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HOW TRANSPORT ACCESS AFFECTS HOUSING PRICES



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Abstract: The construction of subways has an external impact on the urban environment. Among these effects, the most significant is the increase in housing property values near subway stations. Tashkent, the largest commercial and capital city of Uzbekistan, is selected as the subject of this research due to its unique characteristics. The Hedonic Pricing Model (HPM) is employed to analyze changes in property values within a 1,000-meter radius of completed subway stations. Utilizing land rent and land location theories, along with a model assessing the impact of urban transport on surrounding real estate prices, this study investigates Tashkent's influence zone on property values. The paper concludes by emphasizing the significance of urban development and subway construction and proposes that development strategies should vary based on the characteristics of subway networks in different parts of the city.

Key words: urban environmental effects, housing property values, Hedonic Pricing Model (HPM).

INTRODUCTION

Although ancient cities in Uzbekistan date back 2.5–3 thousand years, the process of urbanization began much later. This process can be divided into several historical stages, with the final stage occurring in the 1980s, when only 42.3 percent of the population resided in cities. Over the next two years, this figure dropped to 40.4 percent, and the downward trend continued until 2009. One reason was the slowdown in internal migration; another was that the natural growth rate of the urban population was 1.5 times lower than that of rural areas.

In 2009, due to the predominance of the rural population, the Cabinet of Ministers adopted a resolution titled "On Improving the Administrative-Territorial Structure of the Republic of Uzbekistan"¹, aimed at introducing urban lifestyle, culture, and infrastructure to rural regions. As a result, 965 villages were granted "small city" status. Consequently, the urban population increased from 9.6 million in 2008 to 14.3 million in 2009, raising the urbanization rate to 51.7 percent. In recent years, the degree of urbanization has slowed and stabilized at around 50.6 percent, ranking Uzbekistan 147th out of 218 countries worldwide.²

According to statistics, the population of Tashkent has reached a record high of 2.5 million people. This surge in population has led to increased use of transportation, resulting in several urban challenges such as traffic congestion, environmental pollution, and an energy crisis. As the capital and most populous and

¹ <https://lex.uz/ru/docs/6907415>

² According to the level of urbanization of the countries worldwide, published by Department of Economic and Social Affairs, UN 2019

developed city in Uzbekistan, Tashkent is facing significant traffic problems that cause major disruptions in daily life. In response to these issues, the Committee for Roads under the Ministry of Transport of the Republic of Uzbekistan reported that in 2020 it invested 517.7 billion UZS in road construction and reconstruction, which is 103.3 percent of the previous year's performance. This indicates that traffic congestion is becoming a critical concern in urban areas. To mitigate the severe traffic burden, Tashkent has increasingly invested in the construction of multiple subway lines. The metro plays an essential role in enhancing mobility for residents. Currently, four subway lines are operational, spanning 51.4 kilometers and comprising 38 stations. According to national statistics, the average daily ridership of the Tashkent metro has reached 180,000. However, between 2015 and 2017, annual passenger targets of 167 million were not met possibly due to poor service quality and scheduling delays. Several other factors also discourage metro usage. In the 21st century an era of digital connectivity passengers lose mobile service during subway rides due to the underground nature of most lines, with some rides lasting nearly an hour. Although the metro system generates significant daily revenue for the government, efforts to modernize its technological infrastructure have lagged. Tashkent metro still operates Soviet-era trains from the 1980s that lack noise insulation, making the environment uncomfortable for passengers. Furthermore, until 31 May 2018, photography in metro stations was prohibited, as they were designated military facilities due to their secondary function as nuclear shelters. However, from 1 June 2018, the newly elected president lifted the ban, and photography is now permitted inside the subway system.

Table 1. Population growth in Tashkent 2015-2020.

