. The European Commission proposes in the Action Plan on Urban Mobility (2009) to accelerate implementation of these plans in Europe and to support their development.

The European Commission has published “action plan for intelligent transport systems implementation in Europe ” in 2008 and supporting ITS directive no. 2010/40/EU in 2010 in relation to regulation of information technology and intelligent transport systems development. Both these documents provide a legal framework for the ITS implementation. The main objective is to initiate uniform ITS development on pan-European scale.

The importance of this approach is given especially by the fact that ITS may bring clear benefits related to road transport efficiency, sustainability and safety and contribute to the objectives of internal market and competitiveness in the EU at the same time.

In the field of urban mobility, the ITS action plan called upon support of ITS development in urban areas and at the same time upon permeation of the strategies offered in relation to ITS development specified in the given urban mobility action plan. The mobility action plan proposes creation of methodical procedure for ITS implementation focused on urban mobility improvement as one of the options.

This methodical procedure has been prepared based on the above mentioned context. The results of the efforts conducted so far allow to assume that there is a very tight link between public transport system organization and sustainable mobility strategy and that the issues can not to be solved in a short term.

6.1.2 LEGISLATIVE AND CONCEPTUAL LEVEL

This segment enumerates all related legislation that has to be followed and observed within the context of development of information systems in public transport in selected area. If these documents are missing, it is necessary to exert pressure on their formation. Strategic development plans, feasibility studies comparing alternative solutions of the issues, guidelines for handling data and cooperation of architectures across systems with a long-term perspective are considered in the first place.

General characteristics of the current state

Policy documents and effective legislation relevant for this step are listed in the Czech and EU legislation chapter in order to enable their evaluation.

It is important to be aware of the status of already created policies before making the decision to create new plans. This information has to be compiled into comprehensive document in order to provide necessary basis for the creation of new plans.

It has to be reminded here that the European Commission will support local authorities in development of „Sustainable urban mobility plans“ that cover both freight and passenger transport in urban and suburban areas. These plans shall include separate parts dedicated to the ITS plans.

Participating in announced competitions and calls for co-funding of the projects focused on equipment of the systems based on the very strategic plans processed according to the proposed methodology scheme is another possible step.

Definition of the objectives in the 1st segment

- Identification of the current strategic plans;
- Identification of the legislation that has to be observed and monitored during implementation;
- Ddesign of the ITS implementation plan.

6.1.3 TECHNOLOGICAL ANALYSIS

This segment describes individual parts that the system is composed of.

It puts importance especially on the components and subsystems complying with relevant standards that are listed in the annexes. This technological analysis makes it possible to evaluate the current system equipment and to design its renewal or to project new system that meets current requirements.

Newly composed systems shall be designed based on the proposed standards and such alterations shall take place during system renewals so that higher-level system compatibility is provided.

There is an option to use data from the proposed archive server module, so-called historic data, according to proposed characteristics and features of the individual components that are defined by the standards.

The system has to be designed as open (meeting relevant interoperability requirements) with the option to obtain required data related to the needs of strategic documents and plans.

It is possible to acquire data globally from all participating systems, including real-time system cooperation, based on the proposed functional model for information sharing via the centralized component.

General characteristics of the current state

ITS systems´ development and implementation into public transport is a complicated process. Although the ITS integration plan is based on already existing equipment and renewal plans, this procedure also requires to incorporate new tasks as well as to modify certain methods. There is a new task for better optimization and transformation of new procedures. It is clear that this new structure has to be approved properly.

An overview of all subsystems and their equipment in order to enable access to further information shall be listed in order to increase the system efficiency.

Definition of the objectives in the 2nd segment

- Analysis of current system equipment and formulation of relation structure of individual components and their suppliers;
- Design of step by step project implementation;
- Solution of various kinds of risks that can occur during a component renewal;
- Definition of requirements for standards that have to be met,
- Assessment of the option of connecting into centralized data transfer structure.

6.1.4 ANALYSIS OF IMPLEMENTED ITS AND THEIR EQUIPMENT

This segment brings an example of the complex analysis of the systems already well-established and operated in the Czech Republic, including their services and functions. It aims to provide an overview of the existing systems, age of implemented components and

subsystems and the probability of interconnection with surrounding systems as well as definition of the options to connect to these systems in the future.

General characteristics of the current state

Currently operating systems have to be monitored as part of this activity. It is necessary to monitor in which way the dispatch procedures are organized, how the data is exchanged, if the system operates within an integrated transport system or within a single carrier. It is desirable to keep track of individual systems´ function architectures, to search for the possibilities while building a new system such as how to ensure wider compatibility with the option of system interconnection through a centralized component.

Definition of the objectives in the 3rd segment

- To ensure efficient use of available funds;
- To prevent selection of financially unreal measures.

6.1.5 REFERENCE SYSTEM ARCHITECTURE

This segment gives an example of possible system architecture that illustrates cooperation of subsystems and components within a complex system.

6.1.6 SYSTEM SUCCESS INDICATORS

This segment proposes methodology for multi-criteria evaluation of alternatives for selection of suitable information system and formation of the indicators including successive implementation stages. The considered stages are: selection of evaluation alternatives, definition of all alternative evaluation criteria, and definition of individual evaluation criteria weights, partial (isolated) evaluation of individual alternatives, and multi-criteria evaluation of the alternatives. The INTRMUROS method has been applied, after the criteria definition.

