



INTEGRATED TRANSPORT SYSTEM AS A TOOL OF RAISING QUALITY OF TRAVELLING

INTEGRISANI TRANSPORTNI SISTEM KAO SREDSTVO ZA POBOLJŠANJE KVALITETA PREVOZA

Jaroslava DECMANOVA

Logistics institute of industry and transport. Faculty of BERG, TU of Košice, Slovak Republic

Abstract: The article describes a principle of integrated transport system as a method which application is possible to achieve within traveling and providing transportation services in bigger urban agglomeration higher comfort and enjoyment.

Key words: Integrated Transport System, Public Passenger Transport, Quality

Apstrakt: Rad opisuje princip integriranog transportnog sistema kao sredstvo kojim bi se postigla veća udobnost i zadovoljstvo prilikom prevoza i pružanja usluga prevoza u većim gradskim naseljima.

Ključne reči: integrirani transportni sistem, javni prevoz putnika, kvalitet

1 INTRODUCTION

An integrated transport chains consist of several elements and factors, which is situated in various levels, of which using and mutual relations define effectiveness and transport system functioning.

Interaction between all of this elements and factors with increasing complication of mobility and with remaining number of roads present several limitations and problems, e.g. High consumption of energy, transport congestion, high measure of environmental pollution, more time spended on ways, as a result is dissatisfied users and passengers. This situation involves that the users gradually leave public personal transport (PPT) and rather prefer individual automobile transport (IAT), whereby existing problem make worst.

1. UVOD

Integrirani transportni lanci sastoje se iz nekoliko elemenata i faktora, koji su smešteni na različitim nivoima, čije korišćenje i međusobni odnosi određuju delotvornost i funkcionisanje transportnog sistema.

Interakcija između svih ovih elemenata i faktora uz sve veću mobilnost i uz preostali broj puteva, pokazuje nekoliko ograničenja i problema, na primer, veliku potrošnju energije, zagušenje saobraćaja, visok nivo zagađenja životne sredine, više vremena provedenog na putu, a posledica toga je nezadovoljstvo korisnika i putnika. Ovakvo stanje vodi ka tome da korisnici postepeno prestaju da upotrebljavaju javni prevoz lica (JLT) i da više koriste individualni automobilski transport (IAT), čime doprinose da trenutni problem bude još izraženiji.

In order that they can public personal transport compete with individual transport, the users have to have possibility to enjoy comfort during entire way although they are obliged to change one means of transport or service to other. Basically is concerned integrated transport system (ITS) which with implementation in PPT may to provide higher standard of traveling for the passengers.

2 CHARACTERISTICS OF ITS

ITS is defined as a complex, organized transport system, which base is close cooperation of individual subjects functioning in the area of public personal transport with the purpose to perpetually insure transport service of area of the region.

Integration is based on cooperation and coordination:

- in the sphere of **transfer – operating**, which lead up to safety optimal to knot between connections and means of transport operated by bus and by railway corporations,
- in the sphere of **tariff**, resident in use united travel document,
- in the sphere of **economy, organization and control** between transporters and other subjects responsible for PPT.

2.1 INTENTION OF ITS

Intention of the creation of ITS in a given territory is a necessity to change the method of mass transportation so that to make mass transportation more effective, economic efficiency and more snug on the part of passengers and transport operators. This necessity rise in situation when:

- there is an increase IAT and on the part of road communication leads to their abuse and thereafter to unfavorable influence this transport to an environment, but also at a life inhabitants in town. Unbearable increase IAT causes decrease of demand after a public transport and here rise 2 problems:

Da bi javni prevoz lica bio konkurentan individualnom transportu, korisnicima se mora pružiti mogućnost da imaju veću udobnost tokom celog putovanja, i pored toga što su primorani da menjaju prevozna sredstva ili usluge. U osnovi, radi se o integriranom transportnom sistemu (ITS) čijom bi se implementacijom u javnom ličnom transportu putnicima obezbedili bolji uslovi prilikom putovanja.

