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PUBLIC TRANSPORT SYSTEM IN THE FUNCTION OF LAND USE

Key Words
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Abstract

The relationship between land use and transport is complex. Together they form a dynamic system and interaction in the urban environment or at the city level through urban areas and beyond. Land use is also difficult to quantify. In general, the area of land use in sustainable development represents different characteristics such as distance from the city centre, size of settlements, land use, provision of local facilities, development density, proximity to transport networks, the shape of settlements and urban form. The attractiveness of a part of the city will greatly influence the decision to accept living in it. In addition, the connection with the city centre or other important contents by public transport lines is of great importance. This paper discusses the importance of the impact of Urban Public Transport on the development of a particular settlement or part of the city, ie to what extent it will contribute to the increase (decrease) in the prices of housing units and construction land.

1. INTRODUCTION

Public transportation is crucial for the future of a nation. Strengthens the economy, conserves energy and resources, reduces congestion, reduces global warming and improves air quality and health, critical assistance in emergencies and disasters, increases the value and development of the real estate, mobility in small urban and rural communities, greater access for groups of all ages and circumstances, lower health costs… - all this contributes to a better quality of life. In 2005, U.S. residents made 9.7 billion trips by public transportation [1]. From 1995 to 2005, travel by public transport increased by 25% [2].

Also, public transport is extremely important for the transport system of a country and essential for the economic and social quality of life of citizens. New information technologies warn passengers via e-mail or mobile phone when the next bus or train arrives. People plan their trips over the internet. It helps everyone, families, students, retirees, people with disabilities, while trying to accomplish their jobs, meet daily needs and maintain a high level of traffic independence.

At the beginning of the paper, a brief overview of the importance of public transport in certain areas of life is given. The second chapter deals with the importance of housing near the public transport system and the impact on the environment. The connection between land use and public transport is presented in the third chapter, in which important scientific papers on this topic are highlighted. Also, the consequences of increased costs on the population and households, in general, are explained. The fourth chapter discusses the key elements of the functional relationship between public transport and land use.

2. THE IMPORTANCE OF HOUSING NEAR THE PUBLIC SYSTEM

Expanding the public transport system is a significant undertaking for any region. For residents and businesses for whom accessibility is important, such investments can also substantially redistribute the value of a location within a part of the city, making the area more or less desirable than before due to its proximity to the public system. The value of a residential location is best reflected in how much people are willing to pay to live there!

A place of residence located near public transportation should dictate a higher rental price or selling price than that housing unit located further away. In theoretical terms, the reduction in travel time should be reflected in the value of the property price.

The relationship between the physical environment and the role of planning, design and management is reflected in the creation of a safer community. But the benefits of living near a system or public transport line can be greater. In addition to lower transportation costs, the ability to travel within a large metropolitan area and avoid traffic jams is highly valued by some. Others are attracted by commercial and entertainment facilities that are often sorted by transit stations and busy roads.

Today, a large number of technical, regulatory, planning and other possibilities are available to reduce the negative impacts of urban transport on the environment. A

successful public transport system generates significant economic value for cities because it improves the accessibility of the gravity area of the stop. There is a great need to maintain the benefits of public transport in terms of emissions and energy consumption as these are key factors in further promoting its use.

2.1. Evaluation of the impact of the public transport system on the environment

Research has shown that users are prepared to pay more for housing located in areas that represent new urban principles or are "traditional neighbourhood developed." These settlements are passable, of higher density, and have access to jobs and facilities.

Tu and Eppli (2013) found that buyers would pay 4.1 to 14.9% more for housing in new urban areas. In another study, the authors found that households were prepared to pay more for homes in settlements with a better-connected street network, smaller blocks, pedestrian access to commercial facilities, and proximity to the Light Rail System (LRT).

3. RELATIONSHIP BETWEEN LAND USE AND PUBLIC TRANSPORT

Boarnet and Crane (2001) found that the relationship between land use and transportation is very sensitive to the choice of empirical methodologies [3]. Different land use characteristics are often interrelated. For example, historic areas with large populations tend to be located near city centres in areas with good public transportation. The relationship between land use and transportation is further complicated by the close connection of both elements with several socio-economic factors, such as owning a car and income, which are interrelated [4].

Land use has the greatest impact on the daily travel of residents living there. The higher the density of the city, the higher the demand for public transport in terms of timetable, but also the shorter the length of the trip. It should be recognized that a factor such as high housing density tends to be associated with lower household incomes, while low housing density is associated with high incomes [5]. In addition, low incomes are associated with a low rate of car ownership.

3.1. Consequences of increased costs for population and households

The cost of investment in access roads and communal infrastructure is two to five times higher in fragmented than in compact settlements (Figure 1). While cities and settlements with compact structure and multi-storey buildings have on average 0 to 60 housing units/ha and road lengths of about 5 to 20 m per housing unit, the mentioned average in dispersed settlements is significantly lower and amounts to 0.4 housing units/ha, and 5 to 50 m of road length per housing unit [6].

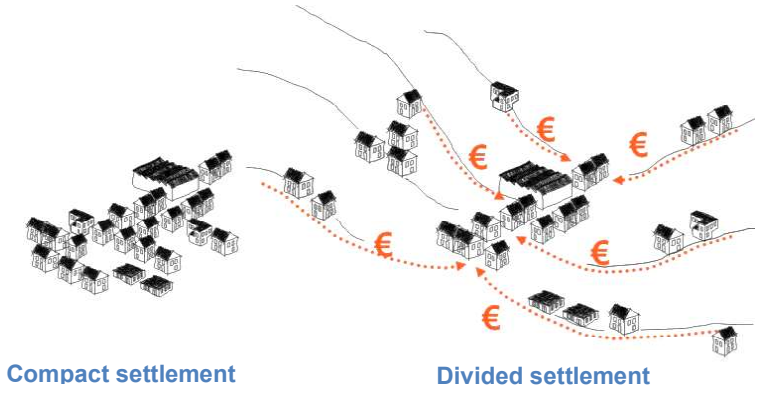

Figure 1. The cost of an inefficient settlement system [7]

Inefficient spatial planning increases the costs of the population and households, which are reflected in:

- Needs to own and use a car for transport purposes;
- Constant increase in mobility costs;
- Lack of quality transport services for the elderly and other vulnerable groups.