General characteristics of the current state

The procedures in this activity follow the proposed methodology for multi-criteria alternative evaluation. It is important to compile input matrix of the multi-criteria evaluation and to design the criteria to be evaluated by experts in a given field in order to select the most useful alternative for implementation of the planning improvement system and to enable better data transfer.

Definition of the objectives in the 5th segment

- Multi-criteria analysis;
- SWOT analysis;

- Questionnaire survey.

6.2 SUB-THEME: INTELLIGENT PRIORITY IN PT

This part of the document is a methodology for the needs of implementation of intelligent public transport priority system at the intersections controlled by traffic lights into the conditions of the Czech Republic. We will introduce the principles of system's operation, its positive impacts and approaches necessary for its implementation herein.

6.2.1 WHAT IS THE PT PRIORITY?

Rate of motorization increases constantly in bigger cities in the Czech Republic. Passenger cars perform great amount of trips each weekday which logically affects public transport operation. Road network capacity is not to be changed easily and therefore the prioritization of all modes of public transport is very important in order to maintain smooth traffic flow and time table accuracy.

Metro, railroad, cableways, water transport, these are some of the public transport modes that are given significant advantage over bus transport. The bus transport is affected by several external influences (intersection capacity, congestions, accidents, collisions etc.) which results in many negative impacts such as decrease of PT service quality and speed, failure to stick to timetables, and outflow of the passengers from PT to individual car transportation.

The public transport priority is thus a very broad concept that can be explained as set of all measures contributing to public transport (PT) preference and support. The most common means of prioritization include dynamic control of traffic signal signs, dedicated lanes for public transport (PT) vehicles, infrastructural modifications (access restriction zones, segregation of lanes,…), legislative preference for transit of certain vehicles through transport network and other measures such as transport optimization (line planning, timetable optimization).

Considering the Bristol solution (Good Practice No. 14) and the conditions that exist in the Czech Republic, the focus will be on the public transport bus priority at the traffic signal signs within the scope of this document only.

CDV in cooperation with HW suppliers from the Czech Republic have developed an innovative PT vehicles priority system (for traffic signal signs) called TYFLOSET. This system was developed on technological basis of Bristol´s Good Practice using verified procedures and methods. It is based on state-of-the-art procedures and technologies such as GPS detection, V2I and V2V communication.

6.2.2 LEGISLATIVE LEVEL

First of all, it is necessary to analyze existing legislative conditions in the field of public transport vehicles´ prioritization, especially at TSS, in the context of the implementation process of this

system. In the Czech Republic, these conditions are specified by the following documents and acts:

- Action plan for ITS implementation in Europe (2008);
- ITS directive no. 2010/40/EU (2010);
- Road traffic operation law no. 361/2000;
- Transport Policy of the Czech Republic for the period of 2014 – 2020;
- City notices;
- Technical standards.

Transport issues currently affect life of the Czech Republic's population significantly and thus become an important political concern. The term "PT prioritization" is a generally accepted principle at the municipal and national levels already. In this respect, strategic documents and plans are fundamental for traffic policy of individual cities.

Clear output from those documents is the fact that the PT priority policy is a widely accepted principle at a general level. The level of prioritization is a transport policy issue in the first place. Considering adoption of specific prioritization measures, it depends primarily on the intentions and decisions of a city and to what extent are the cities willing to prioritize the PT. According to the current legislation, the cities have one hundred percent of discretionary power in approving the transport solutions; all the other subjects can only comment these measures.

6.2.3 TECHNOLOGICAL ANALYSIS OF THE TYFLOSET PRIORITY SYSTEM

The designed solution of public transport vehicles´ priority is based on application of command transmitters and receivers for the visually impaired people called TYFLOSET.

The system of command receivers and transmitters as part of the on-board information system (IS) serves primarily to provide information to blind, partially sighted and other persons with reduced mobility and orientation. This information is provided to the users acoustically especially at the public transport (PT) stops. The radio-communication technology of the devices from the TYFLOSET command set can be also used conveniently for other transport applications during vehicle operation. Crucial benefit is the fact that some version of the TYFLOSET system is installed in most public transport vehicles in the Czech Republic. Therefore there are lower purchase costs of upgrading the vehicles HW with any necessary extra technical equipment.

Part of the TYFLOSET system, which relates to the vehicles, is linked to an on-board information system operated by a bus controller, either by an on-board IS computer or by

another type of controller, e.g. by a ticketing device which however performs basic functions of an on-board computer; this computer's database comprises the information on progress of a driven route acquired from other detection and localization systems as well as the information on punctuality of a connection, respectively on deviations from the planned timetable (TT).

Such information system enables assessment of vehicle position including orientation at the intersections with traffic signal signs (TSS) and to request priority for PT vehicles (depending on current deviation from the timetable). Such a sophisticated system enables active, conditioned, traffic-dependent prioritization of the public transport vehicles by means of a dynamic control with no intervention from the control center (decentralized system) through direct communication of the vehicle's IS with the TSS controller.

