



Research Article



Investigation of the Effect of Existing Transportation Network Opportunities on the Preference of Kayabaşı Mass Housing Area

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Abstract

In recent years, there is a need for renewal and improvement in existing settlements. In other words, urban transformation is due to many reasons, such as the increase in the population in cities, inadequacies in the social field, natural disasters, obsolescence, and desolation. Especially since Turkey is in an earthquake zone requires living in more reliable cities, it is tried to prepare a base for transformation by creating legal legislation that encourages urban transformation. In the regeneration process and improvement of these problematic areas of cities, integrated transportation planning is also crucial besides using the land. It is seen that the transportation network factors that are not planned in parallel with the urban transformation cause some inadequacies and problems in that city over time. When solutions to prevent these problems are not produced and taken into account, it becomes impossible to leave sustainable quality livable cities for the following years. Istanbul is one of the cities where urban transformation works are most intense, both in terms of seismicity and its increasing population. Therefore, every transformation activity should be planned and carried out considering the building and social life layers and transportation elements. Within the scope of this study, the urban transformation process in Kayabaşı District, which has undergone a rapid transformation process in recent years, has been examined with a survey in the context of transportation network opportunities and the effect of existing transportation network opportunities on the preference of the residents. While the survey content was being prepared, it was questioned why the residents living in this region preferred to live here first. Then the share of the existing and planned transportation network in preferences for the area was tried to be revealed. In line with the results, it has been proposed to increase the public transportation alternatives and timetables in the Kayabaşı region and make transportation from the mass housing to the public transportation stop points more accessible.

1. Introduction

Urbanization and the resulting urban growth have greatly influenced humans and the environment [1]. Urban development increases very rapidly with the increase in transportation network and services. Therefore, transportation and urbanization are inseparable pairs, and

both trigger and complement each other. In this context, it can be said that urbanization and transportation are concepts that affect each other in two ways. The expansion of transportation networks in any region and the increase in transportation services will encourage settlement. Urbanization studies that started in any region oblige transportation for that region.

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It is seen that there are many studies in the literature on urbanization, city, and transportation factors. In one of these studies, Urban Public Transportation Systems, Vuchic [2] suggested that topography, natural features, economy, and historical factors that shape urban settlements are the main features that affect the transportation network. In the same study, the factors affecting the urban form were examined under four main headings. The first of these is the geographical inputs that affect the city's shape that shapes its development. The second is population demographic structure and migration movements. Thirdly, the economic activities are shaped according to the population, conditions of the period, and the transportation and accessibility factors. In this context, factors such as inadequacies in transportation infrastructure, misuse of resources, neglect of public transportation are the leading causes of urban transportation problems [3]. For this reason, it is essential to consider the transportation issue together with the urban land use and to focus on this fundamental point when evaluating the transportation master plans [4].

On the other hand, Kisty and Lall [5] defined the relationship between land use and transportation possibilities as a successive cycle in their book Transportation Engineering. In this cycle, while taking land value and accessibility into land use, travel and transportation needs have also been included in transportation opportunities. Therefore, it can be said that every negative or positive development in travel and transportation needs affects land value and accessibility in parallel.

İlhan [6] conducted a study with the title of 'A Comparative Evaluation on Urban Transformation and Mega Transportation Projects': The Case of Istanbul, which was declared as an urban transformation area in the master's thesis, Ayazma, in the province of Istanbul, to examine the changing transportation habits in the transformed area and their effects on the city. Transportation habits were evaluated. In this context, İlhan [6] presents, to solve the traffic, which is a critical problem in Istanbul, and to live in a more livable environment, a set of suggestions has been created to prevent further urbanization in the following process and the implemented projects:

- Urban transformation etc. establishing a legal framework by fully determining the concepts by law, without leaving any gaps, in other words avoiding processes/implements that would allow amnesty,
- In addition to the improvement of physical structure in transformation areas, social conditions of people living in the area are also improved,
- Analyzing the current situation of transportation connections in transformation areas and making future predictions based on these data,
 - Forest, 2B, etc., which are likely to be settled due to transportation projects. Ensuring the protection of lands,
 - Directing people to public transportation rather than using individual vehicles, and for this, fee improvements of existing public transportation lines, new routes, additions of hours, etc. to be made,
 - Ensuring the efficiency of the transportation system by increasing the connection with other transportation

networks by making arrangements on the existing transportation lines,

- Carrying out studies to reduce the densities of construction in areas with increased transportation capacity,
- Accessibility of public transport for all,
- By restricting the access of individual vehicles to the central areas where there is a high density, it can be ensured that public transportation is allowed to enter these areas.

From another point of view, the increasing number of vehicles on rural roads as a result of population growth has led to one of the most critical problems of the transportation system, namely traffic accidents, which affects the economic and social situations of the people [7]. Mahani et al. [8] stated in their study using the Kolmogorov–Smirnov test in Gilan Province, Iran, that most traffic accidents result from car-car or car-motorcycle collisions (Figure 1). Also, road traffic accidents (RTAs) today represent the eighth leading cause of death globally [9][10][11].

In this paper, the urban transformation process in Kayabaşı District, Istanbul, which has undergone a rapid transformation process in recent years, has been examined with a survey regarding transportation network opportunities and the effect of existing transportation network opportunities on the preference of the residents. The survey results to investigate the impact of existing transportation network facilities on the importance of the Kayabaşı region have been listed, and a set of recommendations has been presented. The rest of the paper is organized as follows: A brief description of Kayabaşı region, the urban transformation process of Kayabaşı, and existing and planned transportation facilities are given in 2nd Section. Results and discussion are shown in Section 3. Conclusions and Recommendations with two proposals are provided in Section 4, which concludes the paper.

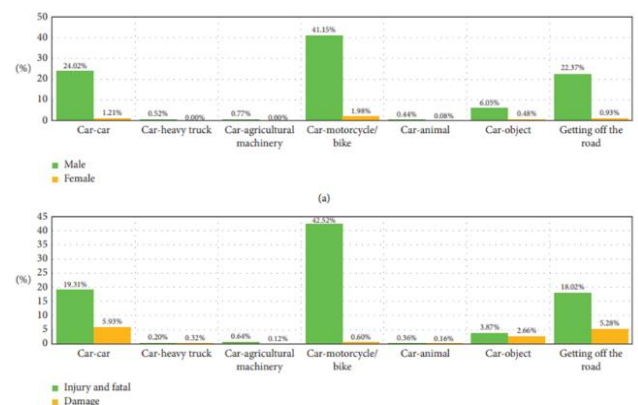


Figure 1. Accident statistics based on the type of vehicle accident and driver gender; accident severity [8].

2. Description of Kayabaşı Region

The area to be discussed within the scope of this study is the Kayabaşı District of Başakşehir District, which has experienced a rapid urban transformation process in recent years. Kayabaşı, formerly known as Aya Yorgi, is located just above the Sazlıdere Dam. There were ruins of Greek and Armenian churches in the village where Armenians and Greeks lived until the 1920s. However, after the War of

Independence, the Greeks living in the town were sent to Greece. The Turks living in Kovitse Village of Thessaloniki and Drama were settled in Kayabaşı and Mahmut Şevket Pasha. Kayabaşı, which was a village of Bakırköy until the mid-1980s, was connected to Küçükçekmece, which was a district in 1987. In 2009, it became a part of the Başakşehir District (Figure 2, Figure 3). Kayabaşı, which starts from Fenertepe with the toll booths of the TEM Highway and extends to Şamlar Village and Arnavutköy, has a land of approximately 1.5 million square meters [12].



Figure 2. Basakşehir District boundaries.



Figure 3. Kayabaşı neighborhood boundaries.

