

INTELLIGENT TRANSPORT SYSTEMS IN PUBLIC TRANSPORT

INTELIGENTNI PROMETNI SUSTAVI U JAVNOM PRIJEVOZU

KRAMAR, Uros & GAJSEK, Brigita

Abstract: *Applicable public transport services and quality public transport are possible within the system which competes with the use of personal vehicles. Advanced information and communication technologies, which are connected in intelligent transport systems, play an important role in establishing competitive public transport. Intelligent transport systems represent big advantage for users (better service because of better reliability and punctuality, reduced time of journeys, planning a multimodal journeys and etc) and operators and organizers of public transport (monitoring and managing traffic flows, saving time and costs, optimizing use of vehicles, better productivity and bigger satisfaction of employers).*

Key words: *Intelligent transport system, Public transport, EU transport policy*

Sažetak: *Odgovarajuće usluge javnog prijevoza i kvalitetan javni prijevoz mogući su unutar sustava koji konkurira korištenju osobnih vozila. Napredne informacijske i komunikacijske tehnologije, koje su povezane u inteligentne prometne sustave igraju važnu ulogu u uvođenju konkurentskog javnog prijevoza. Inteligentni prometni sustavi predstavljaju veliku prednost korisnicima (bolje usluge zbog veće pouzdanosti i točnosti, smanjenja trajanja putovanja, planiranja višemodalnog putovanja itd.) operaterima i organizatorima javnog prijevoza (nadzor i upravljanje prometnim tokovima, ušteda vremena i troškova, optimalno korištenje vozila, bolja učinkovitost i veće zadovoljstvo poslodavaca).*

Ključne riječi: *inteligentni prometni sustavi, javni prijevoz, prometna politika Europske unije*



Authors' data: Uroš **Kramar**, Faculty of Logistics Celje - Krško, University of Maribor, Celje, uros.kramar@uni-mb.si; Brigita **Gajšek**, MSc, Faculty of Logistics Celje - Krško, University of Maribor, Celje, brigita.gajsek@uni-mb.si

1. Introduction

Living conditions in urban settlements in last ten years has been changed. Increase of transport, congestions and overpopulation can be felt trough quality of living. Fast way of living and globalization processes is forcing us in complex mobility solutions, a longer journey and dispelled living area. We can talk about two main problems, which appears in an urban public transport and are in a consequence of suchlike trend:

- Big investments of public money, which is required by urban public transport.
- Operators in public transport area are losing shares of passengers, what is the consequence of characteristic of public service: This usually leads in lack of money for necessary investments.

In a wish in the bettering of situation of public transport area it is necessary to give an assurance of better quality in public transport.

When the need for mobility turns up, users want transport which is adaptable, approachable, independent, reliable, fast, economical and safe. In other words, they want a quality public transport and quality service. Intelligent transport systems can have important influence on efficiency of public transport system through right information at the right place and at the right time. It can also enlarge use of public transport. In future research we would like to confirm this statement.

In a broad sense, the intelligent transport systems in public transport encompass a different type of wireless and wiring communications – based information, control and electronics technologies integrated into public transport system. These technologies might be integrated into the infrastructure of transportation system or/and into urban public suprastructure, figure 1. Intelligent transport systems in an urban public transport might be briefly described as the systems of means to achieve sustainable, safe, environmental friendly and qualitative urban public transportation by applying advanced information and communication technologies.

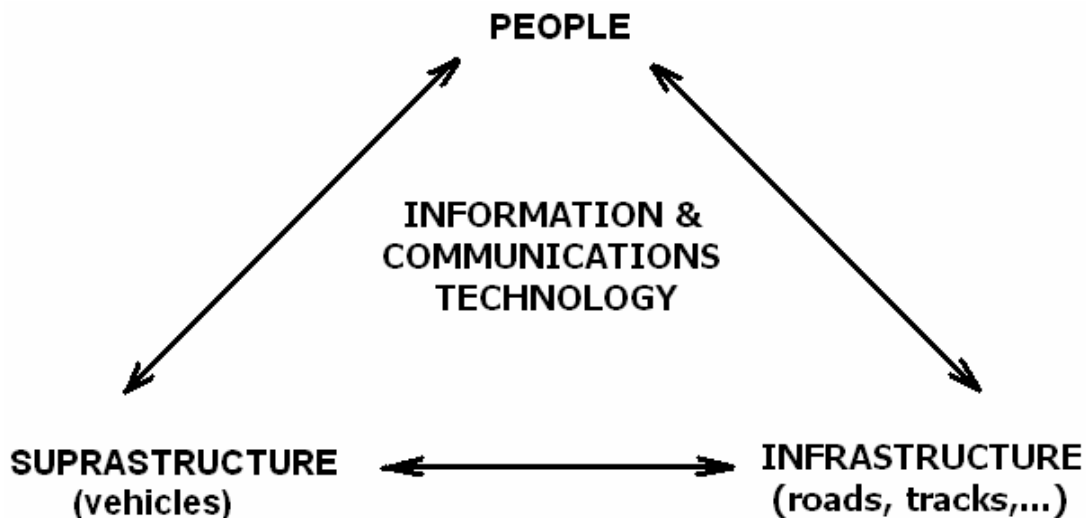


Figure. 1. Concept of intelligent transport system

At the same time institutional development and willingness to implement intelligent solution must be achieved.

