CONDITIONS AND PROPOSALS OF TARIFF INTEGRATION 
FOR THE INTEGRATED TRANSPORT SYSTEMS 
IN THE SLOVAK REPUBLIC

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The integrated transport systems are the solution of decreasing utilization of public passenger transport in many cities and areas around the cities not only in the countries of the European Union. The statistics figures of using the public passenger transport in Slovakia have the decreasing tendency in the last 10-15 years. There were performed some experiments to create the integrated transport systems in Slovakia but they were not developed anymore. The presented article analyses the conditions for implementing the integrated transport systems in Slovakia with focusing on tariff integration. It points out the key elements in creation of integrated transport system to be attractive for passengers and to be advantageous to the transporters.

Keywords: integrated transport system, public passenger transport, tariff system

1. Introduction

The number of passengers using the public transport for their everyday trips has been decreased during the last years in the Slovak Republic. This development is very similar to the development in most of countries in Europe last decades.

Table 1. Comparison of passenger transport by mode in the Slovak Republic

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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rail public transport</td>
<td>89 471</td>
<td>66 806</td>
<td>50 325</td>
<td>50 458</td>
<td>48 438</td>
<td>47 070</td>
<td>48 744</td>
</tr>
<tr>
<td>Road public transport</td>
<td>722 510</td>
<td>604 249</td>
<td>461 772</td>
<td>449 456</td>
<td>403 270</td>
<td>384 637</td>
<td>365 519</td>
</tr>
<tr>
<td>Urban public transport</td>
<td>515 593</td>
<td>404 539</td>
<td>383 118</td>
<td>395 064</td>
<td>400 673</td>
<td>397 046</td>
<td>399 425</td>
</tr>
<tr>
<td>Individual road transport</td>
<td>1 333 334</td>
<td>1 664 342</td>
<td>1 750 171</td>
<td>1 769 147</td>
<td>1 792 000</td>
<td>1 812 245</td>
<td>1 847 112</td>
</tr>
<tr>
<td>Passenger cars registered in the Slovak Republic</td>
<td>1 015 794</td>
<td>1 274 244</td>
<td>1 197 030</td>
<td>1 303 704</td>
<td>1 333 749</td>
<td>1 433 926</td>
<td>1 544 888</td>
</tr>
</tbody>
</table>

Figure 1. Development of passengers’ number in public passenger transport in Slovakia
The development of number of passengers has decreased in railway public transport, road public transport as well as in urban public transport. On the other hand, the individual road transport has increased. This development is caused by the increasing level of living standards. The individual road transport offers more advantages for inhabitants while the public passenger transport services are not so attractive because of travel time, accessibility (time, space) but mainly the quality of travelling. The preference of public passenger transport is still remaining at a low level. Last but very important thing for passenger decision-making to use or not the public transport is the price. The prices in the case of all modes have increased dramatically last 15 years. All these facts influenced the changeover of passengers from public to individual transport.

2. Experiments of Integrated Transport Systems in Slovakia

Last ten years the experiments to create the integrated transport system have been done in some cities. Some of them are still continuing and even there are the plans for their full operation. These days there is the integrated transport system in the different stages of development in 2 cities – Bratislava and Žilina. The experiment of the integrated transport system has been done in Košice but it is not in service for now.

The common features for all the experiments of integrated transport systems in Slovakia are as follows:
- the integration was applied only to the chosen lines of urban transport, railway transport and bus transport,
- the integration covered only small part of area,
- the integration was based mainly on using one tariff for time ticket, the transport integration and tariff integration was not developed further.

On the base of the above mentioned it can be concluded that the integrated transport systems in Slovakia are not the integrated transport system in the true sense.

2.1. Bratislava

The first attempt of integration on the area of Bratislava was in year 2000. That time the passengers could use the net season ticket for trips by urban public transport and railway transport. Later the suburban bus transport has been integrated but only a few lines. This situation has been lasting out practically till now. In 2005 the company “Bratislava Integrated Transport” proposed the aim to create and operate the integrated transport system on the area of whole Bratislava region. In 2007 the document “The Concept of Bratislava Integrated Transport” was processed. The process of integration (such operations as as the tariff setting, transport integration, the technical equipment, economic integration and system with main focus on revenues dividing) is elaborated in this document.
Last two years the preparations for the system start have been implemented but the start as such is still postponed. There are mainly political and economic reasons, which have the influence on the system start-up.

