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HOW PUBLIC TRANSPORT SERVICES AFFECT THE URBAN ENVIRONMENT

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Abstract

The authors reviewed the functions of strategic planning and identified problems in the development of urban passenger transport services. They identified the impact of land use on public transport development. Scientific studies of regions and cities have determined a number of conditions for their economic growth in the post-industrial economy, which include the importance of agglomerations and clusters, the differentiation and specialization of economic activities, the development of services and infrastructure. Increasing employment, the development of regional and municipal innovation systems, the ability of cities and regions to be attractive for living and creative fruitful work are increasingly important for the socio-economic development of cities. One important consequence of the research is that economic transformation towards regional and urban growth and development is becoming increasingly dependent on dense physical space. All these conditions can be realized with the availability of efficient and high-quality transportation services, vehicles and infrastructure, increased mobility of the population and accessibility of the services provided. This, in turn, means that public transport is the driving force for the economic development of regions and municipalities in terms of mobility and accessibility in general, as well as in comparison with other modes of transport.

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1. Introduction

Public transport has a large capacity of simultaneous transportation with a relatively limited demand for space. Thus, public transport can be used when the density of users of transportation services is reached. These factors are prerequisites for realizing economies of scale and creating an enabling environment for the growing transport services sector. Combined with the fact that public transport is often more environmentally friendly than private cars, political and social interest in public transport can be expected to increase in many countries and cities. However, there is not much research on the economic impact of increased public transport and its impact on the growth and development of urban districts. Economic research in this area is aimed at analyzing accessibility as a time in transit and the impact of investment in transport and road infrastructure. This means that there is a greater need for more extensive and in-depth empirical studies of the state and development of urban public transport.

2. Problem Statement

In this scientific survey, the authors set the task of studying the functions of strategic planning for the development of public transport services. Issues of the strategic level, including the interaction of companies, were considered by such authors as Yakhneeva et al. (2020), Yakhneeva et al. (2019). The dynamic management impact on strategic change in general was described by Helfat and Martin (2015) in his study. Attempts to empirically establish the relationship between the economic growth of a region or municipality as an effective sign and the development of public transport as a factor sign are absent or poorly founded. This can be explained by the fact that regions and municipalities occasionally and inconsistently use public transport management functions such as diagnostic analysis, forecasting and optimization. The main function of public transport is the provision of transportation services as a complement to personal vehicles, which currently dominate the transport regime of cities. The integrated planning of public transport services is hardly carried out at the regional and municipal levels. The authors also set and solved the tasks of identifying the problems of the development of public urban transport services. These tasks can be attributed to the target-forming in this study.

3. Research Questions

The issues of the study include the problems of urban public transport. Among the notable problems of urban public transport, the main ones are:

- disproportionate demand for services and the level of development of road infrastructure and traffic routing, which causes traffic congestion, difficulties in parking public transport at stopping points, reduction of public (municipal) space due to high and intensive passenger traffic;
- insufficient quality of public transport services, including low speed, low safety and low level of additional service on the line;
- negative impact on the environment, especially buses, in terms of exhaust pollution, and noise from electric modes of transport (trams);
- unfavourable financial condition of municipal transport organizations in conditions of insufficient subsidization of services and low salaries of staff.

Thus, a comprehensive analysis of these problems contributes to the formation of a tendency to resolve the current situation in the field of urban public transport services and proves the relevance of research.

4. Purpose of the Study

Of particular importance for the development of urban public transport is the strategic planning of its services as part of the public good, in close connection with service quality management. When planning the quality of urban public transport services, applied aspects of service development, such as determining the required investment in vehicles and transport and road infrastructure, should also be evaluated.

Regardless of the source of financial and logistical resources allocated to the development of public transport, it is important to achieve a high socio-economic efficiency of their use, which in itself is a problem due to the lack of a scientifically sound methodology for assessing it. Agafonova et al. (2019) consider the need for corporate social responsibility in the activities of enterprises. It is necessary to study and analyze aspects affecting the quality of the performance of urban transport functions in modern conditions. Authors such as Sosunova et al. (2019) propose to use adaptive management mechanisms in order to improve the quality of logistics services provided. Kalashnikov et al. (2018) propose to use a logistical approach to the quality of transport services. Rakhmatullina et al. (2020) in their article give an assessment of the quality of public transport services in the digital economy.

Having considered the activities of domestic enterprises, all significant features of the provision of services should be reflected. But it is most important to understand what problems in the field of urban transport services reduce the quality of service provision. The purpose of the work is to identify problems in the development of urban transport services, consider the functions of strategic planning for the development of public transport services, and reflect the characteristics of the implementation of these functions in the regions. The tendency to increase attention to public transport at the regional level, changing the distribution of responsibilities among different levels of government leads to a closer attention to integrated planning and support for decision-making in public transport management. Regional authorities understand that the development of public transport should be planned and integrated across the region through the development of planning guidelines and tools. The main problem here is the coordination of efforts of regional and municipal authorities to use the territories as a space for providing public transport services, developing transport and road infrastructure, and more fully subsidizing public transport services.