2.1. Urban Transformation Process of Kayabaşı Region

Before talking about the urban transformation process of the Kayabaşı region, it is necessary to talk about the potential of this region that encourages transformation. It has significant advantages in some aspects in the project area. Especially its connections with the high-level transportation system and its location to the centers around it provide benefits. While the region is connected to the TEM highway in the south, it is surrounded by the newly built Northern Marmara highway in the north and the Basın Ekspres highway in the east (Figure 4). In addition, due to its proximity to the newly opened Istanbul Airport, it has a location above many new transportation networks that are being planned. Also, existing advantages of transportation, many public lands in the total area, and the combination of different geographical structures such as valleys and hills to be used in the project provide convenience. In this way, it was possible to create natural boundaries between functions and masses during the project's design. The proximity of the project area to social reinforcement areas such as Olympic Village-Olympic Park and advanced mass housing examples

such as Başakşehir and Onurkent indicates that a more efficient environment will be created in the future.

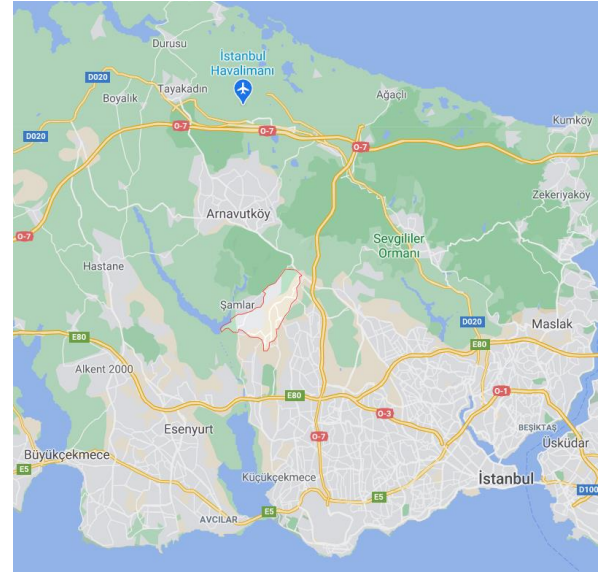


Figure 4. Kayabaşı neighborhood location relative to highways.

With the announcement of the “Istanbul Metropolitan” project, the interest of investors in the Kayabaşı region increased rapidly, and the land value of the region began to grow. Many housing projects of TOKİ, Emlak Konut, Kiptaş, Avrupa Konutları, and various private construction companies have been built and continue to be built.

2.2 Existing and Planned Transportation Facilities in Kayabaşı Region

Today, many bus lines provide transportation to the Kayabaşı region and a metro line (Table 1).

The works for the new metro network, which will pass through Kayabaşı Neighborhood and serve until the new city hospital, are continuing by making a northern extension to the M3 Metro line, the construction of which was started in 2017 (Figure 5, Figure 6).

Table 1. Kayabaşı current transportation networks table [13].

Bus lines	Metro
79B Kayaşehir-Bakırköy	M3
79F Kayaşehir-Yenibosna Metro	Kirazlı-Metrokent
79KM Kayaşehir-Mecidiyeköy	
36AS Kayaşehir-Sefaköy Metrobüs	
78E Başakşehir-Kayabaşı Kiptaş	
79E Kayabaşı Kiptaş-Eminönü	
79KT Kayabaşı Kiptaş-Tekstilkent Metro	
79T Kayabaşı Kiptaş-Taksim	
MK12 Olimpiyatköy Metro-Güvercin-tepe-Kayaşehir	
79C Kayaşehir-Cebeci Mahallesi	
79K Kayaşehir-Yenibosna Metro	
79Y Kayabaşı Kiptaş-Yenibosna Metro	
MK11 Olimpiyatköy Metro-Kayaşehir-Güvercin-tepe	
78G Başakşehir-Güvercin-tepe	
79G Kayaşehir-Zeytinburnu Metro	
36AY Arnavutköy-Yenibosna Metro	

“very important”, two is “important”, three is “partly important”, four is “less important”, and five as “not important at all” and shared with the Interviewees. According to the graph, if it is assumed that columns 1, 2, and 3 reflect the judgment that transportation is essential, it can be said that the residents mostly care about transportation. In support of this question, in Question 6, the importance of the new metro extension, which will provide access to the interior of Kayabaşı Neighborhood, in their preference for the area was questioned, and the answer was “very important” to a large extent (Figure 12). In other words, it can be concluded that basically all the existing and planned developments regarding transportation in the Kayabaşı region encourage residence in the region. This result was achieved by asking the Interviewees to rate the importance of direct access to them in Question 7 (Figure 13). More than 66% of the Interviewees answered the 7th question as “very important”.