	2015		2016		2017		2018		2019		2020	
	Total		Total	growth	Total	growth	Total	growth	Total	growth	Total	growth
Tashkent city	2,371.3		2,393.2	100.9	2,424.1	101.3	2,464.9	101.7	2,509.9	101.8	2,571.7	102.5
Uchtepa	252.8		255.3	101.0	257.8	101.0	262.7	101.9	265.7	101.1	273.3	102.9
Bektemir	31.0		31.4	101.3	32.4	103.2	33.0	101.9	34.3	103.9	34.9	101.7
Yunusabad	312.8		315.6	100.9	319.8	101.3	325.0	101.6	330.7	101.7	339.2	102.6
MirzaUlugbek	260.9		262.2	100.5	264.6	100.9	267.6	101.1	270.9	101.2	274.6	101.4
Mirabad	129.5		130.6	100.8	132.3	101.3	134.5	101.7	136.3	101.3	138.8	101.8
Shaykhantakhur	314.5		319.4	101.6	325.0	101.8	330.0	101.5	337.7	102.3	342	101.3
Almazar	337.4		341.8	101.3	347.2	101.6	352.7	101.6	359.1	101.8	365.6	101.8
Sergeli	165.9		168.2	101.4	171.0	101.7	175.8	102.8	181.4	103.2	192.8	106.3
Yakkasaray	115.0		115.1	100.1	115.7	100.5	117.5	101.6	118.7	101.1	119.6	100.8
Yashnabad	219.4		220.3	100.4	222.3	100.9	226.6	101.9	230.9	101.9	242.3	104.9
Chilanzar	232.1		233.3	100.5	236.0	101.2	239.5	101.5	244.2	101.9	248.6	101.8

Since 2018, three major construction projects have been underway, including the development of a new "Sergeli Line" with a length of 7.1 kilometers, and a ring-shaped line encircling the city to connect all four existing lines. The construction of the subway not only transforms the city's original locational advantages and disadvantages in its layout, but also significantly contributes to the appreciation of nearby residential properties and alters the vertical structure of housing prices. Tashkent remains the only city in Central Asia with a subway system, and it continues to upgrade its transportation infrastructure by adding new lines. These developments are not only improving travel convenience but also influencing neighborhood preferences and housing values. Given these facts, this paper examines the impact of various factors such as proximity to business districts, parks, emergency hospitals, and subway stations on property values, using the Tashkent Metro as a case study. Furthermore, by quantifying the effect of subway stations on housing prices, this paper proposes development strategies for urban transportation in Tashkent.

LITERATURE REVIEW

The inauguration of subway lines has significantly improved residents' mobility, transportation efficiency, environmental quality, and overall daily life across the globe. Subway accessibility is often a key factor in residential location choices. This subject has been the focus of international researchers since the 1970s. One of the earliest studies, conducted by Boyce et al. in 1972, offered a preliminary examination of transit-related effects on suburban property values. Damm et al. focused on how urban property values responded to the anticipated implementation of Washington D.C.'s heavy rail system. Stegman developed a computational model to analyze the relationship between residential property values, location, and traffic costs.

Over the past five decades, a substantial body of empirical research has explored the relationship between rail transit infrastructure and property values along subway corridors. Tang et al. reported that the introduction of light rail systems led to a 32.1% increase in housing prices near subway stations. Shanjun Li et al. (2015) found that reducing the distance to a subway station by one kilometer increased property values within a 3-kilometer radius by 15%, and by 3.4% for properties located 3 to 5 kilometers away. Gatzlaff (1993) investigated the Miami Metrorail's effect on nearby residential property values using repeat-sales indices and hedonic regression methods. The results suggested that property values were only weakly affected by the announcement of the new system. Following the opening of its Red Line in 1997, Taipei's subway system attracted considerable research interest. Jen-Jia Lin et al. (2003) analyzed property prices before and after the subway's inauguration, concluding that subway openings significantly influenced hedonic prices based on floor space, building age, and proximity to public amenities such as schools and parks. Moreover, the impact varied across submarkets depending on construction stage, urban location, property distance from stations, zoning laws, and building type. In Warsaw, Radoslaw (2016) found strong evidence that the planned M2 subway line influenced apartment prices even prior to completion. Increased distance to a subway station corresponded to decreased housing prices—from -2.5% per km in 2008 to -3.0% per km in 2015. Juhana et al. (2015³) found that a new subway station in the Helsinki metropolitan area influenced property prices within at least a 400-meter radius. The average increase in residential apartment values was 11–15%, with a total estimated impact of €122–193 million in the studied region. This transit-driven price effect boosted municipal revenues from property taxes by nearly 10%.

