

ЕФЕКТЪТ ОТ ГРАДСКАТА ТРАНСФОРМАЦИЯ ВЪРХУ УСЕЩАНЕТО ЗА АДЕКВАТНОСТ НА ПРОТИВОЗЕМЕТРЪСНИТЕ МЕРКИ И ИНФРАСТРУКТУРАТА НА ФИКИРТЕПЕ

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EFFECT OF THE URBAN TRANSFORMATION ON THE PERCEPTION OF EARTHQUAKE MEASURES AND INFRASTRUCTURE ADEQUACY IN FIKIRTEPE

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Abstract:

Urban revitalization efforts in specific districts of Istanbul, which have undergone population growth and irregular urbanization in the past decade, have raised concerns about the effectiveness of urban transformation practices in Istanbul in terms of earthquake measures and infrastructure following a recent natural disaster that impacted ten cities in Turkey. Despite the frequent mention of the anticipated earthquake in Istanbul by earthquake researchers, there is no study indicating how public perceptions have evolved regarding infrastructure and earthquake measures as a result of urban transformation. In this regard, our study focuses on the impact of urban renewal on earthquake preparedness and infrastructure adequacy in the Fikirtepe district of Istanbul. The study involved 130 participants with diverse demographic characteristics and employed a survey method that included an evaluation scale with five options (ranging from 'completely inadequate' to 'completely adequate') to assess changes in earthquake measures and infrastructure adequacy due to the urban transformation in Fikirtepe. According to the findings, before urban transformation, earthquake measures in the Fikirtepe district were predominantly considered 'completely inadequate' (42.30%) or 'inadequate' (26.15%), but after urban transformation, it was largely rated as 'adequate' (41.08%) and 'completely adequate' (39.53%). Furthermore, there was no significant change in the number of respondents choosing not to vote. Consequently, it has been revealed that earthquake-related security perceptions in Fikirtepe have improved due to urban transformation. However, conducting further research that examines earthquake measures, a crucial component of security, with more detailed parameters will help elucidate the role of urban renewal in this process.

Keywords: *urban transformation, urban revitalization, earthquake, infrastructure, Istanbul, Fikirtepe, Turkey*

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1. INTRODUCTION

Turkey was caught off guard by two massive earthquakes that struck its most developed regions in 1999. The devastating impact led to widespread concern about the earthquake resistance of structures and the construction codes for new buildings. The Marmara Earthquakes in 1999 caused significant damage to Turkey's industrial heartland, leading to a national economic crisis. To aid in the physical reconstruction and economic recovery, the Turkish government collaborated with the World Bank and the European Investment Bank to launch the "Marmara Earthquake Emergency Reconstruction Project". This project aimed to restore living conditions, support economic recovery, and develop strategies for disaster risk mitigation in the affected region. Although the country promptly implemented several emergency measures, a more comprehensive response only gained traction after another massive earthquake hit the city of Van in 2011 [1, 2].

This led to the introduction of "The Law of Transformation of Areas Under the Disaster Risks" (Law No. 6306) in 2012. The law aims to built structures at risk of disasters in order to create a safer and healthier living environment. Since the law came into force, numerous large-scale transformation projects have been initiated in various Turkish cities. However, the implementation of this law faced strong opposition from some segments of the population. Opponents argued that the urban transformation law deviated from its primary aim, as in practice, the law had limited application in disaster-prone areas due to market conditions. There were also concerns about the social impacts and the legal structure of the law, complicating its effective implementation [1].

After the February 6, 2023 Kahramanmaras earthquake in which more than fifty thousand people lost their lives, earthquake and construction experts have begun to make their voices heard in the media for the expected Istanbul earthquake in Turkey. With the fact that the disaster reality forgotten after the Düzce earthquake in 1999 reminded itself of a major disaster affecting approximately ten cities, the risks that the cosmopolitan city of Istanbul and its surroundings, which has a population of ten cities, will face in the event of a possible earthquake, combined with the public's concern about the lack of disaster management, have increased participation in urban transformation practices that have been ongoing for the last two decades.