2 KARAKTERISTIKE ITS-a

ITS se definiše kao složeni, organizovani transportni sistem, u čijoj osnovi je bliska saradnja pojedinačnih subjekata koji rade u oblasti javnog prevoza lica u cilju stalnog obezbeđivanja usluge prevoza u oblasti ili regionu.

Integracija je zasnovana na kooperaciji i koordinaciji:

- U oblasti **transfера - рада**, što dovodi do bezbednosti koja je optimalna za tačke spajanja linija i prevoznih sredstava na kojima rade autobuske i železničke kompanije,
- U oblasti **cene**, za rezidente koji poseduju opšti putni dokument,
- U oblasti **privređivanja, организације и контроле** između prevoznika i drugih lica odgovornih za javni prevoz lica.

2.1 NAMENA ITS-A

Namena stvaranja ITS-a na određenoj teritoriji je potreba da se promeni način masovnog prevoza tako da masovni prevoz bude delotvorniji, ekonomski efikasan i udobniji za putnike i prevoznike. Ova potreba se pojavljuje u situaciji:

- Kada je prisutno povećanje IAT-a što dovodi do prekomernog korišćenja drumskih saobraćajnica i samim tim do nepovoljnog uticaja na životnu sredinu, ali takođe i na život stanovnika u gradovima. Nepodnošljivo povećanje IAT-a uzrokuje smanjenje potrebe za javnim transportom, pa se javljaju dva problema usled toga:

- a. how to prevent that the passengers do not stop to use public transport,
 - b. how to stabilize the share of users IAT, eventually to limit its increasing quantity;
 - in a public transport limitation of financial resources and requests of passengers to a provided prices and services of public transport, direct to necessity of better utilization of transport system attendant given territory, eventually the region.
- a. Kako spriječiti da putnici prestanu da koriste javni transport,
 - b. Kako stabilizovati udio korisnika IAT-a, eventualno ograničiti njihov sve veći broj;
 - U ograničavanju finansijskih sredstava za javni transport i zahteva putnika za obezbeđenim cenama i uslugama javnog transporta, uz potrebu za boljim iskorišćenjem transportnog sistema koji funkcioniše na dатој teritoriji, eventualno regionu.

2.2 PURPOSES OF ITS

The purpose of integrated transport is optimally satisfaction of inhabitants transfer needs with high - class transport service of territory with individual transfer and tariff conditions, with to knot connections and means of transport, with perfect information about a transport and with the efforts:

- to harmonize, to optimalize and to coordinate transport services each other offered individual transporters,
- to engage all of transporters into the system integration in served territory,
- increase quality and the level of provided services,
- to launch an united tariff and transfer system,
- to adjust receipts from travel cost,
- to coordinate investment subsidy in necessary measure,
- to provide entire integration of railway transport into the system of regional mass transportation,
- to support the railway transport with restriction of contemporaneous bus connections,
- by the basic terminal – permeation knots of integrated regional transport system for transfer the persons to give rise center services for traveling public, which increase attractiveness of this terminals, information availability and on its consequences also the safeness.

2.2 SVRHA ITS-A

Svrha integrisanog trasporta je optimalno zadovoljenje potreba stanovnika za prevozom uz pružanje najbolje usluge prevoza na teritoriji, uz održavanje uslova individualnog prevoza i cenovnika, uz povezanost linija i prevoznih sredstava, uz savršenu inoformisanost o prevozu i uz ulaganje najvećih npora u cilju:

- Uskladihanja, optimizacije i koordinacije transportnih usluga između individualnih prevoznika,
- Angažovanja svih prevoznika u integraciji sistema na dатој teritoriji,
- Povećanja kvaliteta i nivoa pruženih usluga,
- Uvođenja jedinstvenog tarifnog i prevoznog sistema,
- Poravnanja priznanica od putnih troškova,
- Kordinacije investicionih subvencija u potreboj meri,
- Obezbeđivanja potpune integracije železničkog transporta u sistem regionalnog masovnog prevoza,
- Podržavanja železničkog transporta uz ograničavanje broja istovremenih autobuskih linija,
- Osnovnim terminalima – čvoristima integrisanog regionalnog transportnog sistema za prevoz osoba kako bi se poboljšale usluge za lica koja putuju, što povećava atraktivnost ovih terminala, raspoloživost informacija i samim tim doprinosi većoj bezbednosti.