Large numbers of studies have provided evidence of the positive value impact of a new transit line on residential properties (Boucq, 2007; Hess & Almeida, 2007; Landis, Guhathurta, Loutzenheiser, & Zhang, 1995; Voith, 1993), commercial properties (Cervero, 1996; Cervero & Duncan, 2002; Nelson, 1998), or population growth (Vaturi et al., 2011). The volume of the impact can be differentiated even in studies reporting significant positive effects. For instance, Pickett and Perrett (1984) found that there was an average increase of 1.7% in the values of properties near the newly opened Tyne and Wear Metro stations in the UK. Voith (1993) concluded that the properties with access to the Lindenwold Line in Philadelphia had a price premium of 6.4%. Armstrong and Rodriguez (2006) estimated a spatial hedonic price function and found that the commuter rail service in Eastern Massachusetts raised the single-family residential property values by 9.6%–10.1%.

Meanwhile, some scholars have performed comparative studies on the influences on surrounding properties caused by rail transportation, based on different time and spatial conditions. Im and Hong (2017) examined the willingness to pay for the benefits of improved accessibility to public transportation with an empirical analysis of the change in housing unit prices, both at the time the construction decision for Daegu Subway Line 3 was made and when the subway operation started. Kim et al. concluded that the farther the distance from subway stations, the greater the decrease in property prices. The results of Kirsikka Riekkinen et al. (2015) showed that a new subway station has an impact that reaches at least 400 meters in most surroundings, with the impact on residential apartment values averaging 11–15%, and the total impact in the studied area estimated at approximately 122–193 million euros. Armstrong and Rodriguez (2006), using data from 1,860 single-family residential housing units from four municipalities with commuter rail service and three without, estimated local and regional accessibility benefits of commuter rail services in Massachusetts and found that proximity to commuter rail right-of-way indicated a negative effect on property values.

Having begun its operation in 1974, the metropolitan railway system of Korea has experienced significant development during the last two decades, and research around its impact has also flourished. A large number of research studies on how property values are influenced by transportation have emerged. It is widely believed that the convenience of transit has a positive effect on the increase in land prices.

As a leader in rail transportation systems, China's subway systems have attracted numerous researchers to conduct studies. During the 1990s, many research proposals were published aiming to determine the correlation between transportation accessibility and property prices. An analysis of these research proposals

3 "The Impact of a New Subway Line on Property Values in Helsinki Metropolitan Area", Juhana HIIRONEN, Kirsikka RIEKKINEN and Hanna TUOMINEN. 2015

shows that the main direction has been to study the degree of impact on housing unit prices caused by the construction of rail transit in various cities from an empirical perspective. The main finding is that traffic is an important factor affecting land values. However, due to differing levels of economic maturity, urban planning, and infrastructure development, the extent to which the development of rail transportation influences property appreciation varies.⁴ The Tashkent metro system is the only subway system in the country and, compared to world standards, it has remained underdeveloped over the years. However, Tashkent has expanded its territory several times, and the number of motor vehicles in the city has increased dramatically. As a result, the need for eco-friendly transportation systems has become vital. The first step toward a solution was the extension of existing lines; the next is the construction of a more convenient circular subway line to connect all lines and cover most of the city. With reference to the methods used in previous studies, this paper focuses on the degree of influence on the value of residential property near subway lines, considering both completed lines and those under construction in different areas of Tashkent.

RESEARCH METHODOLOGY

The value of a housing unit is based on what willing clients in the market are prepared to pay for the home, but every buyer is different. For example, one family might prioritize location factors such as schools and job proximity over the size and condition of the home. In order to determine the factors used in this paper, it is important to review the elements considered around the world as affecting housing prices.

