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**MODEL OF THE INTEGRATED REGIONAL PUBLIC TRANSIT SYSTEM
BETWEEN THE TERRITORIES OF THE MUNICIPALITIES OF NIŠ,
PIROT, TOPLICA AND JABLANICA DISTRICTS IN THE REPUBLIC OF
SERBIA**

Keywords

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Abstract

Regional public transit between the municipalities of Niš, Pirot, Toplica and Jablanica districts connects the surrounding municipalities and cities with the territory of the city of Niš. It has a significant socio-economic function because it serves residents who live in smaller municipalities, i.e., cities, and work and study in the city of Niš. As such, regional public transit in this region is very present and has the same character as suburban public passenger transport that connects settlements with the inner-city area. In practice, Niš, Pirot, Toplica and Jablanica districts represent a unique socio-economic entity. Daily migrations of citizens between these four districts are carried out using intercity bus lines operated by several public transit companies. The tariff system and the ticket system differ between operators and even among departures of the same operator. Transfer points offer different, inconsistent information and services due to varying ownership structures and contractual agreements with transit companies. Therefore, market of public transit system between districts is unregulated and it can be characterized as defensive and unsustainable because citizens are unable to use the entire offer due to the complicated system. To address these challenges, it is necessary to develop an integrated model for the regional public transit system, connecting the four districts into a cohesive unit and improving the quality of public transport services. Integration can be achieved at four different levels: physical, tariff, informational, and wide planning integration.

1. INTRODUCTION

From the political and socio-economic point of view, City of Niš is a regional center in a wider geographical area in which gravitates different population. As a modern university city, it is simultaneously the natural, social, economic, educational, health, cultural and sports center of Southeast Serbia [5]. According to the 2022 census, 249,501 inhabitants live in the area of the City of Niš, while 178,976 live in the town itself. It covers an area of 596 km² [4].

Therefore, it can be said that Niš, Jablanica, Toplica and Pirot administrative districts represent the gravity area of the City of Niš (Figure 1).

It covers an area of 10,490 km². According to the 2022 census, 682,493 inhabitants live in four cities and 22 municipalities (5 of which belong to the City of Niš), of which 56% live in urban settlements (382,284 inhabitants). Compared to the data from 2011, there is a decrease in the number of inhabitants of 12.1% [4].



Figure 1. Geographical position of the city of Niš in relation to its gravity area

By population, second largest is the City of Leskovac, which is the seat and main center of the Jablanica administrative district. It is located in the Leskovac basin and covers an area of 1025 km². It includes 144 settlements, three of which are city-type (Leskovac, Vučje and Grdelica), which makes this territory the most sparsely populated in the Republic of Serbia. It is 50 km from City of Niš.

The City of Pirot is the seat of the Pirot administrative district. According to data from the 2022 census, Pirot has 49,601 inhabitants, which ranks it as the third largest city in the territory of the Niš gravity area, in terms of population. It is 75 km from City of Niš. The state road of the first “A” class passes through the Pirot district, which is part of the European E80 and the pan-European road corridor 10.

The City of Prokuplje is the seat of the Toplica administrative district. According to data from the 2022 census, Prokuplje has 34,942 inhabitants. It is 50 km from Niš. An important highway passes through the Prokuplje district, already mentioned road E80, which leads from the Adriatic Sea and Pristina to Dimitrovgrad, Sofia and Istanbul and further to the Middle East. Also, from the aspect of tourism, within the Toplica district there are three extremely visited spa centers, namely Lukovo, Kuršumlija and Prolom Spa center.

2. REGIONAL (LOCAL) TRANSIT SYSTEM IN THE NIŠ GRAVITY AREA

According to market conditions, the basic factors that influence the quality of regional (local) bus public transit between the municipalities of Niš, Pirot, Toplica, and Jablanica districts can be classified into seven categories that are circularly dependent, it is:

1. Natural migrations and devastation of the area;
2. Extremely competitive relations between transport companies/operators;
3. Illegal modes of passenger transportation (line taxi service, illegal van transport service, etc.) and individual motorization;
4. “Dedicated bus shuttle service” - special form of regular line passenger transportation which is organized for specific category of customers;
5. The tariff system and the ticket system - different tariffs between private operators and even among departures of the same operator;
6. Real operating costs of the private transport companies - fuel consumption, fleet maintenance, employee salaries;
7. Non-coordinated services - timetables, networks, stations and transfer points, system information's, etc.;

2.1. Natural migrations and devastation of the area

The development of urban systems in the observed area has an extremely monocentric character. One or a few larger cities within the region dominate their size, functions and content, while other smaller municipalities and cities have a slow development or even decline. This smaller local governments can be characterized as devastated areas. Regional (local) transit in these settlements has a significant socio-economic function as it serves residents who work and study in Niš or other larger cities such as City of Leskovac, Pirot and Prokuplje. However, the budgets of these local governments are not able to finance or subsidize public transit services.