2.3 ORGANIZATIONAL STRUCTURE OF ITS

The organizational structure ITS create subjects ITS as a features of this structure and interrelations between them, which present the ties of organizational structure. Subjects ITS are considered a basic building stones of ITS.

Here belong mainly:

- region
- cities and towns
- autonomy organs,
- state administration organs,
- transporters,
- travelling public.

An important subject, which is institutes by the creation of ITS and so it is responsible for operation entire transport system is **coordinator**. Coordinator (organ, institution) at the same time also performs the function administrator on a certain territory served with integrated transport.

Three - level organizational arrangement of ITS illustrate the following picture:

2.3 ORGANIZACIONA STRUKTURA ITS-A

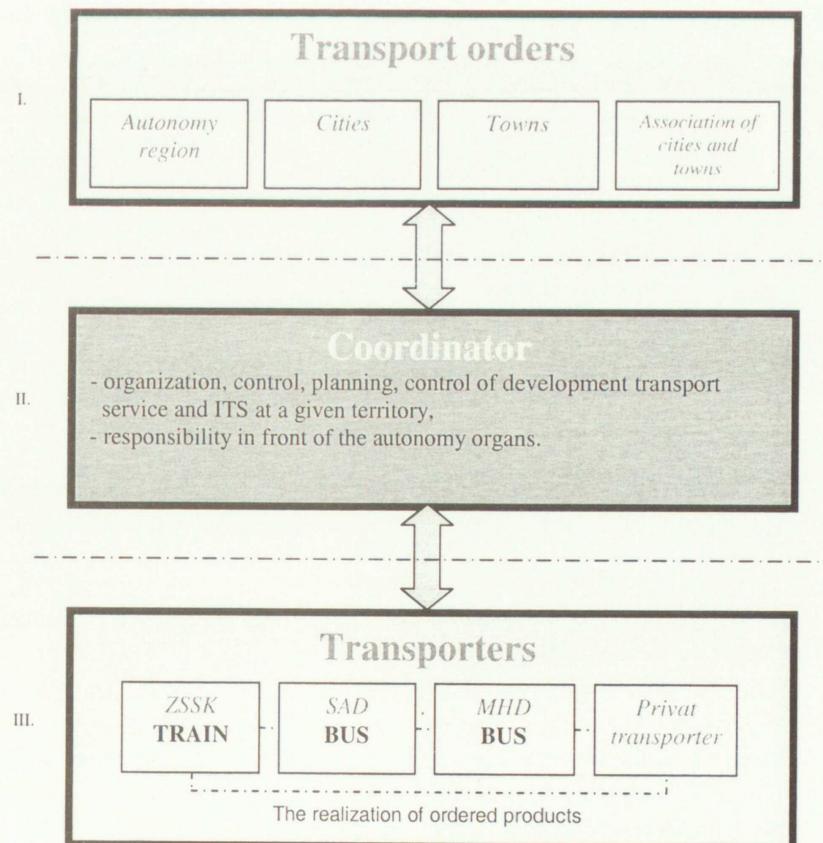
Organizacionu strukturu ITS-a čine subjekti ITS-a kao i karakteristike ove strukture i odnosi između njih, koji predstavljaju veze organizacione strukture. Subjekti ITS-a se smatraju temeljima ITS-a.

U njih spadaju, između ostalih:

- region
- gradovi i varošice
- autonomni organi,
- organi državne uprave,
- prevoznici,
- lica koja putuju.

Važan subjekt, koji se postavlja u toku stvaranja ITS-a i koji je prema tome odgovoran za rad celog transportnog sistema je **koordinator**. Koordinator (organ, institucija) takođe u isto vreme vrši funkciju upravnika sistema na određenoj teritoriji koju opslužuje integrисани transport.

Trostepeno organizaciono uređenje ITS-a prikazano je na sledećoj slici:



Picture 1 Organizational arrangement of ITS
slika 1 Organizaciono uređenje ITS-a

2.4 LEGISLATIVE CONDITIONS FOR CREATE ITS

Realization of structure, content and progress of works of ITS is oriented to be in harmonize with European transport policy heading, projection in determining documents of EU.