Many housing markets are highly geographical. For instance, national house prices may be falling, but certain areas (e.g. London, Oxford, Tashkent) may still experience rising prices. Desirable areas can buck market trends due to high demand and limited supply. For example, houses near good schools or with convenient rail links may carry a significant premium compared to other locations. Any property might be ideal for a specific individual – being close to their workplace or near their parents – but appraisers determine location value based on three primary indicators:⁵

- The quality of local schools

- Employment opportunities

- Proximity to shopping, entertainment, and recreational centers

These factors explain why some neighborhoods command high prices, while others just a few miles away may not. Additionally, proximity to highways, utility lines, and public transit can all impact a home's overall value. When calculating a home's worth, location may be more important than even the size or condition of the house. The neighborhood is one of the most significant influencers of a home's value, contributing to both qualitative and quantifiable aspects of its appeal. For instance, school system quality is strongly correlated with home prices. While it remains debated whether home prices influence school investment or vice versa, it is clear that school quality significantly impacts property values.

When estimating a home's market value, size and usable space are crucial elements, as larger homes typically result in higher valuations. The price buyers are willing to pay per square meter can vary significantly. Livable space is most important to both buyers and appraisers. Bedrooms and bathrooms are particularly valued – the more a home has, the higher its general worth. Traditionally, Uzbek families are known for their hospitality, making extra bathrooms and bedrooms a top priority when considering a place to live. However, these trends are highly local-specific. Due to the lack of national research papers covering this topic, only international methodologies have been utilized in this paper. The Hedonic Pricing Model (HPM) is the main method used in this article. Commonly applied in housing market studies, the HPM identifies price determinants based on the premise that a product's price is influenced by both its internal characteristics and external factors. According to the HPM, housing unit prices are determined by the combination of functional characteristics provided by a property and the external environment.

In simple terms, any change in the quantity or combination of these factors can influence the price of a housing unit. It is also widely assumed that the distance to subway stations can be a determining factor for the HPM to assess. Given the constant variation in housing values, a quantitative analysis of influential factors can be performed using Multivariate Regression Analysis combined with the HPM.

Variables for the model. Price per square meter was selected as the dependent variable, as construction firms usually state prices based on this unit. Independent variables were selected using classical methods from previous research on the subject. For simplicity, the factors were grouped into three categories: accessibility, neighborhood, and structure. Table 2 describes the variables identified as the most influential in determining housing unit prices.

4 The Impact of Subway Lines on Residential Property Values in Tianjin: An Empirical Study Based on Hedonic Pricing Model Hui Sun, Yuning Wang, and Qingbo Li, 2016

5 <https://www.inman.com/2017/08/07/6-factors-that-influence-a-homes-value/>

Table 2. Description of variables for modelling residential property values.

Categories	Variables	Description
Accessibility	Distance to city center	Straight-line distance to the crossing of Tashkent City amusement park (km)
	Distance to closest open market	Straight-line distance to open grocery market (km)
	Distance to closest subway station	Straight-line distance to subway station (km)
Neighborhood	Distance to closest park	Straight-line distance to park (km)
	Distance to closest hospital	Straight-line distance to first-class hospital (km)
	Distance to key schools	Straight-line distance to key primary school or middle school (km)
Structure	Green area ratio	Ratio of green area to total area
	Floor area ratio	Ratio of total building area to total area

The factors listed in Table 2 were selected as those with the greatest influence on changes in property pricing. In this paper, the most important and fundamental factor affecting property value is location. The distance to the Central Business District (CBD) reflects how much a property is influenced by its proximity to the city center. To a certain extent, this defines the property's main economic and sociocultural positioning. Additionally, traffic is one of the key components of location. Convenient transportation can significantly alter a property's relative accessibility and, thereby, affect its economic and sociocultural appeal.

Among different modes of urban transit, the construction of subway lines substantially impacts the commuting patterns of nearby residents. The closer a property is to major transit arteries; the more alternative travel options are accessible. Consequently, residential units in such neighborhoods benefit from improved connectivity, which contributes to the appreciation of housing values in these areas. Tashkent, however, serves as a poor example of a franchised modern urban area. The lack of franchised businesses makes the city center a particularly attractive destination for consumers from across the city. Urban centers, in contrast, attempt to fill this gap by offering a variety of facilities for local residents.

