

Urban Quality of Life Index at Neighbourhood Level: The Case of Eyüpsultan

Mahalle Düzeyinde Yaşam Kalitesi Endeksi: Eyüpsultan Örneği

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Öz

Kentlerin makro ölçekte kategori (mega kent, büyükşehir...) ve coğrafi açıdan farklı olması karşılaştırmaları sağlıklı kılmamaktadır. Dolayısıyla mikro (mahalle düzeyinde) ölçekte yaşam kalitesine bakılması iyileşmelerin artmasına olanak tanıyacaktır. Bu çalışmada mahalle düzeyinde kentsel yaşam kalitesi endeksi hesaplanması amaçlanmıştır. Mahalle düzeyinde yaşam kalitesinin ölçülmesi, eksik tarafların giderilmesi ve politika yapıcılara bu anlamda kendilerini geliştirmelerine olanak tanınması hedeflenmiştir. Mikro ölçekte ve özellikle İstanbul metropolünde yaşam kalitesini arttırmak, konuyla ilgili kamusal karar alma süreçlerine destek olunacak yenilikçi platformları geliştirmek için Eyüpsultan ilçesi düzeyinde çalışma gerçekleştirilmiştir. Yöntem olarak ikincil verilerin standardizasyonu gerçekleştirildikten sonra tema endeks skorları hesaplanmıştır. Endekslerde yer alan gösterge ağırlıkları için uzman görüş ve önerine başvurulmuştur. Her mahalle için belirlenen temalarda alt endeksler (Tema Endeksler) ve Eyüpsultan ilçesini temsil eden ana endeks (Genel Endeks) hesaplanmıştır. Ana endeks sonuçlarına göre Göktürk Merkez, Mimar Sinan, Merkez, 5.Levent ve Mithatpaşa mahalle düzeyinde kentsel yaşam kalitesinin en yüksek olduğu mahalleler olurken, Rami Cuma, Güzeltepe, Döğmeciler, İslambey ve Esentepe mahalleleri son sırada yer almıştır.

Anahtar Kelime: Yaşam kalitesi, Yaşam kalitesi endeksi, Yaşam kalitesi parametreleri, Yaşam kalitesi modellemesi.

Abstract

The fact that cities are categorised and geographically different at the macro scale does not make comparisons healthy. Therefore, looking at the quality of life at the micro scale will allow improvements to increase. This study aims to calculate an urban quality of life index at the neighbourhood level. It is aimed to measure the quality of life at the neighbourhood level, to eliminate the missing aspects and to enable policy makers to improve themselves in this sense. The study was carried out at the level of Eyüpsultan district in order to increase the quality of life at the micro scale and especially in the metropolis of Istanbul and to develop innovative platforms to support public decision-making processes on the subject. As a method, theme index scores were calculated after standardisation of secondary data. Expert opinions and suggestions were consulted for the indicator weights in the indices. Sub-indices in the themes determined for each neighbourhood and the main index representing Eyüpsultan district were calculated. According to the main index results, Göktürk Merkez, Mimar Sinan, Merkez, 5.Levent and Mithatpaşa were the neighbourhoods with the highest urban quality of life at the neighbourhood level, while Rami Cuma, Güzeltepe, Döğmeciler, İslambey and Esentepe neighbourhoods ranked last.

Key Words: Life quality, QoL index, QoL parameters, Modeling QoL.

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INTRODUCTION

It has long been recognised in the literature that quality of life cannot be explained by GDP per capita, which measures material welfare, alone. There are factors such as environmental pollution, non-market activities, social and cultural life that are not used/ignored in the measurement of GDP but affect the quality of life. There are a large number of studies to construct alternative, non-monetary social and economic welfare indices that are thought to affect the quality of life and become a statistical model by combining these factors. The difference in the results of the indices subject to the studies arises from the indicators used and the weights of the indicators. The most common main problems in measurement are selection bias in the factors chosen, arbitrary judgements by researchers, or weighting different indicators (measured on a comparable and meaningful scale) to obtain a single result.

The UN's Universal Declaration of Human Rights was taken as a reference in determining the factors and indicators used in the creation of the Quality of Life Index. Although the UN is shown as the main reference in the formation of the index, there is no information on the exact indicators or how to weight these indicators. In this case, another study conducted in the literature has also consulted expert opinions in order to obtain healthy results on life satisfaction surveys and indices. Life satisfaction surveys consist of basic questions about how satisfied people are with their lives in general. However, studies on life satisfaction that only deal with survey results cannot be used as an indicator of a country's quality of life. One reason for this may be the lack of access to a sufficient number of cities/regions/countries. Another reason may be the possibility of measurement errors. Another reason may be the possibility of measurement errors. Such problems arise in the evaluation of the relationship between life satisfaction perceptions and objective indicators. Therefore, a single average life satisfaction index instead of a multi-component index without taking into account the characteristics of the city/region/country increases the possibility of making errors in assessing the quality of life between cities/regions/countries. Objectively, what should be inferred from the Quality of Life Index is that most of the differences between cities/regions/countries can be explained by objective factors. It should not be forgotten that there may be indicators that cannot be explained by objective factors.