The devastation of these areas and the constant population decrease also affects the decrease in the number of users of public transit service. In such conditions, private carriers that do not have the public transport obligation are forced to reduce their bus departure and constantly raise the prices of tickets in order to ensure economic security.

2.2. Extremely competitive relations between transport companies

Competitive relations between transport companies that operate on gravity area of the city of Niš can be reviewed from several different aspects:

- Competition between private transport companies with similar financial power;
- Competition between smaller and larger private transport companies;
- Competition between state and private companies (Railway and bus operators);
- Competition established by bus station managers favoring certain bus operators;
- On route competition – present on corridors with a high flow of passengers;

In the literature, when it comes to deregulated public transit systems, one of the main problems is identified as unfair competition, where companies with stronger financial resources eliminate competition in their zone with a price policy, and then use their monopoly positions to increase profits.

In practice, competitive relations in the observed area are established differently. Smaller bus operators, with smaller and simpler organizations, have significantly lower operating costs. Consequently, they are able to offer lower quality services at a lower price. On the other hand, large companies, despite being financially stronger, often struggle to meet the conditions imposed by several smaller operators. This extremely competitive relations, established through price policies, are often reinforced by bus station managers favoring certain bus operators.

2.3. Illegal modes of passenger transportation and individual motorization

Problem of illegal transportation was recognized by a new "Law on passenger transport in road traffic" from 2017, but the complete suspension of regular transit and its gradual recovery in the post-Covid 19 period influenced the increased occurrence of illegal passenger transportation by cars and vans.

In March 2021, legal transport companies, through the road transport business association "Srbijatransport", drew the attention of the Ministry of Construction, Transport and Infrastructure of Republic of Serbia, to the increasingly frequent occurrence of illegal business in the field of passenger transport and, in this regard, demanded increased inspection controls on the ground [3].

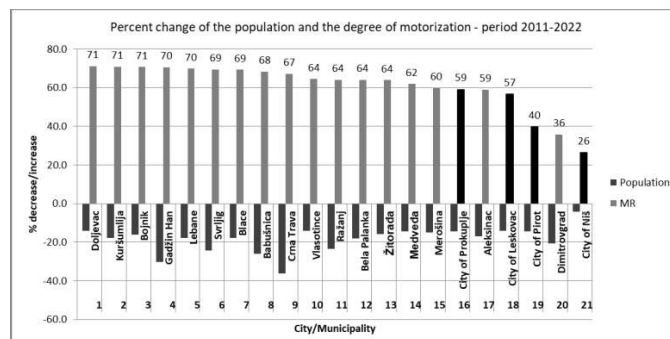


Figure 2. Percent increase of motorization rate in period 2011-2022 according to population decrease.

Within the four observed districts, in the last ten years, the number of registered passenger cars increased by 30.8%, while the population decreased by 12.1% [4]. It is characteristic that the most devastated areas have the greatest motorization rate increase (Figure 2). It can be concluded that the traffic policy is still oriented towards favoring the passenger cars.

2.4. Dedicated bus shuttle service

This form of public transport is organized as transport of employees from their place of residence to work and from work, as well as students from their place of residence to school and from school. Therefore, it is contracted for a certain category of passengers (a certain business entity, organization, institution, etc.), with the exclusion of other passengers, according to the agreed frequency and on the agreed transport route [6].

While there are numerous advantages to this form of organizing scheduled transport, it is necessary to further enhance organization in this area to overcome its existing disadvantage, such as overlapping with existing scheduled public transit.

2.5. The tariff system and the ticket system

Planning and designing tariff model is one of the most sensitive business processes faced by private carriers.

The tickets price is directly related to the quality of the transport service and is the main factor that affects the user's decision. When we talk about decisions, it also refers to the choice of which mode of transportation the passenger will fulfill his need for travel and with which operator. On the other hand, the tariff politic affects the financial stability of the carrier and ensures its competitiveness on the market.

2.6. Real operating costs of the private transport companies

High ticket prices, which are formed on the basis of the real operating costs of the operator, create conditions for an increase in illegal transportation, individual motorization and unfair competitive relations between private operators, which further leads to new consequences, namely a smaller number of passengers and, paradoxically, less financial justification of the service, despite the increase of ticket price.