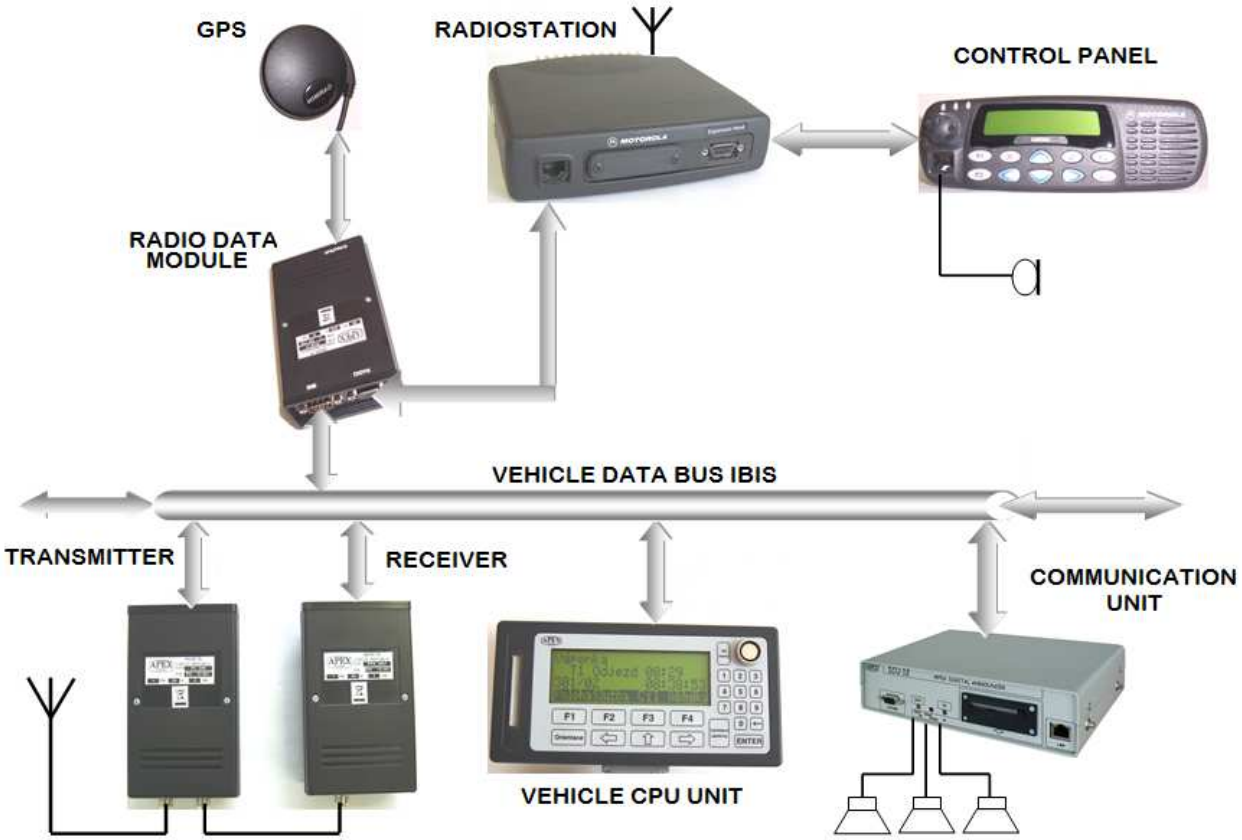

Figure 6: Architecture of a priority system based on the TYFLOSET architecture

6.2.4 ANYLYSIS OF IMPLEMENTED SYSTEMS IN THE CZECH REPUBLIC

The most developed priority systems in the Czech Republic are in four largest cities (Praha, Brno, Ostrava, Olomouc). We will only focus on a bus priority system for purpose of this chapter. The reason for this limitation is the fact that the selected GP Bristol presents just such a technical solution.

City	Prague	Brno	Ostrava	Olomouc
Inhabitants	1,289 mil	0,404 mil	0,311 mil	0,102 mil
Area	496 km2	230	214	104
Traffic lights	578	142	105	34
Active priority	266	56	12	14

Table 3: Czech cities characteristics

Prague

Bus priority at the traffic signal signs is slightly more complicated than priority for trams. Use of the bus priority system at the traffic signal signs is conditioned by technical equipment of the vehicles as well as by fitting the traffic signal sign with relevant controller which accepts commands from the vehicles and switches individual traffic signal sign phases based on its program.

The bus priority system operates on the basis of the radio communication between vehicle and controller at a traffic signal sign. Infrared beacons placed at a sufficient distance in a front of a stop line indicate vehicles approaching the intersection. The onboard device also enables linking of the system with the applicable line timetable so that the controller prefers especially these lines a highest need it most because of a delay. The priority request is sent into the controller according to the established timetable variance; this request is classified into three levels from low to high.

Active detection devices are being put into operation in SOR (bus manufacturer) vehicles; these devices did not communicate with the intersections originally. The system has been put into operation in 68 buses in 2010 which is nearly one half of the new vehicle delivery. Total of 580 vehicles has been equipped with the functional devices by the end of 2010. This is half of the fleet of DPP which is major public transport operator in Prague. There was an increase in the number of bus priority traffic lights, although it is difficult to determine their amount accurately. This is caused by the fact that the bus detection is likely installed even at the intersections whose software responds to buses in such a negligible way that it cannot be considered priority.