The quality of life index is a subjective measure of happiness. The monitoring of this concept in cities has developed since the 1960s. Especially starting from the 2000s until today, it is observed that the concept of quality of life has become interesting both in research and in the political field. As of the 2000s, the European Union's Regional Cohesion Policies, UN Habitat Programme and Sustainable Development agenda and OECD policies have played an important role in the study of the concept in question. At the same time, it is understood

that the concept in question is an important element in city competitiveness and economic development of cities. In this context, when a city is categorised as smart, safe, global, slow, etc., it is seen that the institutions that produce both national and international strategic urban development decisions have reached a consensus within the framework of quality of life and its constituent dimensions (Şeker et al., 2022).

The concept of Quality of Life encompasses the processes of human development, the average life expectancy of individuals within their communities and the environmental systems and individual value systems in which all these psychological processes are influenced. There is no consensus on the definition of quality of life. The reason for this is the scope of the concept in question. It is observed that quality of life is used in some studies instead of other concepts such as well-being, life level, life satisfaction, happiness and morale.

With this study, it is important to show that the quality of life index is at the centre of the city and that all concepts are examined in relation to each other in a complex image. In the studies, sustainability, housing, health and economic developments constitute the most dominant themes. In addition to these themes, it is observed that the theme of well-being is related to quality of life. This concept functions as a core concept in terms of reading and understanding individual processes. At the same time, it is understood that whichever concept is at the centre, indicators related to sustainability and environment are important.

In this framework, necessary arrangements and steps should be taken to ensure that cities become sustainable and healthy cities. In addition to these, it should be aimed to take advantage of the opportunities arising from smart city technologies, to establish/reinforce cooperation between rural and urban areas within the city and even within the district, and to fight against the informal economy in a phased manner based on local conditions and communities without creating new problems. As it can be observed today, it is seen that the level of complexity is increasing with the exponential growth of many problems such as economic, housing and housing. This picture does not present a good picture in terms of happiness and satisfaction levels. Therefore, the issue should be handled at a more sensitive level by taking these problems into consideration.

İstanbul metropolis has a high income level. However, when the metropolis of İstanbul is evaluated in terms of social services, housing conditions and general satisfaction level, it is understood that it does not go in parallel with the high income level. Low urban service efficiency, large differences in income distribution, inequality and distortions, and spatial distortions are among the main reasons for this situation. Therefore, current indicators should be meticulously monitored. In addition to these explanations, İstanbul metropolis is important in terms of hosting creative industries, being a city of culture and history, and being the locomotive city of the neighbouring cities, the region and even the country. In this context, interpreting these indicators for

disadvantaged groups such as university students and the elderly, and not only evaluating average levels, will contribute to a better understanding of the dynamics related to quality of life and the development of solutions.

The city is already facing epidemics, climate change, pollution, ageing societies, digital divide, chronic socio-geographical inequalities, migration and economic uncertainties. The growth of cities also leads to a higher population vulnerability to natural and technological disasters. With this study, it is aimed to calculate and determine the Urban Quality of Life Index at the Neighbourhood Level in Eyüpsultan, to understand the position of Eyüpsultan in terms of quality of life both in the İstanbul metropolis and in the country, to examine the level of quality of life at the neighbourhood level, to determine the priority problem areas (subject and space), to compare with previous studies and to develop proposals to guide planning studies.