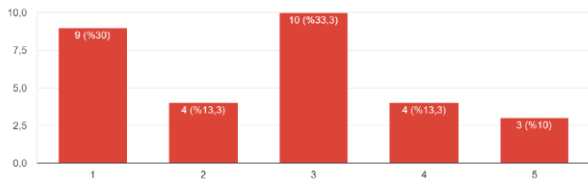


Figure 11. Survey 5th question.

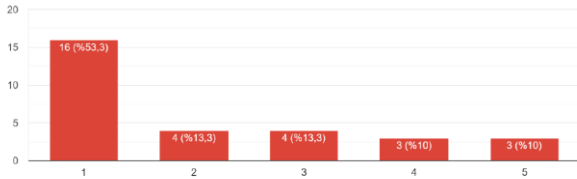


Figure 12. Survey 6th question.

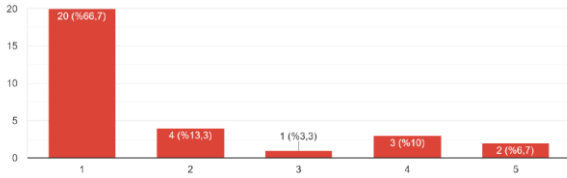


Figure 13. Survey 7th question.

The following four questions of the survey were designed to investigate the accessibility of the Kayabaşı Region by public transportation. In this context, in question 8, the rate of use of public transportation by the residents of the region was asked (Figure 14). While 63.3% of the respondents stated that they provide transportation to the region by public transportation, a substantial proportion of 36.7% is provided by private vehicles. For this reason, the reasons for this were tried to be examined with the 9th question (Figure 15). It is seen that the most important reason for this is the infrequent public transportation services. A secondary reason is that there are security-related problems. It is estimated that the issues related to security may be related to the planning problems made at the scale of urban transformation and idle areas in the region that have not yet been built. Assuming that the transformation is still ongoing, it can be thought that this problem will result in a positive outcome with the finalization of urban transformation.

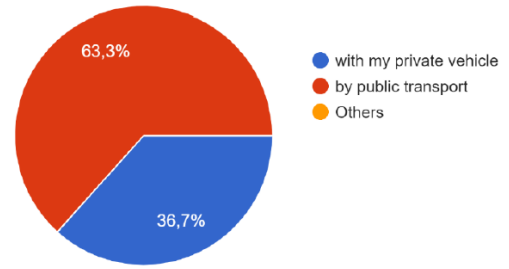


Figure 14. Survey 8th question.

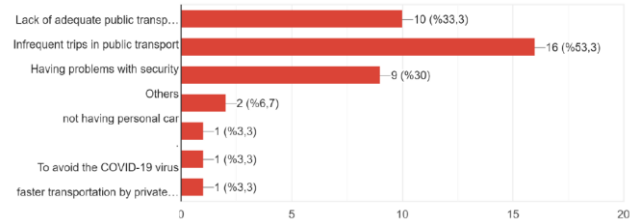


Figure 15. Survey 9th question.

In the 10th question of the survey, an answer was sought to question which metro and bus alternatives are mainly preferred for public transportation to the region (Figure 16). According to the result, it is seen that 63.3% of the bus alternatives are used. This situation can be explained by the fact that the existing metro network does not reach the Kayabaşı area.