Brno

Dopravní podnik města Brna, a.s. (public transport operator of Brno) has built a unique dispatch centre equipped with CIS (Control and Information System) in recent years. This system enables an instant detection and elimination of all timetable variances as well as optimization of public transport operation. One of the function of the CIS is to evaluate the exact vehicle location (by GPS) and provide priority of public transport vehicles at controlled intersections.

Ostrava

There are altogether 12 active public transport priority intersections. Part of the controllers at the traffic signal intersections in Ostrava is already out-of-date and unable to meet satisfactorily the demands that are made on them. They do not even use proper transportation software which is necessary to provide passengers with the maximum comfort. The controllers at these intersections have to be exchanged with the new ones.

Olomouc

Currently, there are 14 intersections equipped with dynamic traffic management system in Olomouc. Priority is given to delayed public transport vehicles over other road users, at these intersections. Moreover, there are so-called inductive loops built in the roadway. Their task is to register vehicles (cars,…) waiting in the intersection. If the inductive loop registers no vehicle, the system does not trigger the “green” signal in this direction and gives priorities to other directions in most cases.

6.2.5 SYSTEM SUCCESS CONDITIONS

Public transport priority systems are likely to be implemented most successfully if the targeted city already has severe transport problems, such as congestion or a lack of proper infrastructure.

Prioritisation of public transport vehicles is an affordable option to enhance the accessibility of areas with a medium population density, which currently can be reached only by using highly congested roads. There, a tram or a metro line would not be justified because of the high costs, but priority systems would be an appropriate solution as the investments are relatively low compared to the benefits in terms of running time and comfort.

For the introduction of reserved lanes for public transport, it is crucial to have enough space available and to implement a monitoring system to achieve a good control of the lanes in order to increase their efficiency. When a new road infrastructure is planned, it is advisable to implement prioritising solutions already at the stage of planning and technical design.

6.2.6 IMPLEMENTATION STEPS

Collection of required data

- Analysis of the current traffic situation and infrastructural conditions to make sure that the new sestem, which will be implemented, is an appropriate solution for the city;
- Measurement of current public transport quality for the folow-up evaluation once the system is implemented;

- Launch of a mobility survey to detect the needs and opinions of the PT users;
- Identification of the most problematic streets and junctions as well as the duration of peak time delays to define the areas where the system could be implemented;
- Evaluation of the legal and regulatory frameworks in the city;
- Collection of State-of-the-Art solutions (in our case – identified GP).

Formal decesions

- Choice of the most problematic corridor / intersection (bus lanes / traffic light priority);
- Approval for the type of the priority system;
- Approval for the enforcement system;
- Agreement between all stakeholder involved (local administration, police, PT operator,..).

Technical implementation

- Construction of the technical analysis document of the intersection;
- Development of the control application software for the intersection controller;
- Validation of the rules against timetable of PT vehicles;
- Instalation of the new equipment;
- Calculation of the new PT timetable following the implementationof the priority system.

Information campaign

- Inform car and PT users about the new system.

System evaluation

- Market research among the PT users
- Research of the modal split
- Evaluation of the system indicators (time saving, polution, speed of vehicles, economic impact, ROI, ...)

6.3 SUB-THEME: OPEN DATA

6.3.1 WHAT IS THE CONCEPT OF OPEN DATA?

Numerous traffic information applications are one of the most successful and fruitful areas where open data is used extensively. These applications enable better planning of citizens´/passengers´ trips by train, metro or by bus, location of free parking places or better planning of their trips by non-motorized transport while avoiding road works. What is the open data actually? The data is open if there is no legal, technical or other limitation to its access, processing and further distribution. Access to the data, its processing and further distribution with an added value is enabled for any purpose including commercial one with no limitation or discrimination. It is also allowed to use the data free of charge or for a processing fee under equal and transparent conditions.

Data and information can be provided by means of two different options:

1) As unprocessed data in machine-readable formats, so-called **Open Data**

2) Through standardized interfaces and services (API interface), so-called **Open Service**

Ever growing pressure on creation of the Open Government Data (OGD) platforms is also caused by enormous increase of utilization of smart phones and internet in general.

Support of dissemination of information and data on public transport and other transport modes has an added value for passengers in creation of numerous applications that can be focused on individual passengers´ preferences. The passengers can then choose the most suitable applications that meet their ideas about the provided information.

Fusion of various data sets enables creation of e.g.:

- Applications for evaluation of real estate in dependence on various parameters;
- Tourist guides;
- Multimodal mobility and infomobility services;
- Integration of transport services in different contexts.

Many politicians perceive the OGD initiative as an opportunity to make public sector services more attractive. Machine-readable data has a monetary value which is multiplied by quality of the data/information provided in this way. There is a link between providing, using or re-using of public sector information and economic growth. The public sector information is used by companies, individuals and even public sector itself and it gains an added value:

- Commercial sector can provide services by means of applications, web portals etc.
- Academia can use the data for creation of models and studies or for economically relevant computations, stimulation of innovations and development of new products and services.
- Motivation of public service providers for supporting higher transparency and creation of better strategies.
- Reduction of the obstacles for market penetration and solutions of information asymmetry.