1. RESEARCH METHOD

Eyüpsultan district has 29 neighbourhoods and is located on the West Side of İstanbul. The district is neighbouring Sarıyer, Şişli, Kağıthane, Beyoğlu, Fatih, Zeytinburnu, Bayrampaşa and Gaziosmanpaşa districts and has an area of 242 km². Eyüpsultan Urban Quality of Life Index is designed to compare the neighbourhoods in Eyüpsultan district in terms of quality of life. 22 neighbourhoods (Göktürk Merkez, Mithatpaşa, Mimar Sinan, Güzeltepe, Akşemsettin, Çırçır, Alibeyköy, Yeşilpınar, Karadolap, Esentepe, Emniyetetepe, Sakarya, Silahtarağa, Eyüpsultan Merkez, İslambey, Rami Yeni, Rami Cuma, Düğmeciler, Topçular, Nişancı, 5.Levent and Defterdar) were included in the study. The villages of Akpınar, Ağaçalı, Çiftalan, İhsaniye, Işıklar, Odayeri and Pirinççi, which are located in the rural areas of Eyüpsultan district, were not included. The reason for this is that they do not have neighbourhood characteristics compared to the other 22 neighbourhoods and are negatively reflected in the index calculations. Therefore, 22 neighbourhoods of Eyüpsultan district were studied in this research. Urban quality of life indices include multidimensional and abstract factors. In this context, abstract factors have been concretised and a method has been derived to make them measurable.

1.1. Data

In the assessment of Urban Quality of Life, 12 main indicator categories were used. These are; Disaster and Infrastructure category with 12 sub-indicators, Satisfaction with Municipal Services category with 10 sub-indicators, Environment and Green Space category with 5 sub-indicators, Education Demography with 7 sub-indicators, Education Infrastructure with 12 sub-indicators, Demographic Structure with 15 sub-indicators, Economic Capacity with 18 sub-indicators, Economic Welfare with 13 sub-indicators, Security with 3 sub-indicators, Health with 5 sub-indicators, Social Life with 17 sub-indicators and Transport with 11 sub-indicators. A total of 137 indicators were compiled for this study.

When the quality of life indices of international organisations are examined, no study has been conducted under the category of disaster. When it is considered in terms of resilience against both natural and technological disasters, it is observed that the capacity of the region/city/district/neighbourhood against possible disasters is not measured. For example, it is observed that there is no sub-set on quality of life in cities under earthquake risk, therefore such issues are not subject to evaluations. Migration movements, mobility of economic activities, existence of capacities of the region/city/district/neighbourhood and resilience against disasters play important roles. At the same time, the effects of climate change are also one of the important factors that give/will give direction to planning. Therefore, it is important to fight against all types of disasters and to focus on this. Disaster and Infrastructure sub-index consists of 12 indicators.

Table 1. Disaster and Infrastructure Indicators

Data Period	Disaster and Infrastructure	Source
2023	Emergency Assembly Area Capacity per Person (m ²)	İMM*
2023	Emergency Assembly Area - Infrastructure Adequacy Index	
2022	Number of Fire Incidents per Thousand People	
2020	7.5 Neighbourhood Based Values of Eyüpsultan District Temporary Shelter Needs for Scenario Earthquake	
	7.5 Neighbourhood Based Infrastructure Damage Estimates for Eyüpsultan District for Scenario Earthquake	
	7.5 Scenario Earthquake for Eyüpsultan District Neighbourhood Based Loss of Life	
	7.5 Scenario Earthquake for Eyüpsultan District Neighbourhood Based Number of Seriously Injured	
	7.5 Number of Hospital Treatments by Neighbourhood in Eyüpsultan District for Scenario Earthquake	
	7.5 Eyüpsultan District Neighbourhood Based Building Damage Estimates for Scenario Earthquake (Number of Very Heavy and Heavy Damaged Buildings)	
2022	Number of Water Faults (Annual)	İSKİ**
	Average Elimination Time of Water Faults (Minutes)	
	Average Household Daily Water Consumption (m ³)	

* Istanbul Metropolitan Municipality

** Istanbul Water and Sewerage Administration

When the international indices are analysed in terms of all services under the responsibility of local governments, it is thought that the decreasing living costs of İstanbul may be misleading. According to the

results of international indices, the services of local governments are generally in need of improvement. From this point of view, some of the services are provided by district local governments and some by provincial local governments. Since the indicators are generally collected in spatial categories, it may not be possible to evaluate the networks, which are actually in a network structure, in a healthy way. For this reason, it is important to collect spatial information during the collection of data on users or to take spatial differences into account when interpreting these data. Satisfaction with Urban Services sub-index consists of 10 indicators.

Table 2. Satisfaction with Urban Services Indicators

Data Period	Satisfaction with Urban Services	Source
2022	Share of White Desk Applications in the District Total - Requests (Percentage)	IMM
	Share of White Desk Applications in the District Total - Complaints (Percentage)	
	Number of White Desk Applications per Thousand People - Requests	
	Number of White Desk Applications per Thousand People - Complaints	
2020	Complaint Rate in White Desk Applications (Percentage)	İGDAŞ***
2021	Solution Centre Number of İGDAŞ Applications Rate of Change 2021-2022 (Percent)	
2022	Solution Centre İGDAŞ Share in Total Number of Applications in the District 2022	
2021	Solution Centre İSKİ Number of Applications Change Rate 2021-2022 (Percent)	İSKİ
2022	Solution Centre İSKİ- Share in Total Number of Applications in the District 2022	
	Number of Solution Centre İSKİ Applications per Subscriber 2022	

***İstanbul Gas Distribution Industry and Trade Joint Stock Company

Today, people spend a significant part of their time in privately owned public and semi-public spaces. These can be open or closed spaces. In the environment formed by urban areas, especially the functions of public spaces as an area of reconciliation, cultural sharing and dissemination of various social innovations are gradually increasing. Environment and Green Space sub-index consists of 5 indicators.