2.2. Žilina

Žilina regional integrated transport system has been created mainly for the reason to revive the railway line from Žilina to Rajec (the town about 20 km southwards). This line is interconnected with the urban public transport. The passengers can use single tickets and also tickets for a season. The area is divided into 7 zones (Fig. 3). The integration is oriented mainly on tariff integration.

![Figure 3. Zones in integrated transport system in Žilina [6]](image)

2.3. Košice

In Košice, the second largest city of Slovakia, the experiment of integrated transport system was focused on the employees of US Steel. Similar to the one in Žilina, first of all the urban public transport and railway transport was integrated; later the suburban bus transport was integrated too. But the project was terminated because of unfavourable economic results.
3. Current Conditions for Integrated Transport System Creation

3.1. Legislation on Passenger Transport in Relation to the Integrated Transport Systems

Until recently, the law of the Slovak Republic did not support the creation of the integrated transport systems. The amendment of Act 168 from 1996 about the road transport from year 2007 defines the integrated transport system and sets the duty for regions and municipalities to support the creation of the integrated transport systems.

“The region or municipality supports the creation of the integrated transport system in the passenger transport. The integrated transport system means the connection of the railway transport services with urban transport system and suburban bus transport into one system of lines in the way that it brings the advantages of unified tariff, transport conditions and unified transport documents.”

The similar new passage containing the support for the integrated transport systems is included in the act for railway transport:

“The integrated transport system means the connection of the railway transport services with the system of urban transport and suburban bus transport into one system in which the lines are interconnected and the connections are harmonized. This is based on the unified time-table. The ticket sell system is unified as well. The integrated transport system has to be able to perform the trips on the interconnected lines with only one transport document.”

It appears from above mentioned that for now there are only basic support defined. More detailed elaboration of each part of integration, the process of integration, the conditions for all involved parts are absent in both acts.

The government of the Slovak Republic issued some documents relating to the public passenger transport. In 2002 it was the conception of regional transport policy creating. The integrated transport system is mentioned there as one of the most effective ways for the share of public passenger transport to be maintained or increased.

Another support of the integrated transport system is included in the document “Transport Policy of the Slovak Republic till 2015” from 2005. One of the aims is to provide the support of inhabitants’ mobility by developing and operating of integrated transport systems. The integrated transport should provide suitable, safe and economical transportation of passengers. It is necessary to create the unified transport conditions, tariff, transport documents, coordinated timetables, complex information transport systems and relevant transfer terminals. The implementation of the integrated transport systems can be at two levels, either in the area of city and the suburban area, or in the region area.

In 2007 the Ministry of Transport, Posts and Telecommunication of the Slovak Republic agreed the Operational programme Transport 2007 – 2013. It is the programme document for drawing from EU funds in the transport segment. The infrastructure of the integrated transport system is one of preferred axis in this document. As the more exact fact it is mentioned that the strategy is focused mainly on the integration of the public railway passenger transport, its support and preference in two largest cities of the Slovak Republic – Bratislava and Košice. The railway infrastructure should be the base for transport system and the other transport modes.

The government of the Slovak Republic adopted the Resolution on the development of public passenger transport. The integrated transport system is proposed as one of the provisions whereas the legislative support and the creation of the transport integrators are the other provisions included in this document. The legislative support means:
- to set down the duty to integrate the public passenger transport at the regional level and the subsidies determined by integration;
- to set down the method of allocating the financial resources for integrated transport systems and to limit the number of parallel lines according to the transport area service;
- to enable to create the transport integrator including setting down its competences;
- to adjust the competences of regions in the area of regional railway transport.

The activities which should be provided by integrator should be also set down by legislation.

3.2. Tariff Legislation

The tariff integration has the key role in the integration process. On one hand the tariff and tariff conditions should be set to make the system attractive for passengers, on the other hand it should provide the revenues for all the involved transporters. Within the tariff integration it is necessary to integrate the different tariffs of all involved transporters, the tariff documents and the transport conditions.
The integration of different tariffs has to be in compliance with the legislative framework. The key problem in the Slovak Republic regarding the tariff is the fact that the maximum prices for suburban bus transport, railway transport and urban transport are fixed by different administration. From 2005 the prices for suburban bus transport are regulated by regions. The prices for railway transport are regulated by the office for regulation of railway transport. Now the process of movement of the competences from the office to the regions is implemented. But in this time the regions do not have the full competence to set the prices for railway transport. The urban transport is regulated by the municipalities.

In Table 2 the differences in the current prices are shown between the suburban bus transport (SBT) and the railway transport (RT). There are also shown the prices when the passenger uses the transport card in the suburban bus transport (SBT-TC). In this case the prices are lower.