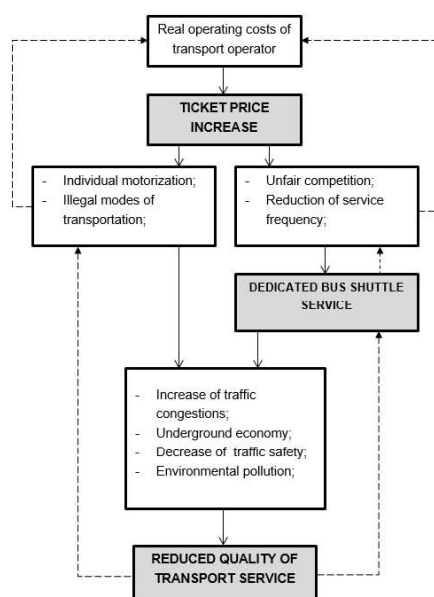


Figure 3. Influence of the formation of ticket prices based on real operating costs on the quality of transport service

2.7. Non-coordinated services

The tariff system and the ticket system differs between operators and even among departures of the same operator. Transfer points offer different, inconsistent information and services due to varying ownership structures and contractual agreements with transit companies. Uncoordinated services are the main characteristic of a deregulated regional transit system in Niš gravity area.

3. CONCEPT OF THE REGIONAL INTEGRATION OF TRANSIT SYSTEM

The integrated transit system represents a common operational environment in which interconnected transit operators (private and public) and subsystems of public transit have a unique organization of transport in a certain area.

The basic elements of the integrated system are the network of lines, the timetable, the tariff system, the billing system and the information system. Integration can be achieved at four different levels: physical, tariff, informational, and wide planning integration [2].

The physical or transport networks integration implies the synchronized planning and modeling of networks and lines that meet simultaneously or at defined time intervals, in one or more transfer points, independent of the subsystem and ownership structure of the transport operator.

A unique system of tickets, regardless of subsystems and ownership structure, allows passengers to use different modes of transportation, by purchasing only one ticket that can be valid for a short period (several hours, day ticket) or have a longer time validity (weekly, monthly, annual).

Information is a key factor in the traffic management. Important decisions are made based on the information about the state of the system and about the traffic requests. On the other hand, the information system is one of the most important parameters of the transport service quality. The availability of information that is presented to the passenger before entering the system and in the system, itself makes public transport a more convenient and attractive choice.

The concept of wider planning integration implies analyzing the mutual influence of the use of surfaces, transport system and wider social interests. It primarily refers to the consideration of the following aspects: Impact of land use and surface purpose on trip generation, social integration and environment protection.

4. LEGAL FRAMEWORK

The legal framework that governs the field of public transport in Republic of Serbia was established in such a way that it represents the first obstacle to the regional integration of the public transit system.

“The Law on Road Transport” defines the conditions for the establishment of public transport and, in this sense, prescribes the competences and responsibilities of local, regional and state administrations. The line ministry in charge of traffic, registers and verifies intercity bus lines and timetables. Bus carriers submit an application for registration of intercity lines once a year, and the proposed timetables for intercity bus passenger transportation are coordinated and approved by the commission.

Registration and verification of timetables for public urban and suburban transit is entrusted to the authority of the municipal or city administration. Local government, on the basis of the “Decision on Public Passenger Transit”, prescribes the way of organizing, the conditions of performance and the conditions of use of public transit on a certain territory, as well as all other issues of importance for public passenger transport system.

Regional public transit between the municipalities of Niš, Pirot, Toplica and Jablanica districts, forms a system of bus lines of various private carriers.

These scheduled bus lines, when their routes pass through two different cadastral municipalities, must be registered as intercity regardless of the social needs of the inhabitants or its travel character.

5. CONCLUSION

Regional public transit between the municipalities of Niš, Pirot, Toplica and Jablanica districts can be characterized as defensive and unsustainable because citizens are unable to use the entire offer due to the complicated system.

The price level, the ticket system, the payment methods and the way of providing information are regulated by each of the carriers independently, according to their own interests. Requests for registration of intercity timetables are submitted exclusively for those lines for which there is economic justification. The moment the line is no longer profitable, the carrier withdraws. On the other hand, registered timetables, which are not maintained, are often kept "in a drawer" because in this way the market is protected from competition.

Larger cities, such as Niš and Prokuplje, have organized public urban and suburban passenger transport based on a public-private partnership model. Smaller municipalities, such as Merošina and Bojnik, organize the transportation of students according to the model of "dedicated bus shuttle service". However, the majority of local governments still do not have settled public transit, but it is organized on a completely commercial basis, that is, by approving municipal timetables for local carriers who apply for them.

To address all these challenges, regionalization of public transit and concept of regional integration is necessary. According to that, there are number of obstacles that needs to overcome related to legal framework, political environment, business models of companies, as well as the way revenue are distributed.

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