Table 3. Environment and Green Space Indicators

Data Period	Environment and Green Space	Source
2022	Number of Parks in Neighbourhood per Thousand People (Excluding IMM)	Eyüpsultan Municipality
	Park Area Per Capita m ²	
	Number of IMM Parks per Thousand People	
	IMM Park Area Per Capita m ²	
	Active Green Area Per Capita m ²	IMM

The decline in the quality of education has become more pronounced in recent years. It is considered that this category should be closely monitored due to costs, economic crisis and the increasing weight of the private sector in the field of education. Education Demographics sub-index consists of 7 indicators.

Table 4. Education Demographics Indicators

Data Period	Education Demographics	Source
2021	Illiterate (%)	TURKSTAT
	Doctorate Graduate (%)	
	Total Number of University Graduates per Thousand People	
	Proportion of Female University Graduates (%)	
	Average Duration of Education (Male)	Calculated by compiling TURKSTAT data.
	Average Duration of Education (Female)	
	Average Duration of Education (Total)	

Education Infrastructure sub-index consists of 13 indicators. Data compiled from the Republic of Türkiye Ministry of National Education Eyüpsultan District National Education Directorate.

Table 5. Education Infrastructure Indicators

Data Period	Education Infrastructure	Source
2023	Number of Students per Classroom	Republic of Türkiye Ministry of National Education Eyüpsultan District National Education Directorate.
	Proportion of Schools with Single Education (%)	
	Proportion of Schools with Cafeteria (%)	
	Proportion of Schools with Student Shuttle Service (%)	
	Education Infrastructure Index	
	Proportion of Schools with Library (%)	
	Average Number of Books per School	
	Number of Books per Student	
	Proportion of Schools with a Sports Hall (%)	
	Number of Students per Teacher	
	Number of Kindergartens	
	Number of Primary Schools	
	Number of Secondary Schools	

Demographic Structure sub-index consists of 15 indicators. The data were compiled from TURKSTAT, İstanbul University Urban Policy Research Center and Eyüpsultan Municipality.

Table 6. Demographic Structure Indicators

Data Period	Demographic Structure	Source
2022	Average Residence Duration in Eyüpsultan (Year)	İstanbul University Urban Policy Research Center database
2023	Proportion of those with İstanbul Registry Information	
	Proportion of those with Eyüpsultan Registry Information	
2023	Number of Voters Born in Foreign Countries	Eyüpsultan Municipality
	Voters Born in Foreign Countries / Population Over 18	
2022	Marital Status - Divorced (+ 15 Age %)	TURKSTAT
	Marital Status - Spouse Deceased (+ 15 Age %)	
	Total Population	
2022	Population Difference (%) (5 Years)	Calculated by compiling TURKSTAT data.
	Population Density (km ² /population)	
	Generational Conflict Risk Coefficient	
	Average Age	
	Total Age Dependency (%)	
	Total Child Dependency (%)	
	Total Elderly Dependency (%)	

The development of economic diversity in the region brings positive effects in terms of quality of life. The use and dissemination of advanced technologies, the existence and increase of new business lines, the introduction of appropriate business lines to the region, and the acquisition of labour force skills are of great importance for today. Economic Capacity sub-index consists of 18 indicators.

Table 7. Economic Structure Indicators

Data Period	Economic Structure	Source
2023	Number of Faculties/Schools	Council of Higher Education
	Number of Students at the University Campus in the Neighbourhood	
2023	Domestic Demand Potential	Calculated by compiling TURKSTAT data.
2022	Number of Workplaces / Population (per thousand)	TURKSTAT