6.3.2 OPEN DATA IMPLEMENTATION OBSTACLES

Legislative obstacles:

Current legislation, guidelines and regulations are often perceived as market obstacles in themselves, the question is whether rightfully or not. However, certain legal regulations and directives actually prevent the data from being released and shared which limits their availability. The OGD license is thus perceived as effective means of improving the availability of public sector information.

Economic obstacles:

The issue of charging for information data sets in the public sector is complex, data from both providers and users is missing and therefore it is difficult to analyse costs and benefits related to the data release.

In order to simplify the whole process of data provision and of reducing the requirements for individual software products for providing multimodal information, it is necessary to use existing standards and to create cross connections among the data sets of various transport modes as well as with new mobility services (car sharing, bike sharing, car-pooling).

We speak about several participants of the whole process in the open data environment:

- **Data provider** – the subject responsible for collection of source data from various data sources (GPS on-board units, detectors etc.).
- **System administrator** – the subject responsible for evaluation of the source data. Commercial subjects are concerned primarily.
- **Network administrator** – the subject responsible for information transfer and distribution to the end users through various distribution channels.

- **Service provider** – the subject that creates a direct connection to the end users e.g. by designing travel planning applications etc.

- **End user** – customer of the service provider. It is a customer although the willingness to pay for the transport applications is minimal.

6.3.3 LEGISLATIVE LEVEL

EU PSI directive

Regulation (EC) No 1049/2001 of the European Parliament and of the Council of 30 May 2001 regarding public access to European Parliament, Council and Commission documents. This act is a legal regulation that guarantees access to information held by state. It specifies the process of requesting the information held by government. All these requests must be then accepted with minimal costs apart from standard exceptions. Government is typically bound to release the information requested in such way and to support openness towards it.

National legislation

The Act No. 106/1999Sb. on free access to general information is effective since January 1st, 2000 in the Czech Republic. It puts a duty on state, regional, municipal authorities and public institutions to provide information related to their subject. Information is published mainly on a website, or by a request.

Nationwide information system of the timetables (hereinafter referred to as "CIS JŘ")

There are suggestions that the Act 106/1999 Coll. on free access to information shall be also applied to the database created within the scope of CIS JŘ.

- On the basis of § 17 paragraph 2 of Act No. 111/1994 Coll. on the road transport, as amended (hereinafter referred to as "Act No. 111/1994 Coll.) the Ministry of Transport conducts a CIS JŘ for the needs of the public. In terms of current legislative regulations, the information of the timetables in case of domestic regular bus transport are published pursuant to Act No. 111/1994 Coll. as approved timetables for the needs of the traveling public and in the sector of public rail passenger transport under the Act No. 266/1994 Coll. on railways as amended (hereinafter referred to as " "Act No. 266/1994 Coll.").

- The Ministry of Transport can entrust a legal person with the management of this system. Based on contract of CIS JŘ of management as amended by Amendment No. 2 of 29 September 2010 (the "Agreement"), the CHAPS s.r.o. company was entrusted with the management (hereinafter referred to as "processer"). The processer in the concluded contract undertook to carry out this work without the right to financial compensation from the Ministry of Transport. Beyond the framework obligations arising from the management of CIS JŘ pursuant to Act No. 111/1994 Coll. the processer solely based

on the contract is obliged to provide also other activities, the most important of which is in accordance with Article III., paragraph 3, item h) of the contracts the publication of the program outputs for searching the transport connection via Internet.

- Based on this provision, the processer keeps the locator of connection IDOS (http://www.idos.cz/). For this activity, the processer utilizes the database of CIS JŘ and other data sets produced in own activity that are the basic part of locator – it especially regards determining the points for possible change of transport means between individual lines and various modes of public traffic and determination of time necessary for change between individual stops with regard to their distance and factual accessibility, as well as the very delimitation of the stops, among which (despite their different names) the change is possible.

- A single data format JDF 1.10 (hereinafter referred to as "JDF 1.10") as described on the web address www.cisjr.cz. JDF 1.10 is stipulated by relevant transport authority for the carrier as a binding format and a data structure for the electronic form of the timetable and the carrier submits the timetable of urban bus transport or public rail passenger transport on tramway, trolleybus, special or cable tracks for an approval.

6.3.4 OPEN DATA GOOD PRACTICIES

Currently, there are several examples that inspire the possibilities of creating space for sharing of infomobility data. The most noticeable systems of this kind comprise the city of Helsinki (Finland), the United States of America, Great Britain, or cities in Germany or Austria.

Interesting links to operating platforms for open data or open services (OPEN Service) are listed here. The systems of London and Vienna are introduced below.

- https://www.govdata.de/
- http://daten.berlin.de/
- http://data.linz.gv.at
- http://data.london.gov.uk/
- http://data.wien.gv.at/
- http://www.openstreetmap.de/
- http://www.google.de/intl/de/landing/transit/#dmy

London

TfL have opened up their public transport data sources to the public. This has enabled 3 rd party mobile application developers to use the data to provide a variety of real time traveller

information apps (iphone, android, blackberry, mobile windows) for the bus, rail and underground services in London.