Urban disasters provoke direct interactions with the city as both a physical and social entity, impacting personal experiences and urban politics. The destruction caused by earthquakes in Istanbul has sparked similar dynamics, where vulnerable buildings become personal and political concerns, and the roles of nature and culture in creating disasters are questioned. Additionally, risk assessment and mitigation serve as the basis for planning and challenging the city's transformation. The concept of the urban assemblage, focusing on the dynamic and relational nature of the city, offers a framework to view disaster not only as destructive but also as productive-an influence in the continuous reconstruction of the city. Furthermore, the assemblage approach resonates with the ethnographic context, demonstrating the agency of the material world and the intricate causality understood in everyday terms by the residents of a vulnerable city dealing with the threat of disaster.

This study aims to evaluate the impact of the urban transformation law on earthquake preparedness using survey data to determine the extent to which the urban renewal law has achieved its goals in Fikirtepe, Istanbul. In this context, disaster risk regions can benefit from the results of this study and aim for similar results regarding urban transformation laws and practices.

On the other hand, urban redevelopment projects provide opportunities to test innovative infrastructure solutions for creating significant changes in urban areas. Decentralized infrastructure systems are being considered as essential strategies to help cities achieve various

sustainability goals. However, implementing these changes is challenging due to the complexity of existing infrastructure systems [3]. In our study, the views of urban transformation area residents on changes to infrastructure were questioned and the restorative role of urban transformation in infrastructure regulation was aimed to be a source for further studies.

2. METHODOLOGY

In the survey study planned to be conducted in the Fikirtepe urban transformation region of Istanbul, the effects of urban transformation on earthquake measures and infrastructure adequacy were questioned among people with different demographic backgrounds (gender, age, marital status, education, monthly income, the length of life in Istanbul and Fikirtepe). The Fikirtepe region, which has a geographically important location due to its proximity to the Bosphorus Bridge on the Anatolian side of Istanbul, is included in the Kadıköy district administration. Its proximity to the E5 highway, which has access to a large part of Istanbul, makes the region stand out in terms of transportation when looking for a settlement [4].

In the study, a survey applied to 130 people requested reflections on how the earthquake precautions and infrastructure adequacy in Fikirtepe evolved with urban transformation using a five-choice evaluation scale (completely inadequate, inadequate, hesitant, adequate, and quite adequate). In addition, the results obtained from the survey were analyzed using three different scales: Kadıköy, Fikirtepe, and urban transformation, and presented as fractions of the total using GraphPad Prism 9.

3. DATA

3.1. Demographics

In Figures 1, 2, and 3, which display the demographic characteristics of the participants, it is evident that 51.1% (67) of the participants are male and 48.9% (64) are female. Regarding age distribution, 32.1% (42) of the participants are between 26 and 35 years old, 20.6% (27) are between 36 and 45, 18.3% (24) are between 46 and 55, and 15.3% (20) are between 18 and 25. Additionally, 13.7% (20) of the participants are over 55 (Figure 1).

