

Models of Organization and Management of Passenger Public Urban Transport Systems

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Received: October 28, 2021

Accepted: November 12, 2021

Abstract: The paper gives an overview of the model of organization in the management of public urban passenger transport systems (JGTP), which are applied in world cities as well as in some cities in the region. These are complex systems with components of economic, technical, technological and organizational nature, as well as elements of planning, arrangement and organization of space and impact on the environment and its protection, at the same time, as a public service, it is a specific network of various organizational and spatial entities. Systems are open transport systems with stochastic state change.

Keywords: system, organization, management, public urban passenger transport.

INTRODUCTION

Public urban passenger transport systems (JGTP), according to the principles of the European Commission [5] have a key role in achieving the goal of sustainable development and sustainable transport in cities. Regarding the goals and interests of the JGTP system, the following are imposed: ensuring high mobility of residents, opening of the market of services, needs for higher production efficiency and lowering of operating costs of carriers, enabling mobility of certain social groups under favorable conditions, realization of efficient and regulated mechanism (management), revenue, prices and financing of the system, harmonization of service prices with real transport costs, investment and development of the system, etc.

In most of the world and European countries, JGTP is understood as a social interest, whose advantages are measured not only in terms of the number of transported passengers and the price of transportation, but also in terms of factors such as:

- reduction of traffic congestion,
- increasing traffic safety,
- improvement of the environment,
- increasing the mobility of the population, etc.

The advantages of JGTP are transferred indirectly to the city's income, which is the main argument for the city authorities to participate in the ticket price through

active financial support, which enables an increase in the offer of public transport and improved service quality. This means that the policy of active financial support to JGTP by the socio-political community for its faster improvement and development, which is accepted in all developed countries in the world, is the basic lever by which the city government can influence the overall significant improvement of conditions of (time losses due to congestion and irregularities) traffic in the city, as well as the improvement of the environment.

The importance of the public passenger transport system is reflected in:

1. The public transport system enables a large number of inhabitants to realize one of the basic needs, the need to move.
2. The quality of transport service of this system affects the effectiveness and efficiency of all production, supporting processes and other activities of people in the city.
3. Indirectly, it affects the rational use of urban areas, traffic congestion, speed and capacity, safety and environmental pollution in the entire urban area.
4. For a large number of residents, given their financial capabilities, as well as certain social groups (pupils, students, the disabled, pension-

ers, the elderly, the unemployed, etc.) JGTP is often the only option for the realization of transport needs.

5. The public transport system is also an activity that engages large funds invested in resources: vehicles, employees, facilities and equipment, energy, etc. so it is in the interest of the economy of cities or every country that every JGTP company functions and works efficiently.

The key trends in the field of public urban passenger transport [5] today are:

- Obligation and concern of local communities to ensure the mobility of residents with limited use of passenger cars in accordance with the strategy of "sustainable development" and "quality of life",
- Opening the market of services for all carriers and all types of ownership,
- Development of intermodal transport (which implies the systematic use of two or more modes of transport in order to increase the overall efficiency of the transport system),
- Full integration: transport networks (physical integration), tariff integration and logical - information integration,
- The need to increase production efficiency and lower the operating costs of carriers, and
- Citizens' pressure on local self-government bodies to achieve a higher level of quality with an acceptable price of public transport services, and a single ticket for all carriers and modes of transport.

Obligations, responsibilities and tasks of local city administration bodies in an integrated environment with several carriers are: defining the model of organization of the market of services in public urban passenger transport (entry, exit and working conditions of carriers, management at strategic and tactical level), planning of service quality elements (timetables), planning and organization of functioning of the whole system-integration system, defining conditions for acquiring and distributing income to carriers, control of functioning and supervision over defined quality of service and income, determining costs of public urban transport system for desired level of service quality.

WORLD EXPERIENCES [9]

There is almost no city in the world in which public urban and suburban passenger transport (JGPP) is not a basic activity and a basic precondition for a large number of urban activities.

Depending on the importance of JGPP in the transport system of the city and region, as well as the eco-

conomic potentials of local, regional and state institutions in charge of monitoring the work and supporting the performance of public transport activities, the models of organizing and managing the JGPP market vary. In general, there is no formula for the optimal model of connection of local companies for performing the activities of JGPP, in the field of organization, management, current operations and development, in the technical-technological and economic-financial sense.