At present there are 41 legal users receiving a live stream of the data directly from the TfL's servers, and there are around 35 popular mobile apps developed (2014) by third parties using these data streams, which are being downloaded by the public. Within this process, there are intermediary developers who are taking the raw data from TfL, further processing it, and then selling it on to the app developers.

Policy Design Steps and Timing

The policy objective to provide the real time information for free was agreed in 2010, following the implementation of iBus with a delivery through a TfL website and mobile app. The development of this policy in around October/ November 2011 to open up the raw data to 3rd parties including 3rd party app developers was a 'bottom up' change led by the demand for the data.

Actors Involved

- London Mayor's Office – Responsible for setting the strategic policy objectives for London.
- Transport for London (TfL) – TfL is an agency of the London Mayor's Office and has responsibility for the planning and delivery of the majority of London's transport system and services. As a large organization with a range of powers and in-house skills, the majority of the policy changes, approvals and design / specification was undertaken in house.
- Cubic – Cubic is a multinational systems and services company, awarded for the Contract by TfL to implement the open data service, taking TfL's raw data, ensuring quality of service, publishing it to live feeds, providing the developer interface for accessing the data and the signing up to the terms and conditions of use.
- App Developers – a range of individuals and small businesses which use the data to deliver a range of apps and added value services to the end users on a range of mobile phone platforms. These were engaged with to ensure that the open data was delivered in a form which could be used by them.

The cost of open data is marginal when compared to the overall cost of the iBus real time system which provides the data. The full system´s set up including the server, data feeds, development of new API's for the data and web interface cost approximately £300,000.

The costs of the apps sits with 3rd parties and therefore is no cost to the authority. The ongoing cost to support is marginal as the staff responsible for the data server is also responsible for the RTPI system.

Vienna

The city of Vienna became the smart city of the years 2012 and 2013, and according to the statement of the very Viennese officials, the agenda of open Government and open data is the fundamental building block of this success. This concept has been introduced for the first time in 1995 by Dr. Häupl, current mayor of Vienna. The open data is responsible for creation of many values that are already quantifiable now. Currently, there are total of 196 open data sets in machine-readable formats available at public portals. Various applications for mobile and web services are being created for the field of mobility that deal with, for example, comfortable ride by public transport, services of various transport means´ rentals but also such specific issues as elevator failure in the metro. There are more than 110 applications that intensify mutual contact of the city with citizens and communities. All 110 applications are available at https://open.wien.at/site/anwendungen. They have been downloaded in average by 4 500 citizens per application, 80% of that have been Austrians, by the end of 2013. Top applications have been downloaded more than 31 000 times.

6.3.5 RECOMMENDATIONS FOR OPEN DATA IMPLEMENTATION

Absence of functional business model for data sharing is the fundamental factor to understand main obstacles to the creation of functional multimodal information system. Sharing of open data/services is not possible without a state´s support. Roles in creation of open data/services shall be clearly specified with that in mind.

State sector should provide multimodal information service in case that no other commercially based business model is available.

Private sector should provide services with business character that will enable creation of data collection, evaluation and provision system with the state´s support. Data quality and accuracy is stressed most in this model; the data will allow to develop the business potential of other economic subjects who will re-use it.

In case of multimodal information, several platforms can be created that will provide various data packages, e.g. (static and dynamic) public transport data system, traffic information system, floating vehicles data system etc.

Availability of data sets from various systems of various transport modes

State sector shall specify uniform rules for provision of data or information including real-time ones if these are available. Well adjusted policy of open data or services enables naturally

competitive environment among the service providers who can attach „their“ software to any data package which is provided by public sector.

Elementary policy decisions include:

1) Open data will be provided

2) Open services (API) will be provided

If comparing open data and open service advantages, it must be stated that it is more difficult to use open data criteria practically than open services´ ones. Only certain percentage of unprocessed data interpretation allows automatic processing with a relatively little effort. Therefore, extensive funds and effort will be spent to evaluate it with unpredictable results in many cases, which can limit the number of potential users to some extent. Subsequent applications and services are thus carried out to a lesser extent. Unlike open services that enable diverse use of already evaluated information in standardized and clearly defined format. Open Service allows provision of so-called ready-demand services with the advantage of standardized API utilization. Standardized API interfaces usually provide sufficient documentation and developers community that shares experience, advices and ideas via blogs, web forums and social networks.

Especially much simpler provision of real-time data is one of the main advantages of the Open Service.

Necessary measures for data availability and quality

State sector shall ensure sufficient amount of data by various means. Sufficient quality and quantity of data by means of sufficient amount of data sources (monitoring devices, integrated data from floating vehicles, social media etc.) is the necessary precondition for well-functioning information system. Efficient cooperation between public and commercial sector in this field is also necessary.

Possible implementation and business model of Open Data/Services operation

Basic preconditions for the existence of open data or open services system in the field of infomobility are suggested in this part. This part is sorted accordingly to a transport mode and data availability in the Czech Republic. The idea of functional multimodal system based on the Open Government is presented at the end of this chapter.