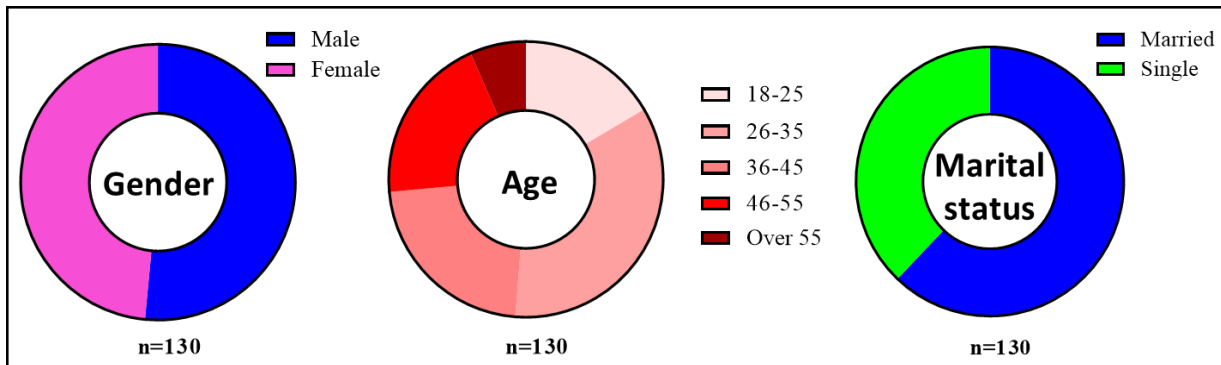


Figure 1. Gender, age, and marital status demographics

In terms of education, 43.5% (57) of the participants are high school graduates, 25.2% (33) hold a bachelor's degree, 15.3% (20) have an associate degree, 12.2% (16) have completed primary education, and 3.8% (5) possess a postgraduate degree. Moreover, 61.1% (80) of the participants are married, while 38.9% (51) are single (Figure 2).

Regarding monthly income, 42.7% (56) of the participants earn between 8,500 and 15,000 TL, 42.7% (56) earn between 15,001 and 20,000 TL, 11.5% (15) earn between 20,001 and 30,000 TL, 2.3% (3) earn more than 30,000 TL, and 0.8% (1) earn less than 8,500 TL (Figure 2).

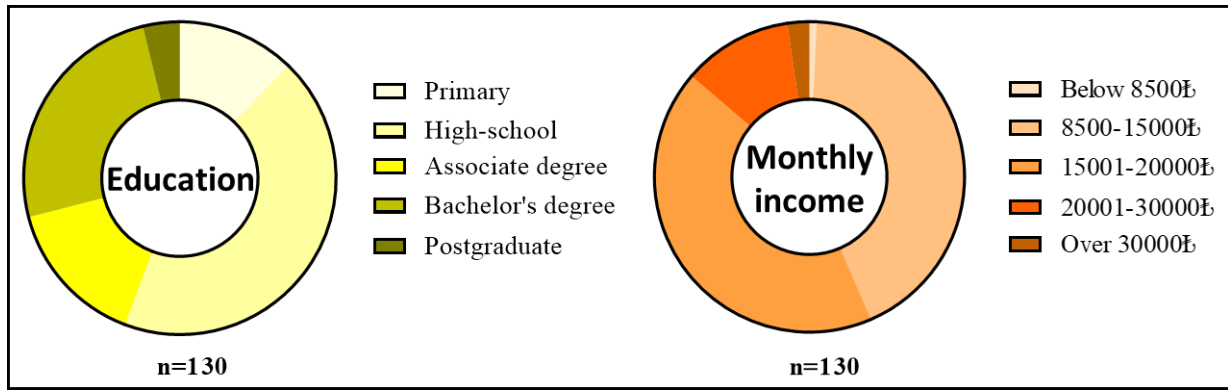


Figure 2. Education and monthly income demographics

A breakdown of the participants' length of stay in Istanbul shows the following distribution: 38.9% (51) have been residents for over 20 years, 24.4% (32) for 10 to 20 years, 17.6% (23) for 5 to 10 years, 11.5% (15) for 3 to 5 years, 3.8% (5) for 1 to 3 years, and 3.8% (5) for less than 1 year.