Table 3. Statistical highlights of the variables.

Variables	Average	Standard error	Maximum	Minimum
Price per sq.m	9.940	0.192	18.5	6
Distance to subway	0.631	0.019	1	0.1
Distance to city center	4.791	0.133	10.3	0.2
Distance to open market	1.007	0.032	2.1	0.25
Distance to school	1.079	0.061	3.5	0.13
Distance to hospital	1.294	0.055	3.2	0.12
Distance to closest park	1.815	0.064	3.8	0.2
Number of floors	9.403	0.221	25	5
Floor	4.864	0.209	19	1
Floor area ratio	5.929	0.124	11.66	1.1
Green area rate	0.351	0.011	0.9	0.122
Underground parking	0.587	0.034	1	0
Security	0.582	0.034	1	0

Tashkent was the first city in the country to implement delivery services. However, regarding online grocery shopping, Uzbekistan remains underdeveloped. There is currently no dedicated platform for online product delivery, meaning households still need to physically visit shopping facilities. Uzbek consumers generally prefer to purchase household goods—especially food products—in person. Often, families reserve their entire Sundays for shopping. Given the limited number of large, open-air market facilities across districts, proximity to such markets plays a significant role in residential settlement patterns.

To address this issue, this paper introduces a new variable to the field of housing research: distance to the nearest open market. Accordingly, key variables affecting accessibility for housing units near subway stations

include: distance to the city center, distance to the closest subway station, and distance to the nearest open market.

On the other hand, research shows that 15–50% of housing unit prices are driven by neighborhood variables.⁶ These may include government-provided service facilities, schools, hospitals, parks, and major commercial centers. As government schools have recently lost their educational reputation due to attempts to adopt foreign practices, the demand for private elementary schools has increased dramatically. These non-governmental educational institutions not only began to emerge in Tashkent but also attracted considerable public attention. As a result, the quality gap between public and private schools has widened. Families with school-aged children now find it reasonable to relocate in order to access higher-quality schools, especially since some key schools require residency within specific district boundaries. Although this trend is still in its early stages in Tashkent, the distance to key schools is becoming an increasingly important factor in housing price formation. Despite the government's efforts to construct local healthcare facilities in each city block, specialized hospitals remain scarce. While Tashkent consists of 11 districts, most specialized hospitals lack branches in each of them, making proximity to top hospitals another significant variable for this study.

Tashkent is home to approximately 2.5 million residents from various religious backgrounds. Religious facilities, therefore, also play a meaningful role in housing decisions. Islam being the dominant religion in Uzbekistan, families with elderly members often prefer living near mosques, as elderly individuals frequently attend neighborhood prayer facilities. However, due to the lack of available data on buyers with elderly Muslim members, distance to the nearest religious facility was not included as a major variable in this paper. By incorporating foreign practices into the construction sector, multi-unit buildings have introduced a new trend in housing design, covering a slightly larger area compared to older models. This trend consumes more space and reduces open areas around buildings, reinforcing the demand for parks in residential neighborhoods. The presence of aesthetically pleasing parks that promote fresh air can increase the value of housing units located nearby. The floor area ratio and the greening rate are considered structural variables. As is well known, the floor area ratio is a key determinant of property price per unit area. For different properties, varying floor area ratios can lead to different average prices per unit area. At the same time, modern residents are placing greater emphasis on the quality of the residential environment. A pleasant living environment is a crucial factor in increasing housing prices. Therefore, the amount of green space associated with a property is one of the factors influencing its price. To expand on structural variables, this study includes two additional factors: underground parking and neighborhood security, treated as dummy variables. As in many developing countries, people in Uzbekistan are increasingly prioritizing safety. Residents desire secure neighborhoods that allow them to move about freely without fear. Recently, major construction firms such as Murad Buildings, Dream City, and Golden House have introduced safety measures like restricting access to housing areas to owners only, requiring unregistered vehicles to obtain authorization before entry, and installing 24/7 security camera systems (CCTV).