The prices are presented for single ticket. Also there are more differences regarding the assortment of season tickets, special tickets and their prices in the tariffs of each transporter.

### Table 2. Comparison of prices between suburban bus and railway transport

<table>
<thead>
<tr>
<th>Distance (km)</th>
<th>SBT (Eur)</th>
<th>SBT – TC (Eur)</th>
<th>RT (Eur)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 5</td>
<td>0.50-0.60</td>
<td>0.37-0.43</td>
<td>0.26</td>
</tr>
<tr>
<td>6 - 10</td>
<td>0.60-0.65</td>
<td>0.43-0.53</td>
<td>0.40</td>
</tr>
<tr>
<td>11 - 15</td>
<td>0.80-0.90</td>
<td>0.66-0.80</td>
<td>0.60</td>
</tr>
<tr>
<td>16 - 20</td>
<td>0.90-1.00</td>
<td>0.80-0.86</td>
<td>0.80</td>
</tr>
<tr>
<td>21 - 25</td>
<td>1.20</td>
<td>1.06</td>
<td>1.06</td>
</tr>
<tr>
<td>26 - 30</td>
<td>1.50</td>
<td>1.36</td>
<td>1.18</td>
</tr>
<tr>
<td>31 - 35</td>
<td>1.70</td>
<td>1.59</td>
<td>1.38</td>
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<tr>
<td>36 - 40</td>
<td>1.80</td>
<td>1.69</td>
<td>1.58</td>
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<td>41 - 45</td>
<td>2.00</td>
<td>1.86</td>
<td>1.92</td>
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<tr>
<td>46 - 50</td>
<td>2.30</td>
<td>2.12</td>
<td>2.18</td>
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<tr>
<td>51 - 55</td>
<td>2.50</td>
<td>2.36</td>
<td>2.52</td>
</tr>
<tr>
<td>56 - 60</td>
<td>2.60</td>
<td>2.49</td>
<td>2.72</td>
</tr>
<tr>
<td>61 - 65</td>
<td>3.00</td>
<td>2.85</td>
<td>2.98</td>
</tr>
<tr>
<td>66 - 70</td>
<td>3.00</td>
<td>2.85</td>
<td>3.18</td>
</tr>
<tr>
<td>71 - 75</td>
<td>3.40</td>
<td>3.19</td>
<td>3.72</td>
</tr>
<tr>
<td>76 - 80</td>
<td>3.40</td>
<td>3.19</td>
<td>3.72</td>
</tr>
<tr>
<td>81 - 85</td>
<td>3.90</td>
<td>3.75</td>
<td>4.18</td>
</tr>
<tr>
<td>86 - 90</td>
<td>3.90</td>
<td>3.75</td>
<td>4.18</td>
</tr>
<tr>
<td>91 - 95</td>
<td>4.30</td>
<td>4.15</td>
<td>4.78</td>
</tr>
<tr>
<td>96 - 100</td>
<td>4.30</td>
<td>4.15</td>
<td>4.78</td>
</tr>
</tbody>
</table>

Data sources: [3][4]

3.3. Present Conditions - Conclusion

As resulted from the above facts the legislation gives the very common base for the creation of integrated transport systems in the Slovak Republic. There are still many areas and problems, which have to be solved and which have to have the support in legislation. The other problem is the goodwill of transporters, regions, municipalities for cooperation and agreement in the key parts in the process of the creation of integrated transport process.

4. Proposal of Basic Parts of Tariff Integration for ITS in the Slovak Republic

The basic task of integrated transport system is to offer the advantages for passengers to prefer the public transport against the individual automobile transport. The main advantages should be:
- simple and intelligible system for passengers,
- the sequence of all the lines and coordinated timetable,
- the one ticket from origin to destination regardless of the transport mode or transporter,
- the advantageous ticket prices,
- unified selling, dispatching and information system.

The experiences of the countries where the integrated transport systems are operated for many years show that these advantages are very attractive for passengers. When the system is clear and intelligible for the inhabitants and it brings mainly the price and time advantages, the increasing number of passengers is the result.

4.1. Legislation Support

The basic problems of creating the integrated transport systems were mentioned in the previous chapter. The following two main aims should be achieved:
1) more detailed support for integrated transport systems,
2) one decision-making place for setting the prices.

1. For more detailed support it is necessary to create and admit the act about the public passenger transport. This act would solve the issue of the public passenger transport and also it would include the issue of integrated transport systems. There were some attempts in the act about public passenger transport but they were not successful. Till this time the act about road transport and railway transport have been only revised.