The principles of European transport policy are needed to implement into Slovakia's transport policy primarily from application aspect. Legislative of EU uniquely defines developments in transport policy and determine the conditions of effect at a transport trade for provider of transport services. The legislative also defines interrelations between state and transporters in these 4 books:

- ❖ White paper European commission (EC) **The common transport policy,**
- ❖ White paper EC **The strategy of recovery railways community,**
- ❖ Green book EC **The network of citizen,**
- ❖ Green book EC **Correct and effective pricing in transport.**

2.4 ZAKONSKI USLOVI ZA STVARANJE ITS-A

Realizacija strukture, sadržaja i napretka radova ITS-a usmerena je ka tome da bude u skladu sa tekstom Evropske politike transporta, plan prilikom odlučivanj u vezi dokumenata EU.

Potrebno je implementirati Evropske politike transporta u politiku transporta Slovačke prvenstveno sa aspekta primene. Zakonodavstvo EU definiše samo kretanja u politici transporta i određuje uslove učinka transportne delatnosti na pružaoca usluga prevoza. Zakonodavstvo takođe definiše međusobne odnose između države i prevoznika u ove 4 knjige:

- ❖ Bela knjiga Evropske komisije (EC) **Opšta politika transporta,**
- ❖ Bela knjiga EC **Strategija za obnovu železnica,**
- ❖ Zelena knjiga EC **Mreža građana,**
- ❖ Zelena knjiga EC **Ispravno i delotvorno formiranje cena u transportu.**

3 ITS IN THE SLOVAK REPUBLIC

In the area of public personal transport ITS in Slovakia's republic non-records an expressive increase. Mentioned transport system operates in 2 cities: Bratislava and Žilina (Table1).

3 ITS U SLOVAČKOJ

U oblasti javnog prevoza lica, nije zabeležen izraziti porast ITS-a u Slovačkoj. Pomenuti transportni sistem funkcioniše u 2 grada: Bratislavi i Žilini (Tabela 1).

*Table 1 Current status ITS in SR
Tabela 1 Sadašnji status ITS-a u Republici Slovačkoj*

<i>City</i>	Bratislava
<i>ITS name</i>	Bratislavská integrovaná doprava - BID
<i>ITS subject</i>	Železničná spoločnosť Slovensko - ZSSK , a.s. Slovenská autobusová doprava - SAD Bratislava , a.s. Dopravný podnik Bratislava - DPB , a.s. Bratislava and communities
<i>ITS starts</i>	2001

<i>City</i>	Žilina
<i>ITS name</i>	Žilinský regionálny integrovaný dopravný systém - ŽRIDS
<i>ITS subject</i>	Železničná spoločnosť Slovensko - ZSSK , a.s. Dopravný podnik mesta Žilina - DPMŽ , a.s. SIRS, a.s. Žilina Rajec
<i>ITS starts</i>	2003

About a realization of ITS also tried the Košice city in 1999 as a Košický integrovaný dopravný systém – KIDS. However in the process the operations KIDS shows like unprofitable. Result of this was low cash sales also a relatively low amount of sold travel tickets. This status leads to end of operation in 2005.

4 CONCLUSION

The mine idea of ITS consist in utilization of knowledge in transport equipment and vehicles area, transport networks, transport technologies, in modelling and optimization transport processes, information technologies in transport, in safeness of transport, quality and effectiveness in transport and influence of transport at a society and at an environment.

To make a complex and mainly quality ITS requires more time and space. To its important aspects belong also e.g. to build up quality road infrastructure with reserved traffic lane for urban mass transportation; incorporation and preferred railway transport, which is from environment aspect more ecological; equipment of vehicles public personal transport with less troubleshooting information system etc.

Upcoming law about PPT should be made also the legitimate frame for constitution ITS, to institute administrators of integrated transport and the establishment rules for PPT financing. But concrete ITS have to create the towns and communities along with transporters by its conditions and requests.