We can not implement intelligent transport system if authority is not prepared for implementation thought acting in all fields which are connected with public transport (urban planning, city development plans, parking policy and etc).

2. Main advantages of intelligent transport systems

The importance of optimization of public passenger transport and the entire transport sector was yet recognised by the European commission.

In year 2001 published White paper of European transport policy were introduced some concrete measures, which must be taken to establish good intelligent transport system. Some of them are very well connected with public passenger transport:

- 50 % of Europe's major towns and cities ought to be provided with traffic and travel information services;
- legislative initiatives should be taken to promote the single European sky, mobile communications for trains, maritime information and control systems, and Galileo.

The importance of intelligent transport systems can be analysed through these main ways of applicability:

- Integration into the infrastructure of transportation system or/and into urban public transport vehicles. A simple solution, giving right of way to public transport at traffic signals, can keep public transport vehicles evenly spaced, on time and can speed up and reduce time of journeys.
- Monitoring and managing traffic flows. ITS allow operators to know exactly where their vehicles are and to manage their fleets more efficiently, and to issue orders to drivers to speed up or slow down.
- Providing passengers with real-time traffic information. Passengers can also be informed of expected waiting times, can better plan a multimodal journey and can save time and costs.
- Ensuring safety and security at vicinities of stations, on streets, roads and in vehicles themselves.

3. Information and intelligent transport system

The 'currency' of an intelligent transport system is information. The information generated by an ITS is used by traffic system managers and users to make timely and informed decisions as to vehicle usage and deployment, to reduce congestion, pollution and accident risk.

The predicted outcome of ITS are improved efficiency, safety, and environmental performance of vehicles and transport systems.

In order to compete with private cars, information must be fast, accurate, convincing and reliable. Only with good information system public transport can compete with private cars.

If we want to have fast and real-time information we have to make sure, that the dynamic information are fast updated and connected with actual conditions. We must pay attention that:

- the dynamic information is always available for the users in order to make his decisions,
- text and spoken word are well understandable, clear and only for explanation,
- users find the same basic concept of information in all media and locations.

Reliability is the main key for good information system in which the user will believe and use it with pleasure.

We can offer good and quality information only if we consider what kind of information users needs and when. The need for information is namely changing, together with journey time.

Adequate information and communication technology is necessary for good IT system in public transport:

- Electronic displays showing the time left before an arrival installed in bus, trolley, tram stops or stations, etc.
- Electronic information desks for retrieving information on routes, ticket prices, timetables, announcements on traffic conditions and etc. accessible also with a wheelchair and made for easy use).
- Information prior to or during the journey on urban public transport services, received through the Internet, phone or mobile services (wireless application protocol services (WAP), short message services (SMS) or other).
- On – board screens in urban public transport vehicles (vocally announcing stops, showing teletexts and other information that could be transmitted on real time from traffic control centres).
- Tickets vending machines (TVMs) (accepting notes, coins, bank cards and giving back change).
- Electronic tickets, e-ticketing (the newest inventions are the contactless tickets, chargeable tickets, multipurpose travel cards and respective equipment, virtual ticket).
- Security systems (security cameras in vehicles, stations and terminals to avoid crime enabling quick reaction from police offices).
- Electronic information signs such as illuminated arrows, numbers, and pictograms must be easy visible, in right colour combinations and good illumination This type of information is very effective if combined with audible information (to attract passengers' attention, to hasten the ones that are late, to inform tourists or foreigners in their language, to inform the blind persons and etc.).
- Other passenger information services (displaying vehicles location, walk distances between stops, parking information for cyclist and drivers especially in park and

ride approach), special purpose information for passengers with functional or mobility disabilities and etc.).

Operability and simplicity of intelligent transport system in public transport must be design in a way that the information needed is provided undependably of time and space and that they are real-time information.

The system must contain information of different operation companies and different modes of transport (bus, train, tram...) at one place. It must make possible to achieve practicability and be multilingual. It must be friendly to disabled people and be operable inside and outside crossing points at terminals. It must make possible to make journeys between different modes and different operators faster and more easy to use. It must include static (timetables) and dynamic information (delays, travelling times...).

4. Conclusion

The implementation of ITS technologies is transforming the way public transportation systems operate, and changing the nature of the transportation services that can be offered by public transportation systems.

The goal is to provide public transportation decision-makers more information to make effective decisions on systems and operations and to increase traveller's convenience and ridership. Such a system will satisfy the expectations and needs through quality of service and economic efficiency, environment care and competitiveness of public transport system.

5. References

European Commission (2003). *Intelligent transport systems: Intelligence at the service of transport networks*, European Commission, Energy and Transport DG, ISBN 92-894-4786-9, Available from: http://www.programtempo.si/media/its_brochure_2003_en.pdf, Accessed: 06-30-2008

European Communities (2001). *White Paper-European transport policy for 2010: Time to decide*, European Commission, Office for official publications of the European Communities, Luxembourg, ISBN 92-894-0341-1, Available from: http://ec.europa.eu/transport/white_paper/documents/doc/lb_texte_complet_en.pdf, Accessed: 06-30-2008

ERTICO – ITS (2002). *ITS-part of everyone's daily life, ERTICO – ITS Europe navigation technologies*, Brussels

ITS America (2004). *Technology transforming transportation (2004 Annual Report)*, Available from: http://www.itsa.org/event_archives/c402/ITSA_Events/Event_Archives.html, Accessed: 01-15-2008