The act about the public passenger transport should include the following parts regarding the integrated transport systems (ITS):
- the process of creating the integrated transport system:
  - the creation of society which will provide the management of ITS,
  - the legal form of society,
  - the necessary steps for creating ITS,
  - the discretions and duties for all involved in the process of preparation, etc.;
- the operating of integrated transport system:
  - the tasks and competences of ITS coordinator,
  - the creation of prices and tariff and transport conditions,
  - the transport coordination,
  - the discretions and duties for all involved,
  - the way of revenues diving, etc.

2. The coordinator (society or region) should have the competence to set the prices for all transport modes involved in the integrated transport system. In Fig. 5 the present state is shown; in Fig. 6 the proposal of solution is displayed.

![Figure 5. Present state of the price setting](image-url)
4.2. Proposed Area

The basic step in the first phase of preparation is to choose the area where the integrated transport system will provide the transport services. This issue is important from two points of view: first, the chosen area has an influence on the other parameters of ITS, such as tariff structure and operation of ITS. The second reason is that this issue is related to the competences of state and local authorities and to the tasks of ITS coordinator.

Generally, two different principles can be used:

1. ITS will cover the whole chosen area – so called “complex integration from the first moment” – ITS covers the whole area from the first moment of the system start-up.
2. The parts of area will be gradually integrated to ITS – so called “gradual integration” – it can be planned or it can be “spontaneous” (e.g. the later decision of municipalities to join in).

The administrative division is another important factor in terms of the area extent selection process. It is also related to the competencies of local authorities and it can influence the fact who will have a role of coordinator.
3. ITS will cover the area of more regions – the strong interconnection between the regions exists, for example two big cities of two regions are situated close to each other and it has the influence on the trips of people in these regions.

4. ITS will cover the chosen area and also it will be connected with ITS in the area of adjacent state.

It is supposed that the second possibility – ITS covering the whole region – will be used in the conditions of Slovakia. There are also the government resolutions, which recommend this type of integration. It is related to the region authority and its present and future competences regarding the public transport. Today the regional authority has the competences to order the local bus transport. The competences for regional railway transport are expected to be moved to the regional authority next year (2012). It will give more possibilities to provide the integrated transport in the area of regions.

The integrated transport system covering the area of more regions is another suitable possibility which could be considered in the case of Slovakia. It is considered in the case of Bratislava and Trnava region in the south-west and Košice and Prešov region in the east (Fig. 8).

As it was already mentioned in chapter 2.1, the integrated transport system of Bratislava has been prepared for several years. Bratislava region is neighbouring to “South Moravian integrated public transport system” in Czech Republic and “Vienna region integrated transport system” in Austria. The representatives of these two ITS have already negotiated with the representatives of Bratislava ITS about the possibility to interconnect all these systems in the future regarding the inhabitants existing trips between these three regions.

4.3. Tariff Structure

The choice of tariff structure is another very important part of integration and it should be considered carefully because it is recommended that during the first years of ITS operation there should not be an extensive changes in the tariff structure.

The tariff structure can be:

a) irregular form of zones,

b) regular form of zones – honeycombs,

c) concentric circles, which can be also radially divided into so called sectors.

Each of these forms has its own advantages and disadvantages and many important factors have to be taken into account in the process of preparing the phase of ITS.
From the passengers’ point of view two cases can happen:

1. The size of the zone is equal or approximates to the original zone margins of transporters. This means the changes will have the minimal influence on the ticket prices.
2. The sizes of zones are different from the original margins, and this fact can have a positive or negative influence on the ticket prices.

The planned tariff structure should meet the following aims:

– not to cause the disadvantage ticket prices based on the tariff structure for passengers, and if there is any disadvantage, it should touch as few passengers as possible and should not touch mainly the regular passengers,
– to create the tariff structure on the base of which the tariff and tariff conditions will be created and will be intelligible for passengers,
– to support the passengers’ interest to use the integrated transport system in combination with the ticket range.

If it is considered, that the integrated transport system will cover the area of region in Slovakia it is supposed, that the irregular zones will be proposed as the tariff structure. The main advantage of this type of tariff structure is that the zones can be created depending on the habitation density, railway and road infrastructure density, existing passengers’ trips in the area, original tariff margins of involved transporters.

The process of tariff zone creation is the following:

1. Analyses of the current tariff margins of transporters involved in projecting the future integrated transport system.
2. Identifying the municipalities, which will be included in one zone. It is supposed that if there is the city with public passenger transport, the area of this city will represent one zone, which can be divided even to more zones regarding the size of the city.
3. Verifying of created zoning – after elaborating of all proposed ticket prices the analyses of the impact of prices on passengers should be done.