5. Research Methods

In this study, general scientific methods of cognition were used. In this study, general scientific methods include: theoretical, practical and empirical. From the point of view of the empirical function of economic science, observation and evidence collection were used. Researchers reviewed and analyzed the provision of urban transport services in modern conditions in a number of regions of the Russian Federation. The authors revealed the features and patterns of financial problems in the field of urban transport services. The authors systematized the data and made reasonable conclusions regarding the identification of problems in the functioning of urban public transport.

6. Findings

The provision of public transport services largely depends on state subsidies, therefore, tariffs for services and salaries of staff of public transport organizations are regulated. Attention is drawn to the low share of subsidies for public transport services in the Russian Federation, which, according to the author's calculations, does not exceed 30%.

State and municipal ownership of public transport systems results in financial problems for three main reasons. The first problem is that not all taxpayers are necessarily potential clients of urban public transport organizations. Transportation systems often extend to urban areas, which cannot provide the necessary customer base for income.

The second is the need to plan the salaries of the personnel of transport organizations in close connection with the dynamics of its growth in other economic activities. The third problem is the insufficient economic efficiency of investment projects for the development of urban public transport services in cities with low population density.

The formation and development of urban land use, as a rule, should be ahead of the dynamics of public transport services. In this regard, planning for urban public transport stops, bus stations, major city terminals and their design, maintenance, including sanitation and safety are important.

Several characteristics determine the impact of land use on the development of public transport:

- availability. The sole purpose of the public transport stopping point is to provide access to the transit system, for example, stops along the bus route. Here, the impact of the land use regime for stop planning is minimal, since the waiting time of the vehicle is not significant. As transit traffic increases and urban mobility increases, accessibility already has a greater impact on local land use to create a more enabling environment for public access to transit lines;

- convergence. As a rule, convergence refers to more important transit stops, in particular, local bus stations, large tram interchanges and metro stations, with terminals that include waiting areas and the provision of additional services. The station is often a transit point of convergence of local traffic for different types of urban public transport. In this case, the effects of land use on transportation services range from parking, office space to catering and retail services. Such urban public transport stations should take into account the nature and extent of passenger traffic;

- integration. Currently, large multi-level urban passenger terminals for modal transportation are being developed. The terminal, in this case, is a central place with a special land use regime, which means the interaction of municipal and commercial use of the territory. There are various levels of integration from simple cooperation between government and business, to the formation of a private-state (municipal) partnership for the joint use of the territory where transit is dominant.

Nevertheless, there is a strong prejudice against the development of urban public transport due to the negative perception of collective travel. Personal mobility is a symbol of status and economic success, so public transport users are perceived as the least successful segment of the population. This shift in concepts can undermine the image of even efficient and high-quality public transport services among the general population.

7. Conclusion

An important trend in the evolution of transport and urban spatial forms is the agglomerated and compact region of the city center. So, many modern cities inherited urban form from the dense urban cores of the center. However, at the other end of the spectrum you can find dispersive urban forms that have been created recently and are associated with a high level of motorization. City ports, airports, railway and bus stations play an important role in the economic viability of the population, state, municipal and commercial organizations, as well as in urban spatial structures, as centers of attraction and distribution of traffic flows.

The evolution of transport and transport technologies in general has led to changes in urban spatial forms. In the past, traditional production depended on the availability of centralized jobs, transport and technological factors, and modern production, shopping and office centers, transport and logistics centers are located in suburban areas due to the lower cost of construction and rental. Thus, urban spatial structures have moved from nodal to multi-nodal forms, which has led to the development of the city and the formation of new ties with regional and global economic actors.

Different parts of the city have different development dynamics depending on its spatial structure. These changes took place in accordance with various geographical and historical processes. Two processes had a significant impact on the formation of modern urban spatial structures: a dispersed model of urban development and decentralization of life. This led to two opposite effects. First, travel time remained relatively stable in duration. Secondly, communication, as a rule, was carried out by road, and not by public transport. Most transit roads and infrastructure systems have been designed to facilitate traffic between suburbs and cities rather than between suburbs. As a result, suburban highways were less congested than city highways.