Although the organizational forms (models) of the JGPP system differ from city to city, they also have several common characteristics [7]. These common characteristics are based on the coordination of transport services in urban and suburban areas, competition between carriers, physical, tariff, management, control and information integration of systems, secure sources of financing their current operations and reliable sources of financing the development of JGPP functions.

Based on the available literature and based on a large number of published papers in the world, it can be concluded that there are three basic concepts, ie groups of models for organizing the market of the JGPP system.

1. Regulated mode model [5] (classic model)

The model of a regulated public monopoly regime in JGPP mainly dominates in JGPP systems where the carrier is owned by the city. Within the same, certain modalities are possible. It is used in most European countries (Austria, Belgium, Germany, Spain, Luxembourg, Greece, Italy, the Netherlands, Portugal, Serbia and Montenegro). Regulated system regime - management of the JGPP system can refer to «public» but also to «private» carriers.

2. Model of restricted competition regime

There are two variants of this model: on different forms of tenders at the line level and with the most common choice of carriers with the lowest price (Denmark, Finland, Sweden so-called Scandinavian model) or on contracts for line network management (France, Norway so-called French model).

3. Model of deregulated JGPP system

This is a free market model based on competition between carriers for individual lines. These models have been applied mainly in the United Kingdom (outside London).

The three basic forms of the JGPP market organization model are:

1. Scandinavian model
2. French model
3. The British model

1. The Scandinavian model is based on a minimum of subsidies and contracts with minimal costs for a certain number of lines.

This model refers to the situation of a clear division between the transport policy set by the authorities and the functioning of the JGPP system, public and private carriers that are under contract with the competent administration. Public carriers are represented by a public regional transport company (RTK) formed by a regional administrative body with the aim of organizing and managing the transport services market on its behalf and for its account. This company is actually a key factor in the transport market of public transport services and is not a regional administration body, and according to the type of business it deals with, it belongs to public activities. The tariff system remains integrated through all subsystems of JGPP, and through different carriers, while the operation of public bus transport is contracted with different carriers, through tenders. In the contract, based on the total (gross) costs, the government specifies the transport service and determines the size of the bus fleet (number of vehicles) and then selects bids for the costs of fleet maintenance. The income generated on the bus lines belongs to the authorities, and the entire tariff system is under their control. Carriers do not assume any individual risk and have only the obligation to rationalize production costs (performing transport services). In the case of contracts based on net costs, the carrier declares the amount of costs for the provision of transport services and then at the same time retains the income generated by ticket sales. The single tariff system remains integrated for subscription tickets, and the income from the sale of single subscription tickets belongs to the competent body of the city administration [2]. This means that this type of contract transfers part of the risk to the carriers.

The tender selects the carrier that offered the most favorable conditions [3], i.e. the carrier that offered the smallest amount of grants. The tender is usually announced for one line or a certain number of lines, and the period of validity of the contract is different.

Since the first such contract was made in London in 1985, this type of contract has been very present in the large metropolises of Western Europe.

2. The French model, unlike the Scandinavian model, is based on contracts for the management of the line network of one or more JGPP subsystems, with additional incentives / sanctions provided for in the contract.

In this model, two entities (city/regional government and carrier) coexist and work together:

- The administrative body (authority) that sets the transport policy is responsible for the area of functioning of the JGPP system, sets the index of return of financial resources of the carrier and parameters for evaluating the work of the carrier i.e. same as with the Scandinavian model,
- The carrier is responsible for the operation and maintenance of vehicles, production efficiency

and management of employees, which is regulated by the contract with RTK.

Responsibility for the marketing strategy, in some cases relies on the competent administrative body and in some cases on the carrier itself. The key feature of this model is that there is no competition in a particular transport area (network of lines) so that if more than one carrier provides transport service, then they do so only in one transport area (with different passenger characteristics) or using different subsystems through which make it less significant to compare the performance of each JGPP subsystem. Carriers work under a contract (license), and by type of ownership they can be a public company, a semi-public or a private company.

3. The British model is this model of competition in the transport market (or imperfectly competitive market), and public administration interventions are limited to setting safety standards for transport services and other institutional regulations.

This model has not been applied in any metropolis of Western Europe (including London), but it is applied in about 85% of subsystems in the UK (including those registered on the outskirts of London). Public city passenger transport is deregulated and is performed through private bus companies, but there is a possibility of subsidizing unprofitable lines (primarily suburban and local).

EXPERIENCES OF CITIES IN THE REGION

Model of organization and management in Kragujevac[4]

Numerous problems that accompanied the public urban and suburban passenger transport in Kragujevac were overcome by the introduction of two carriers on the complete network of urban and suburban lines, in December 2005. Until then, the transport was performed by one carrier - «Autosaobraćaj Kragujevac».