4.4. Integrated Tariffs

The transporters enter the integrated transport system not only with different tariff margins, but also with different price levels and tariff conditions. In the case of the Slovak Republic, it can be said that the most “conflicted” part will be to integrate the prices of suburban bus transporters and railway transporter. This “conflict” can be perceived from the following points of view:

- orderer’s standpoint – ITS coordinator will have a role of an intermediary between the supply and demand. It provides the operation of linkings by ordering them. They have to pay the subsidies for transporters and so they try to optimize the number of links. On the other hand, they have to provide a basic transport connection on the area for the inhabitants and provide the social discounts for some categories. They have to provide the socially sufferable prices for the passengers.

- transporter’s standpoint – Each of transporters enters the ITS with its own expectations. The main aim is to make the public passenger transport more attractive for inhabitants to use it for their everyday trips. The price is one of the key issues and the transporters have to agree on the unified prices.

- passenger’s standpoint – the passengers are accustomed to the certain price level. They are willing to accept its increase only to the certain level. If the increase is larger the passengers start to think about other possibilities or they are willing to accept the higher price but with some compensation as a higher quality of services. It can be said that on the contrary the passengers will expect prices that are more favourable when the integrated transport system is already running. Generally, the passengers and their acceptance of price level is the key part of later ITS success.

When the integrated tariff is prepared, first the prices of single tickets have to be set as the basis for the time tickets. In addition, the analysis of the discounts has to be done regarding the horizontal and vertical price digression of all the tickets. Two parameters have to be set:
- parameter of fare advantage regarding the number of trips (the validity of time of the ticket),
- parameter of fare advantage regarding the travel distance.

**The proposal of parameter regarding the number of travelled zones:**
- it will be based on the tariff structure and the size of zones,
- the value of parameter will be decreasing with increasing number of travelled zones, or its value is constant from the certain distance,
- in case of season tickets the value of parameter will be lower than in case of single tickets. It is the way of supporting the season tickets selling.

**The proposal of parameter regarding the number of trips:**
- it will be based mainly on the range of season tickets,
- its value will be constant for trips independently of the number of travelled zones,
- the value of the parameter will decrease with increasing time of season ticket validity,
- if it is economically acceptable, the value of the year season ticket will be 10 – for the reason of marketing activities,
- the value of parameter for season tickets will be set to provide using of season tickets.

**Table 3. Proposal of parameter**

<table>
<thead>
<tr>
<th>Season ticket</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>day</td>
<td>2 - 3</td>
</tr>
<tr>
<td>week</td>
<td>3 - 5</td>
</tr>
<tr>
<td>month</td>
<td>10 - 20</td>
</tr>
<tr>
<td>year</td>
<td>10</td>
</tr>
</tbody>
</table>

In case of transporters which are considered to be involved in the integrated transport systems in Slovakia, there are differences in the ticket ranges and current parameters between the suburban bus transport, railway transport and urban public transport. There are no season tickets for the trips within suburban bus transport and in case of railway transport there is only the week tickets, used as the season tickets. The season tickets are very important part of ITS tariff so it is evident that the preparation of the integrated tickets and prices will be a difficult process, which will include setting up of the parameters for season tickets.

**4.5. Integrated Tariff Conditions**

The tariff conditions mainly include the reduced fares for the various categories of passengers, the conditions for applying the claim for the reduced fare, for free transportation.

The discounts can be divided from the following point of view:
- social – they support the passengers with lower incomes,
- public interest – for pupils and students, the support of certain groups of inhabitants who help society in some way (e.g. blood donors),
- transport-technological – e.g. the support of trips out of traffic peak for better capacity utilization,
- employees – for employees of transport companies and their family members.

The main aim of the reduced fares is to support the regular or irregular passengers for more trips and to attract more inhabitants for using public passenger transport for their everyday trips.

**5. Conclusions**

The process of integration is very difficult. The tariff system is the key part of it because it has the financial impact on the passengers and their decision to use or not to use the public passenger transport for their regular but also irregular trips. The tariff system has to be solved comprehensively. Each part of the tariff system follows the other one and they influence each other. It is necessary to analyze the current
tariff system of transporters, involved in the integrated transport system. The following proposal of tariff system should be attractive for the passengers and simultaneously financially interesting for the transporters and municipalities. The tariff integration together with the transport integration should make the public passenger transport more attractive and should provide increasing number of passengers.

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