Data Source. The data used in this study were collected from actual property transaction listings on online real estate platforms, as well as directly by the author through real estate agencies representing construction firms. Since the prices of existing housing units are influenced by numerous unobservable factors, this research focuses exclusively on new housing units that are either under construction or currently being marketed. All data were collected between May and October 2020. The housing prices cited do not reflect final sale prices, as most construction firms offer various incentives and discounts to different customer segments.

The dataset consists of projects either under construction or already built but undergoing repairs. These housing units are not fully renovated or furnished, which helps reduce the impact of unobservable factors, thus making the dataset more reliable. Variables such as the distance to the nearest subway station, Central Business District (CBD), open markets, parks, first-class hospitals, and key schools were calculated using Google Maps and Yandex Maps. The floor area ratio and greening rate were obtained from relevant real estate data sourced directly from construction firms and real estate portals based in Tashkent.⁷

According to Y. Zhang (2012), the dominant concept is that urban subway lines influence neighborhood housing values within a 10–15-minute walking distance.⁸ An optimal pedestrian environment can extend this range to up to 800 meters. Given the inadequate frequency of intercity bus services, which has eroded public confidence in the bus system, it can be assumed that walking an additional 200–500 meters is often preferable to waiting in discomfort. Among the Tashkent population, a distance of 1.2 to 1.5 kilometers from subway stations is commonly perceived as convenient and can significantly affect housing prices.

6 P. Linneman, "Some empirical results on the nature of the hedonic price function for the urban housing market," *Journal of Urban Economics*, vol. 8, no. 1, pp. 47–68, 1980.

7 www.domtut.uz, www.uybor.uz

8 Y. Zhang, "Coherent network optimizing of rail-based urban mass transit," *Discrete Dynamics in Nature and Society*, vol. 2012, Article ID 960762, 8 pages, 2012.

ANALYSIS AND RESULTS

This paper employs the standard Hedonic Pricing Method (HPM). The selected variables—including housing prices, accessibility factors, neighborhood features, and structural characteristics—are categorized into dependent and independent variables. The hedonic pricing model is applied to estimate the extent to which each factor influences the value of a property. By controlling for non-environmental variables, any remaining differences in property prices can be attributed to external, environmental factors.

The hedonic pricing model is particularly suitable for property valuation as it utilizes actual market prices and robust, available datasets. Among its advantages is the ability to derive valuations from observable market behavior—especially useful in property markets with reliable data. The model is also flexible enough to accommodate relationships between market goods and various external factors.

HPM estimates the relationship between the dependent variable (price of a property) and a set of independent variables (its characteristics). For example, the price of a house can be represented using the following hedonic price function:

$$P = f(\text{Location, Type, Size, View, Neighborhood})$$

Here, the price of the house (P) is a function of its:

Location relative to the urban center (LOC),

Type of property (TYPE),

Size of the land or unit (SIZE),

View or scenic quality (VIEW), and

Neighborhood characteristics (NEIGH), including school quality, safety, and other community features.

A marginal change in any one of these characteristics results in a change in house price, referred to as the hedonic price—also known as the implicit price or rent differential. This value represents the additional amount a buyer is willing to pay for a marginal improvement in a given characteristic.

Most researchers assume that the hedonic price function takes a multiplicative (log-linear) form. This implies that as a certain attribute improves, house prices increase but at a diminishing rate. The functional form is expressed as follows:

$$P = \beta_0 + \beta_1 \text{Loc} + \beta_2 \text{Type} + \beta_3 \text{Size} + \beta_4 \text{View} + \beta_5 \text{Neighborhood}$$

In this equation, β_1 to β_5 represent elasticities, measuring the proportional change in price caused by a proportional change in each characteristic.