The area of cities allocated to transport is often correlated with the level of mobility. Before the automobile era, about 10% of urban land was in transport, and roads were intended for pedestrians. As the mobility of people and goods increased, the share of urban areas for transport and its infrastructure increased. Large changes in the spatial forms of urban transport are observed between different cities, different parts of the city, central and peripheral areas. The main components of spatial forms of urban transport are pedestrian zones, roads and parking lots, bicycle paths, transit public transport systems, transport terminals (ports, airports, metro, road and railway stations, etc.). For example, many transit systems, such as buses and trams, have significantly reduced the share of road space in other modes of transport, resulting in the creation of bus lanes either on a permanent or temporary (rush hour) basis.

The spatial significance of each mode of transport varies depending on a number of factors, of which density is the most important. If density is considered a gradient, then mobility rings are changes in spatial values for each transport mode in providing urban mobility. In addition, each mode of transport has unique performance and characteristics of the space used.

The most illustrative example is a car that requires space for movement (part of the road infrastructure), but also uses a significant part of urban space for stationary accommodation. Thus, a large area of urban space should be allocated to accommodate the car, when it is economically and socially useless. In large urban agglomerations, almost all free parking spaces on the street and areas of medium and higher density are occupied during the day. In the cities of Western Europe and the central regions of

the Russian Federation, roads account for 10 to 20% of urban space, while in other developing countries this figure is about 6%, but it increases rapidly due to motorization.

Urbanization, among other things, is characterized by increased travel in urban areas. Cities traditionally respond to the growth of mobility with the development of vehicles, spatial forms and infrastructure. In the developed countries of the world, urban spatial structures based on a car are divided into four main types: fully motorized is, which depends on the number of personal vehicles of the city's population; a weak center where many vital activities are located on the periphery; A strong centre with a high density of urban centres with a well-developed public transport system; a network with limited traffic, mainly in the city center and during peak hours.

The further development of urban public transport services is hampered by a number of problems. Thus, cities are territorial entities with a high level of accumulation and concentration of economic activity and complex spatial structures that are supported by urban transportation systems. The larger the city, the higher the complexity and potential for disruption in the urban public transport system, especially with low efficiency of municipal administration. The most important problems of the development of municipal transport are often related to urban areas of the population and occur when transport systems, for a number of reasons, cannot meet the many requirements of urban mobility. Urban economy largely depends on the effectiveness of its transport system for the movement of passengers and goods on various types of urban transport and routes.

Thus, the rapid development of cities occurring in many countries of the world entails an increase in the number of passengers and cargo moving in urban areas. Transport is usually carried out over long distances, but experience shows that over the past hundred years, the average travel time has changed slightly (from 1 to 1.2 hours per day). This means that users of transport services have gradually moved to faster modes of transport and, therefore, the same distance can be covered faster. More efficient vehicle and infrastructure technologies have been put into practice, resulting in a wide variety of urban transport systems in the world. Developed countries have undergone three major urban development periods, each involving a special form of urban mobility (walking, horse-drawn transport, electric transport, road transport).

In the scientific literature, mobility is considered in the social aspect as a problem of equity. The share of cars in city trips varies depending on the urban spatial form, the social status of a citizen, his income, the quality of public transport services and the possibility of parking. Public transport is accessible to social groups such as students, the elderly, and low-income citizens. There are significant differences in mobility based on age, income, gender and health status.

Public transport and municipal transport and road infrastructure play an important role in the development of modern cities. Public transport significantly improves the quality of life in urban agglomerations, providing safe, efficient and economical passenger service. Public transport serves both the individual interests of individual citizens and the collective interests of the entire population of the city, increases personal opportunities and ensures personal mobility. Public transport and urban transport corridors are natural focal points for the city's population, ensure economic and social efficiency of life, and contribute to the creation of strong regional centers that are economically stable, safe and productive. When passengers use public transport for travel, their contacts with others become closer and more communicative, and dependence on cars decreases, which contributes to an increase in the level of physical

activity. Public transport provides savings in public costs, including current and one-time. According to the author's calculations, each ruble invested in public transport projects brings about 6 rubles of economic effect, and every 10 million rubles invested in public transport bring an annual income of 30 million rubles. It is believed that real estate (residential premises, commercial buildings and offices), which are serviced by public transport, is valued higher than its similar types that are not accessible for public transport. Urban passenger transport contributes to state and municipal economic growth, increases the local client base for a number of services (retail, catering enterprises, medical institutions, educational institutions, household services, etc.) (Mintz et al., 2018). This mode of transport revives areas of residence, increases social interaction and pedestrian activity, increases safety, and also helps create a feeling of comfortable living conditions. Thus, it is believed that by 2025, 20% of the population of developed cities will be over 65 years old, and many of them will not be able to drive personal cars, which is an additional driver of the growth of public transport services. All the discussed trends and factors of the formation of the urban transport environment determine the relevance of the study of the state and prospects for the development of Russian urban public transport at the municipal level of the national economy.

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