This possibility considers the Košice city again with founded the KORID Company – Košická regionálna integrovaná doprava, s.r.o. The reason is particularly needs of Košice's autonomous region and the Košice city by the compliance developing programs in the PPT sphere. The KORID Company could be established by Košice (49%) and Košice's autonomous region (51%).

Even the present status of transport in the Prešov (the 3rd largest city in SR) suggests that it satisfy conditions for creation and implementation ITS. PPT covers three transporters – Slovenská

Izvršen je i pokušaj realizacije ITS-a u gradu Košice 1999. godine u okviru Košický integrovaný dopravný systém – KIDS. Međutim, u toku rada KIDS-a pokazalo se da ovaj sistem nije profitabilan. Rezultat ovoga je bio slab novčani promet kao i relativno mali iznos prodatih karti za vožnju. Ovo stanje je dovelo do toga da se ovaj projekat prekine 2005.

4 ZAKLJUČAK

Cilj ITS-a leži u korišćenju znanja u oblasti prevozne opreme i vozila, transportnih mreža, transportnih tehnologija, u modeliranju i optimizaciji transportnih procesa, informacionih tehnologija u transportu, bezbednosti transporta, kvalitetu i delotvornosti pri transportu i uticaju transporta na društvo i okolinu.

Da bi se stvorio kompleksan i kvalitetan ITS potrebno je više vremena i prostora. U ovaj njegov značajni aspekt spada i, na primer, izgradnja kvalitetne dramske infrastrukture sa saobraćajnom trakom rezervisanim za gradski masovni transport; po mogućству inkorporacija železničkog transporta, koji je ekološki čistiji; opremanje vozila za javni prevoz lica uz informacioni sistem za traženje manjih kvarova itd.

Trebalо bi uskoro da se donese zakon o javnom prevozu lica koji bi takođe bio zakonski okvir za stvaranje ITS-a, postavljanje upravnika integrisanog transporta i utvrđivanje pravila za finansiranje javnog prevoza lica. Ali konkretna ITS treba da stvore gradovi i opštine zajedno sa prevoznicima prema njegovim uslovima i zahtevima.

Ovu mogućnost grad Košice razmatra ponovo sa novoosnovanom KORID kompanijom – Košická regionálna integrovaná doprava, s.r.o. Razlog za to je naročito obaveza autonomnog regiona Košice da bude u skladu sa razvojnim programima u oblasti javnog prevoza lica. KORID kompanija bi mogla biti osnovana od strane grada Košice (49%) i autonomnog regiona Košice (51%).

Čak i sadašnje stanje transporta u Prešovu (trećem gradu po veličini u Slovačkoj) navodi na zaključak da on ispunjava uslove za stvaranje i implemenzaciju ITS-a. Javni prevoz lica obuhvata

autobusová doprava, a.s., Železničná spoločnosť Slovensko, a.s. and Dopravný podnik mesta Prešov, a.s. The common integration of these transporters could rise the long - time cooperation in providing PPT sphere with a purpose to cover transport service of territory of the region.

tri prevoznika - Slovenská autobusová doprava, a.s., Železničná spoločnosť Slovensko, a.s. and Dopravný podnik mesta Prešov, a.s. Integracija ovih prevoznika bi mogla da dovede do dugoročne saradnje u oblasti pružanja usluga javnog prevoza lica u cilju pokrivanja usluge prevoza na teritoriji ovog regiona.

REFERENCES / LITERATURA

- [1] Olivková, I.: *Zajišťování dopravní obslužnosti kraje formou integrovaného dopravního systému.* In: Železničná doprava a logistika [online]. 2006, n. 3. Aktualizované 16-10-2006 [cit 2008-05-02]. http://fpedas.uniza.sk/zdal/cisla/3_06/11_olivkova.pdf
- [2] Valášková, M.: *Vývoj integrovaných dopravných systémov na Slovensku.* In: Železničná doprava a logistika [online]. 2007, n. 1. Up-dated 08-02-2007 [cit 2008-05-02]. <http://fpedas.uniza.sk/zdal/?id=107>

Reviewal / Recenzija: Doc. dr Ivica Ristović