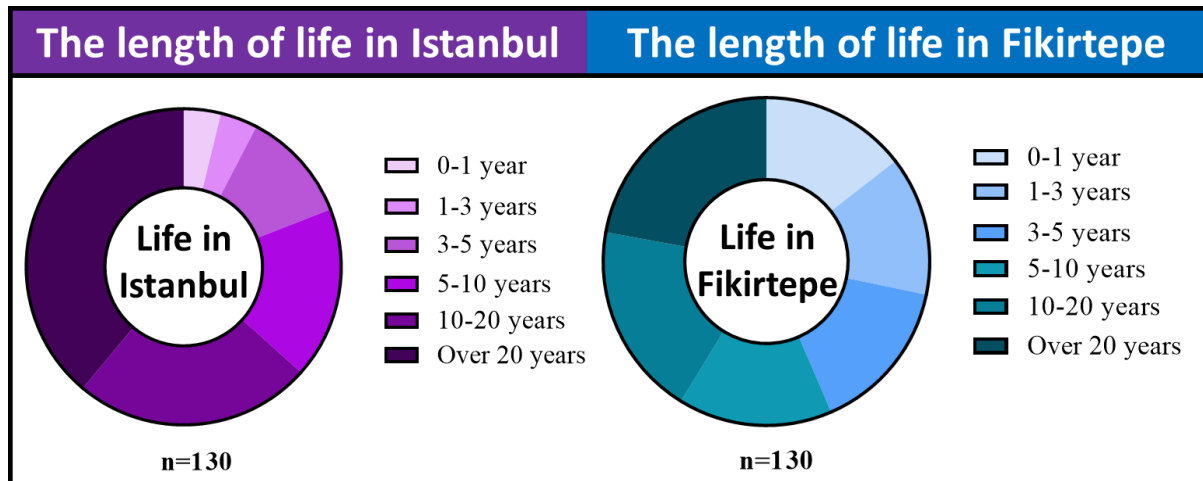


Figure 3. The length of life in Istanbul and Fikirtepe

When looking at the duration of residency in Fikirtepe, it was discovered that 22.1% (29) had lived there for over 20 years, 19.1% (25) for 10-20 years, 15.3% (20) for 5-10 years, 15.3% (20) for 3-5 years, 14.5% (19) for less than 1 year, and 13.7% (18) for 1-3 years.

3.2. Infrastructure adequacy by scales

Infrastructure, which was mostly found to be inadequate at Fikirtepe scale (14.50% for completely inadequate; 35.88% for inadequate; 37.40% for adequate; 3.05% for quite adequate), was more sufficient at Kadıkoy scale (3.05% for completely inadequate; 36.64% for inadequate; 46.56% for adequate; 1.53% quite adequate). While hesitant rates did not show significant change according to three scales (11.63% for urban transformation scale, 12.21% for Kadıkoy scale and 9.16% for Fikirtepe scale), infrastructure adequacy increased significantly according to urban transformation scale (0.78% for completely inadequate; 6.20% for inadequate; 58.91% for adequate; 22.48% for quite adequate) (Figure 4).

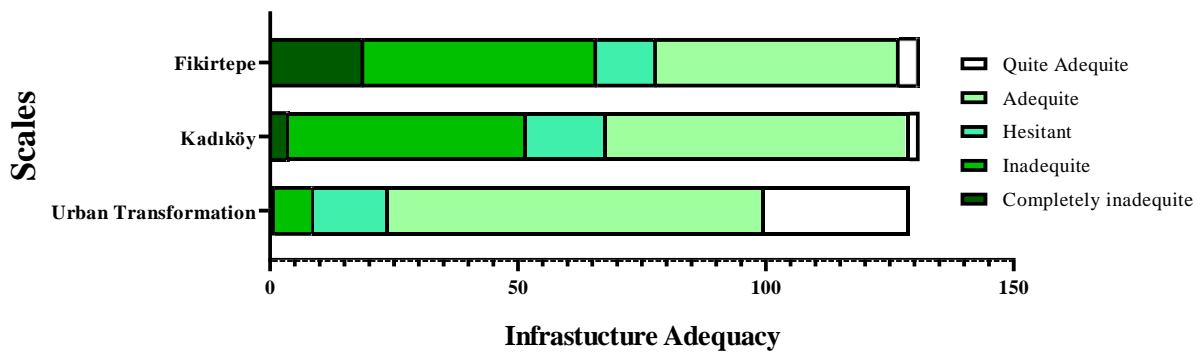


Figure 4. Infrastructure adequacy according to Fikirtepe, Kadıköy, and urban transformation scales