4. PUBLIC TRANSPORT SYSTEM IN THE FUNCTION OF LAND USE

In general, transport affects the availability of land for development and the spatial distribution of economic activities. This has an impact on land price, housing affordability, operating costs, productivity and, ultimately, economic performance.

Urban areas require a well-functioning transport infrastructure, so that traffic can contribute to increasing value by allowing better-located land to often reach its highest value [8].

By linking transport to land use, it is possible to make the urban area more efficient, thus enabling greater economic development. Traffic infrastructure determines how many people can reach a location based on a given area of space and set infrastructure, including individual modes of transportation.

Traffic infrastructure has the potential to change the geography of urban areas, affecting the degree of separation between locations [9]. The efficiency of transport networks enables greater availability and density of development, which creates economic benefits.

The expansion of the Manchester Metro will have many benefits in central Manchester through an increase in house prices along the route. It allows for an increase in jobs in central Manchester, and housing values have risen by as much as 5.4% within a 1-mile radius around the station [10].

Similarly, APTA found that U.S. homes value 41% more when they are close to quality public transportation. People living near public transportation have access to up to three times the number of jobs per square mile.

By attracting investors and tenants, affordability can influence the nature of urban form and future development [11]. Traffic infrastructure is directly related to land use, where some users require more space than others. Where public transport is not available or adequate, people are forced to travel by car, thus complicating the initial problem of traffic congestion and placing increased demands on transport space.

Many places have tried to follow the examples that come from Scandinavia, where the planning policy helped to achieve 80% of the trip without using a passenger car. TfQL (2011) [12] tells that the link between transport and urbanization should be a central policy decision to enable more efficient sustainability of cities. The importance of putting traffic planning at the centre of events is increasingly recognized to achieve several policy goals, including increasing economic competitiveness, improving quality of life, reducing traffic congestion, lower transportation costs, improving air quality, and reducing the cost of providing various services.

„Transport for London" developed a tool to evaluate and evaluate elements of transport interventions. Plans that encourage the transition to active modes and public transport have been found to have a positive impact on land value. This principle was applied to the recent Crossrail project in London with 190,000 square meters of space, improving the environment and creating 1,335 new parking spaces for bicycles. Reducing car dominance, Crossrail enables the development of a modern urban area and is estimated to generate a 10% increase in real estate value, adding £ 5.5 trillion to real estate on the route by 2021 [13].

4.1. Use of public transport

The use of public transportation in the United States in 2013 increased to 10.7 billion trips - the largest number in the last 57 years. However, this increase in the number of public transport trips can be attributed to the increase in the number of subway passengers whose route is most often located in an extremely urban area. The number of Light Rail, Tram, and Bus passengers has increased, but much more slowly, or even declined, over the past decade (Figure 2) [14].

More than half of Americans live on the periphery of cities. Approximately 75% of the population since the post-war construction has moved to the suburbs. Many suburbs have created "urban pockets" by building high-quality public transportation to ease traffic congestion and build mixed-use or high-rise buildings instead of multiple single-family homes.

William Frey, one of the most prominent demographers in the United States, wrote that the difference between cities and suburbs is falling apart. He believes that the suburbs are becoming diverse ethnic, socio-economic spaces, with more housing and sales options near offices, flexible and other space. He also states that the benefits of cities are reflected in [14]:

– More than 10% of global GDP growth by 2025 will come from major cities in the US;
– 80% of the US population lives in large cities, compared to 60% of the population in Europe.

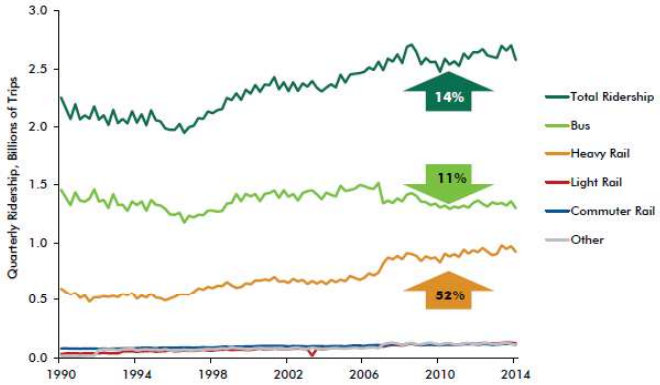

Figure 2. The ratio of the number of transported passengers to different modes of transport

The accelerated growth of the suburbs of Melbourne creates a significant backlog of the required expansion of the public transport network. BusVic from 2011 estimates that 43% of suburban settlements, which developed between 2004 and 2009, are beyond the reach of the existing network of public transport lines - namely: 400 meters from the bus or tram line or 800 meters from the train station [15]. In some cases, entire suburbs are beyond the reach of public transportation.

5. CONCLUSION

The place of residence located near the route of the public transport line should determine a higher rental price or sale price than the housing unit that is further away. In theoretical terms, the reduction in travel time should be reflected in the value of the real estate price. The general impression is that the benefits of the availability and proximity of housing in the gravitational area of the public transport line outweigh the potential side effects, leading to higher facility values in many cases.

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