This was preceded by the preparation of the Study of public urban and suburban passenger transport in Kragujevac by the Faculty of Technical Sciences from Novi Sad. An integrated tariff system has been introduced, i.e. single tickets so that users of public urban and suburban transport services can use the transport services of several carriers. In addition, the system of payment, ticket sales, user - passenger control, carrier control, as well as JGTP management has been improved.

The precondition for the introduction of a new organization and management of the JGTP system was the establishment of the City Transport Agency, which unites all jobs related to JGTP.

The main scope of work of such an institution is to perform entrusted tasks, for and on behalf of the City, as follows:

- planning the development of public transport with the market in the integration of all subsystems,
- setting up and continuous correction of the line network,
- making timetables,
- traffic control,
- introduction of priorities and other measures to increase the speed of public transport,
- passenger control,
- issuing and selling tickets,
- concluding contracts with carriers,
- control of contract execution,
- distribution of revenues from sold tickets for the use of transport services of several carriers,
- charging for services from other bodies and institutions for categories of passengers with preferential prices,
- providing additional funds for the development of JGPP,
- monitoring and analysis of costs and revenues of the carrier,
- tasks related to monitoring and improvement: tariff system, payment system, ticket system, etc.

As a result of the introduction of such an organization and management of the JGTP system, not only a shorter travel time was obtained, but also a reduction in the total cost of operating the system, through the use of unique transport tickets. Unified printing and distribution of tickets, functional dispatch service, installation and maintenance of stop signs and informing passengers about the exact timetable, control of the work of carriers and vehicle documents in the vehicle, payment of additional tickets, as well as distribution of jointly realized income.

Model of organization and management in Niš [4]

The JGTP system in the city of Niš has undergone drastic changes in recent years, both in the level of service quality and in the way of organization, monitoring and planning process. Until 2005, the only carrier in the city of Niš was Nišekspress, and the way of organizing JGPP was completely entrusted to this company, which resulted in certain disagreements between the City and the mentioned company. In accordance with the new situation where the level of quality of public passenger transport was obvious (disrespect of the timetable, reduction of the number of vehicles at work from 190 to 80, obsolete vehicle fleet, etc.), the city management decided to introduce new operators in the JGPP system. However, the basic problem of the concept of such a multi-operator system is the need for the best possible control and manner of organization that requires a special body, which would deal exclusively with matters in the field of JGPP.

At a certain moment, in the city of Niš, passenger transport was performed by seven operators:

1. Nišekspress,
2. Veritimo,
3. Konvoj travel,
4. Transprodukt,
5. Lekon,
6. Ćurdić i
7. Aerodrum.

Due to the fact that the city was not ready for this way of functioning of JGPP, and due to the lack of a relevant institution for management, control and monitoring of such a system, there was an unregulated market which resulted in the withdrawal of some carriers and chaotic situation on public transport lines.

The Administration for Communal Activities, Energy and Transport of the City of Niš tried to apply certain measures in such a system, by accepting the principles of organization of JGPP set by Niš Ekspres in previous years (zone-tariff system, city and suburban lines remain unchanged, carrier collects revenue from sold individual tickets and monthly stamps, etc.). In such a system, the development of the timetable was entrusted to the carrier itself, and the only control consisted of the Directorate for Inspection Affairs and the later established sector of control at the city Airport.

CONCLUSION

In recent years, in all cities in the world, even in the region that have an organized JGTP system, the Model of Regulated Public Monopoly Regime in JGTP has been applied so far (where the only carrier in the system is owned by the city), model of restricted competition regime in this system has been introduced (with two or more carriers - operators in the system). Although the organizational forms (models) of the JGTP system differ from city to city, they also have several common characteristics. These common characteristics are based on the coordination of transport services in urban and suburban areas, competition between carriers, physical, tariff, management, control and information integration of systems, secure sources of financing their current operations and reliable sources of financing the development of JGTP functions. The inclusion of all selected carriers (regardless of the ownership structure: public company, private company, joint stock company, etc.), through a public tender (tender), is preceded by the procedure of preparing the JGTP Study.

Based on the research conducted in the Study [1], the calculation of real income and costs of the system is performed, in order to determine the balances of needs for necessary grants and subsidies from the city budget. Based on the obtained balances, Agreements are concluded between the City (local authorities) and selected

carriers, which regulate the rights and obligations of each participant in the system.

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