3.3. Earthquake measures adequacy by scales

Earthquake measures, which were mostly found to be insufficient at the Fikirtepe scale (42.31% for completely inadequate; 26.15% for inadequate; 18.46% for adequate; 1.54% for quite adequate), were more sufficient at the Kadıkoy scale (23.66% for completely inadequate; 33.59% for inadequate; 21.37% for adequate; 1.53% quite adequate). While hesitant rates were observed to be higher at the Kadıkoy scale out of the three scales (12.40% for urban transformation scale, 19.85% for Kadıkoy scale and 11.54% for Fikirtepe scale), infrastructure adequacy increased significantly according to the urban transformation scale (1.55% for completely inadequate; 5.43% for inadequate; 41.09% for adequate; 39.53% for quite adequate) (Figure 5).

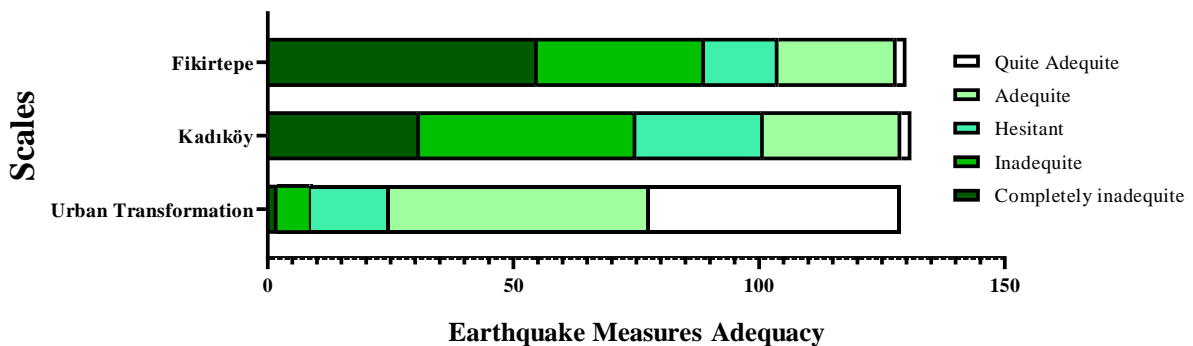


Figure 5. Earthquake measures adequacy according to Fikirtepe, Kadıköy, and urban transformation scales

4. RESULTS

The findings revealed that infrastructure and earthquake measures, which were found inadequate by the survey participants according to the Kadıkoy and especially Fikirtepe scale, increased significantly compared to the urban transformation scale. In addition, the significant inadequacy observed in terms of infrastructure and earthquake measures in the Fikirtepe scale compared to the Kadıkoy scale was accepted as a reflection of the survey results of the study being conducted in Fikirtepe, an urban transformation region.

As a result, with urban transformation, the adequacy assessments in infrastructure and earthquake measures emphasize that the residents of the region mostly showed a significant positive change.

5. CONCLUSIONS

Consequently, it has been shown that the public perception regarding the adequacy of infrastructure and earthquake precautions in Fikirtepe has experienced a positive change due to urban transformation.

However, more research should be conducted by examining different policy and budget studies for infrastructure and earthquake precautions, and thus, ways should be found to include the residents in the projects to be carried out to increase central infrastructure resources and ensure seismic resistance. It is indisputable that this method, which is one of the ways to reduce the problems that may occur later while designing the city as a center suitable for its intended use, is implemented on a larger scale, not only in terms of earthquake precautions and infrastructure, but also in terms of the adequacy of elements such as health and education centers, transportation, parking facilities, and green areas in the regions where post-earthquake reconstruction will be provided.

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