Public transportation of passengers

The system of static data collection and evaluation via the CIS JŘ exists in the Czech Republic; it is focused on the public transport. Its business model presents a problem as it allows to open the timetable data set to a limited extent only and with a great risk, because the whole collection

and evaluation process is funded by a commercial company. All costs of these activities are consequently evaluated economically by number of accesses to the IDOS multimodal planner and subsequent advertisement sales. If the data is opened without a financial support of the state, the existence of the CIS JŘ in its current complex form with an excellent quality of the provided information is in danger.

The valid ČSN 01 8245 – CISReal standard, created on the basis of the EN 15531 SIRI, is available in the field of dynamic data on PT vehicles operation in the Czech Republic. The given format enables provision of evaluated data through the API interfaces. The CISReal system is fully compatible with the CIS JŘ system.

Recommendations for implementation of open data/service system based on good practices:

- Carry out tenders for delivery and operation of the systems for collection, control and evaluation of timetable, or possibly real-time data;
- Commercial company paid for its services by state sector shall become administrator of such system (CIS JŘ) or possibly the CISReal;
- Carry out tenders for delivery of API interfaces for providing timetable and real-time data;
- Suggest uniform fees for connection to the system and also suggest regular operating fees that are non-discriminatory and economically accessible even to small and medium enterprises or possibly to academic sector;
- Specify clear conditions for keeping the data up-to-date and accurate, e.g. by creation of multimodal transport planner guaranteed by state (this system can be created as extension system with some other data sets);
- Specification of uniform and clear rules and conditions for the data use;
- Registration of all clients which allows to regulate access and to keep track of all users;
- Create a motivation programme for transport operators and organizers to share data in real-time (e.g. availability of data on operation of neighbouring systems´ vehicles).

Road transport

It is possible to subscribe to traffic information from the Integrated Traffic Information System (JSDI, Jednotný systém dopravních informací) for the Czech Republic in the XML data format free of charge, on the basis of standardized contract. Data subscription is carried out via standard web services of data distribution interface.

Any individual or legal entity can subscribe to the data provided that they will ensure its further efficient dissemination for the benefit of increased traffic safety and fluency or that they will use it in their information systems to support their own processes and activities related to road transport and traffic.

Description of the data format is here: Integrated traffic information system for the Czech Republic – Distribution of traffic information via data distribution interface. (http://www.dopravniinfo.cz/)

Data from the system of floating vehicles

Data from the system of floating vehicles are available from various sources in the Czech Republic. The data integrated to a single platform enables provision of very valuable nation-wide traffic information that includes lower class roads as well. Individual vehicle fleets used to be isolated in the past without the option to provide sufficiently reliable data. Existence of the RODOS project within the Czech nation competence centre has resulted into aggregation of most of the data to a single data platform and into creation of very sophisticated engine for processing and visualization of this data. The API interface created according to the DATEX II standard presents added value of the system. However, the whole system is still owned by private companies. Therefore, it is not possible to open the interface to third parties.

Recommendations

- Integrated data from the floating vehicles system is very valuable for multimodal information system (option of providing delay/travel time data for individual road network segments).
- Contractual relation between public and commercial sector must be established where the public sector provides funds for using data from the private sector.
- It is necessary to create conditions to design the API interface providing real-time traffic information.
- Contractual relation between provider of the data and the interface must be established for a limited period for the fee contracted for operation of such system.

Provision of multimodal information

Provision of multimodal information to passengers aims to affect and improve passengers´ behaviour and to change their behaviour patterns to use transport modes in a better and more efficient way. The passengers shall not be forced into using specific modes but the attractiveness of public transport or bicycling shall be improved by adequate offer of services. High-quality and reliable information from various sources will enable passengers to make pragmatic and logic decisions.

Currently, there are various data sources available in the Czech Republic; most of them are closed (with the exception of traffic data provided by the National Traffic Information Centre) without the option to provide the data to third parties. If proper policy is applied, uniform rules are specified and suitable economic model is found, it is possible to arrive at complete data set from various transport modes; this data is accessible to the public according to the Act on free access to information.

The currently available data sets and the interfaces ready for sharing with other potential users are listed below. Public sector support and cooperation with commercial sector are fundamental for efficient function of the Open Data/Open services. **In the field of infomobility, these currently available data sets and data formats or even standards are under discussion:**

- Planned timetables in public passenger transport including railway transport (OPEN DATA - JDF and TAP TSI);
- Real-time data on vehicle movement in public passenger transport including railway transport (API - ČSN 01 8245 – CISReal);
- Floating vehicles data (API - DATEX II);
- Data on current traffic conditions (closures, accidents, weather, traffic level) – (API ALERT C);
- Data on occupancy of parking places including parking lots at highways (AP –DATEX II);
- Geoinformation (OpenStreetMap);

Recommendations based on good practices

- Effective cooperation of public and private sector is necessary – the public sector funds the deployment of data source devices, data collection and evaluation and interfaces for provision of data to third parties;
- Special agenda and project must be earmarked within the scope of public sector; the project coordinator and manager responsible for implementation of such system must be appointed;
- Single web platform with all infomobility data sources must be provided;
- It is important to provide marketing of these services so that the single platform is widely known and fully utilizes a potential of this data to be used by various subjects from academic or commercial sector;
- Uniform rules for using the platform data must be provided;
- Equal competition among the commercial subjects must be provided and quality of the provided data must be taken care of (users and passengers must have absolute confidence in the information, otherwise they will not change their travel behaviour).