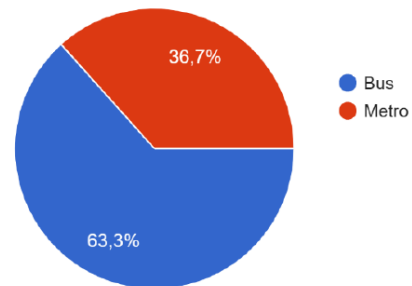


Figure 16. Survey 10th question.

In the 11th question, the extent to which the existing public transportation alternatives are sufficient was questioned (Figure 17). While “1” was quite enough in this question, “5” was shared with the Interviewees as not enough. In this context, if “3” and above are considered to be primarily insufficient, it can be said that more than 70% of the Interviewees did not find the existing public transportation alternatives sufficient.

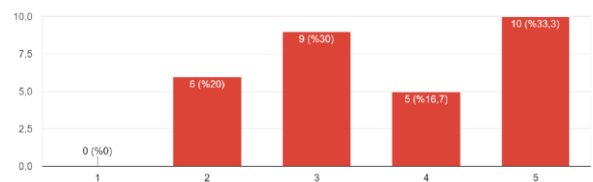


Figure 17. Survey 11th question.

5. Conclusions and Recommendations

There is no doubt that urban transformation is inevitable in growing cities. This transformation can be by improving and renewing existing settlement areas or re-planning a region where urban settlement has not started yet. On the other hand, the concept of transportation may be one reason that encourages urban transformation, or it may develop as a result of transformation. Kayabaşı Neighborhood, which is connected to Başakşehir district of Istanbul province, is one of the regions where urban transformation has continued rapidly in recent years. The fact that this area is on the new Istanbul Airport, Northern Highway, TEM, and Basın express road routes will not only encourage the urban transformation of the region but also a new metro extension has been planned to facilitate the transportation of the increasing population to the region with the transformation.

In this section, the survey results to investigate the effect of the existing transportation network facilities on the preference of the Kayabaşı region will be listed, and a set of recommendations will be presented. According to the results of the survey explained in the previous section, the results of the study are:

- Most residents of the Kayabaşı region have been living in Istanbul for a maximum of 10 years and living in mass housing for a maximum of 3 years.
- The primary reason for the residents of the Kayabaşı region to choose this place is the excellent living opportunities, while the second reason is the affordability.
- Transportation opportunities have an important place in the choice of transportation opportunities to this region.
- The new metro line planned to be built in this region has great importance in the residence of Kayabaşı.
- Good transportation facilities have an essential role in choosing the house they will live in for those living in the region.
- Transportation to the Kayabaşı region is mainly provided by public transportation, and transportation by private vehicle is substantial.
- While the most crucial primary reason for preferring personal vehicles for transportation to the region is the infrequent voyages of the existing public transportation, the secondary essential reasons are the security problems and the lack of adequate public transportation alternatives.
- When public transportation is preferred, buses are mostly preferred.
- Public transportation and transportation facilities in the Kayabaşı region were generally found to be insufficient.

In the light of the survey results listed above, a set of suggestions was created for the improvement of the Kayabaşı District urban transformation area in terms of transportation opportunities:

Proposal 1: According to the survey results, most populations have been residing in Istanbul for a long time and in the urban transformation areas in the Kayabaşı neighborhood for a maximum of 3 years. Again, according to the results, one of the most important reasons for relocation is that they have good living opportunities even with a low budget. In addition, the importance of

transportation in the choice of the house they will live in can be explained by the proximity of the region to the main roads and the new planned metro line making the region attractive. For this reason, in the region where the existing public transportation facilities are not sufficient; Public transportation alternatives should be increased, and the frequency of recent trips should be increased.

Proposal 2: According to the survey results, it is preferred to a considerable extent in transportation by private vehicle. However, this situation may cause traffic problems on the main roads leading to Kayabaşı District, increasing rapidly. For this reason, access to transportation networks from mass housing should be facilitated in a way that encourages public transportation, and solutions to existing security problems should be found.

Conflict of Interest Statement

The authors declare no conflict of interest.

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