Hpm in semi-logarithmic form. In Equation (1), the model takes a semi-logarithmic form, where housing price is transformed using a natural logarithm, while independent variables remain in linear form. The regression coefficients thus indicate the percentage change in the housing price resulting from a one-unit change in the characteristic variable:

$$\ln(P) = \alpha_0 + \beta_1 \text{Acc}_i + \beta_2 \text{Neig}_j + \beta_3 \text{Str}_k + \varepsilon \quad (1)$$

Where:

$\ln(P)$ is the natural logarithm of the housing price,

α_0 is the constant term,

$\beta_1, \beta_2, \beta_3$ are the coefficients,

Acc_i denotes the i -th accessibility variable,

Neig_j denotes the j -th neighborhood variable,

Str_k denotes the k -th structural variable, and

ε is the error term (residual).

The dataset used in this regression comprises housing units located near subway stations. Before concluding that the semi-logarithmic form was most suitable for this model, the data were tested using both linear and log-logarithmic forms. Since the semi-logarithmic specification is widely adopted in the literature—particularly in studies examining the impact of subway systems on property values—this paper finds it to be the most appropriate form for analysis.

Model Results. Table 2 presents the results of a regression analysis on residential housing along subway lines in Tashkent. To further investigate the extent of influence that subway stations exert on residential property prices across different urban zones, a regional regression was conducted, distinguishing between urban centers and non-urban areas, based on a general regression model of surrounding housing. The average R^2 value for the full dataset is relatively low—approximately 0.6728. However, when the data is divided into two groups—urban areas (within 5 kilometers from the city center) and non-urban areas (more than 5 kilometers from the city center)—the R^2 values increase to 0.8147 and 0.7652, respectively. From Table 2, it is evident that proximity to subway stations significantly impacts housing unit prices. Citywide regression results show that the coefficient for distance to the nearest subway station is -0.138, suggesting that proximity to a station accounts for approximately 14% of a housing unit's price. In urban areas (within 5 km), the coefficient is -0.101, while

in non-urban areas, it is -0.189 . This indicates that for properties located 1 km farther from a station, prices decrease by approximately 18%. These findings suggest that housing units located more than 5 kilometers from the city center are more affected by subway accessibility than that closer in. This may be due to urban residents relying more on alternative forms of public transportation. Additionally, current housing market conditions can also influence property values. Like other economic assets, home prices are subject to supply and demand dynamics and may fluctuate with subtle changes in the regional economy.

However, in Tashkent, a persistent supply shortage near the city center—paired with consistently high demand—continues to drive up property prices. On average, housing unit prices in Tashkent are four to five times higher than in other cities across Uzbekistan. This is often attributed to the government's concentrated development efforts in the capital, while rural areas still suffer from issues such as unstable electricity and limited access to gas supplies. Upon comparing the degree of impact across different parts of the city, it becomes evident that housing units in urban areas benefit more from proximity to the city center than those in non-urban zones. This may be due to heavy traffic congestion near the center, making subway lines a more reliable means of transportation during daytime hours. The current layout of the Tashkent subway system does not yet fully connect distant regions directly with the city center, as some segments remain under construction or are not yet operational. Nevertheless, the existing sections already provide more efficient access to the city center compared to other public transit options.

CONCLUSION AND RECOMMENDATIONS

The Hedonic Pricing Model (HPM) is used to comparatively analyze the degree of influence and the characteristics of the influencing factors caused by subway lines on housing prices in urban center areas and non-urban center areas of Tashkent. The results of our analysis showed the following: the construction of a subway plays a significant role in promoting increases in surrounding land prices. By comparison, subway lines that have already been built have a greater influence on surrounding residential housing than lines that are being planned, since the exact locations of new subway stations are not publicly announced. The construction of subway lines has a greater impact on the marginal zones of the city (more than 5 kilometers away from the city center) than on the downtown area (within 5 kilometers). In non-urban areas, the prices of properties near stations show up to an 18% influence from subway stations. However, in urban center areas, the stations' impact on the distribution pattern of property prices is lower—around 10%, as is also observed in some non-urban areas. This may be because the influence of subway lines on housing prices is masked by the impact of other factors.

In addition to the distance to the nearest subway station, residents living in urban center areas may focus on factors such as the distance to the nearest park and key schools—which contribute 3% and 10%, respectively—as well as the condition of the surrounding landscape when choosing housing. This indicates that local residents pay more attention to comprehensive convenient transportation, the residential environment, and the degree of comfort.

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