Ultimately, many useful application may be created that will provide reliable and real travel data.

Creation of numerous applications will enable the passengers to

- Search the journey in real-time on the single place in a national scale with a variety kind of journey planners and helpful applications;
- Use of smart mobile phones to look-up the connections;
- To get information and recommendation what kind of mode is more comfortable, cheaper, environment friendly etc.
- Search alternative connections in the case of any delay;
- Plan the journey within the journey (on-trip planning);
- React effectively on unusual conditions on the route;
- Use a historical data for future planning.

7 TRANSFERABILITY ISSUES

The table shows examples of activities to be prepared and done towards specific policy topics.

No	Topic	Example
1	Specific actions including technical, regulatory & financial aspects	• Analyse of the current strategic plans • Design of the ITS implementation plan in accordance with the current strategic plans • Specify a continuous improvement strategy • Include strategic ITS development to Czech national ITS Action Plan and make it compliant with the Transport Policy of the Czech Republic and its priorities • Define areas of public transport infomobility in the national ITS Action Plan • Define areas of open data in the national ITS Action Plan • Define areas of national development related to the traffic control using combined information from both public and private transport in the ITS Action Plan • Include strategic ITS development to national SUMP methodology and make it compliant with the Transport Policy of the Czech Republic and its priorities • Include strategic ITS development to regional policies and development plans • Include strategic ITS development to urban SUMPs and relevant policies • Prepare guidelines for ITS implementation plans on a national levels
2	Eventual changes to present public policy	• Enable national ITS Action Plan by means of legislative and regulatory changes • Interconnect national ITS Action Plan with the need and allocation of funds and the option of co-funding from European sources • Enable SUMPs by means of regulatory changes • Interconnect SUMPs with the need of funds and the

No	Topic	Example
		option of co-funding from European sources • Prepare ITS implementation plans on regional and city level
3	Obstacles and measures for the alleviation of risks	• Consider private sector´s rights and duties in various fields of ITS • Consider public sector´s rights and duties in various fields of ITS • Specify rules for private and public sector • Specify potential risks • Specify evaluation criteria
4	Steps	• Analyse available data and its current utilization • Suggest possible better utilization of available data in the future • Provide data interconnectivity or a direct system integration • Define successive implementation steps precisely • Use technical standards for specification of product requirements (for both goods and services) • Evaluate current state • Specify realistic alternatives • Evaluate the possibility of using centralized (integrated) system • Ensure compatibility of newly built subsystems with existing ones
5	Responsible bodies	• Take advantage of discussion and cooperation among individual stakeholders from both public and private sector • Ministries are responsible for a national level (accordingly to the road ownership) • Regions and cities are responsible for lower levels (accordingly to the road ownership)

No	Topic	Example
6	Actors to be involved	• Participating stakeholders depend on the geographic level of intended measures • Participating stakeholders depend on the type of intended measures
7	Resources	• Searching for various types of financial resources • Specify framework for co-funding from national and European sources • Prepare conditions for public funds use on various geographic levels
8	Timeframe & deadlines	• Specify temporal correlation of newly prepared implementation plans with existing deadlines of the national transport policies • Specify temporal correlation of newly prepared implementation plans with existing deadlines of the SUMPs´ implementation • Specify temporal correlation of newly prepared implementation plans with existing implementation deadlines of the national ITS plans
9	Monitoring and controlling process	• Process analysis of individual implementation plans • Specify conditions of multi-criteria analysis • Specify conditions for questionnaire surveys • Specify deadlines for work progress monitoring • Monitor risks

Table 4: Examples of activities to be prepared and done towards specific policy topics

8 CONCLUSION

This final version of the POLITE Local Implementation Plan (CDV), is one of the main outputs from the POLITE project. It should serve as a roadmap for transfer of successful good practices from one partner site to another. This document is for all stakeholders who would be involved in the process of transfer and implementation of identified good practices. This document summarises all findings, comments and recommendation which has been identified within all project outputs and are relevant to implementation process.

The table below introduces policies developed or impacted by CDV in POLITE until now.

No	Activity	Results
1	National level transfer site intervention - ITS implementation plans on national level	• ITS Action Plan for Czech Republic for the period of 2014 – 2020
2	Local level transfer site intervention - ITS implementation plans on city level	• Liberec - Public transport priority systems Plan and recommendation related to transport priority on city level.
3	Regional level transfer site intervention - ITS implementation plans on regional and city level	• Pardubice and Hradec Králové city - ITS development strategy plan.
4	National level transfer site intervention	• Methodology certified by the Czech Ministry of Transport: Infomobility development to urban SUMPs
5	Local level transfer site intervention - ITS implementation plans on city level	• Ostrava - ITS development strategy plan.

Table 5: Policies developed or impacted by CDV in POLITE

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