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2023	Number of Shopping Centres	İstanbul University Urban Policy Research Center database
	Number of Supermarkets	
	Number of Discount Stores	
2022	Number of Cargo Branches	
	Number of Notaries	
	Share of Active Firms in the District (Percentage)	
2023	Market Place Number	Republic of Türkiye Ministry of Trade
2022	Environmental Cleaning Tax Collection/Accrual Rate (%)	Eyüpsultan Municipality
2022	Advertisement Tax Collection/Accrual Rate (%)	
2022	Number of Active Firms per Thousand People	İstanbul Chamber of Commerce
2023	Number of Bank Branches in the Neighbourhood	The Banks Association of Türkiye
2023	Number of ATMs in the neighbourhood	
2023	Number of Bank Diversity	Prepared by compiling The Banks Association of Türkiye data.
2023	Population per Bank Branch	

In access to healthy food, various factors such as the food production capacity of the city and its immediate surroundings and the ability to distribute these foods gain importance in reducing risks based on food chains. In this framework, the existence of centres providing access to fresh food and the satisfaction with these centres (e.g. neighbourhood markets, bakeries, etc.) as well as the consumption rates of food produced in the city and its immediate surroundings, etc. gain importance. The Economic Welfare sub-index consists of 13 indicators.

Table 8. Economic Prosperity Indicators

Data Period	Economic Prosperity	Source
2022	Number of Public Bread Kiosk and Sales Points per 10,000 People	İstanbul Public Bread Buffet
2022	Number of People Receiving Social Assistance from District Municipality per Thousand People	Eyüpsultan Municipality
	Number of People Benefiting from District Municipality Food and Clothing Warehouses per Thousand People	
	Rate of Households Receiving Assistance from District Municipality (Percentage)	
	Rate of Households Receiving Assistance from District Municipality (Percentage)	
	Property Tax Accrual/Collection Rate (%)	
	Fair Value Average	
	For Sale Housing Price (m ² /TL)	İstanbul University Urban Policy
	Rental Housing Cost (m ² /TL)	

2023	Change in Sale Price (3 Years-%)	Research Center database
	Change in Rental Price (3 Years-%)	
2022	Number of University Students Receiving IMM Scholarships per Thousand People	IMM
	Proportion of Households Receiving Social Assistance from IMM (Percent)	

Security sub-index consists of 3 indicators. Data compiled from Republic of Türkiye Ministry of Interior Eyüpsultan District Police Headquarters.

Table 9. Security Indicators

Data Period	Security	Source
2022	Crime Type Index	Republic of Türkiye Ministry of Interior Eyüpsultan District Police Headquarters
	Share in Total Crimes Committed in the District	
	Number of Crimes per Thousand People	

The share of the private sector in health services in İstanbul metropolis is quite high. Health sub-index consists of 5 indicators. In this case, it is difficult for individuals from all segments living in metropolises to benefit from health services. In this context, the presence of local governments in this field is important.

Table 10. Health Security

Data Period	Health	Source
2023	Average Number of Examinations per Doctor - Daily	Republic of Türkiye Ministry of Health Eyüpsultan District Health Directorate
	Total Number of Hospitals	
	Number of 112 Stations	
2022	Population Per Pharmacy	İstanbul University Urban Policy Research Center database
2022	Number of Disabled Persons per Thousand People	Eyüpsultan Municipality

Social Life sub-index consists of 17 indicators. The data were compiled from Eyüpsultan Municipality, İstanbul University Urban Policy Research Center, Culture Inventory Project, IMM, Eyüpsultan Municipality, Republic of Türkiye Ministry of Interior.

Table 11. Social Life Indicators

Data Period	Social Life	Source
2023	Number of Child-Youth Centres	Eyüpsultan Municipality
	Total Number of Knowledge Centre Course Students	
2023	Number of Culture and Art Centres (Metropolitan - District Municipality - Private)	İstanbul University Urban Policy Research Center database
	Number of Theatre	
	Theatre Capacity	
	Number of Cinema	
2023	Number of Historical Artefacts	Prepared by compiling the data of Culture Inventory Project.
2023	Total Number of Libraries	Prepared by compiling data from IMM and Eyüpsultan Municipality.
	Total Number of Books	
	Total Library Capacity	
2023	Total Number of Non-Governmental Organisations in Neighbourhoods	Republic of Türkiye Ministry of Interior
2023	Number of Sports Facilities	İstanbul University Urban Policy Research Center database
	Sports Facility Capacity (Area-m ²)	
	Number of Football Pitches	
	Number of Basketball Courts	
2022	Number of Gym / Fitness Centre	Eyüpsultan Municipality
	Number of Members Benefiting from Municipal Sports Activities	

The use of personal vehicles seems to be a negative indicator within the framework of sustainability. At the same time, some studies have also shown that the happiness level of upper income groups with high private car ownership is higher. The use of public transport is important in terms of sustainability culture. It is thought that these issues should be taken into consideration in analyses related to transport, both when determining indicators and collecting data, and when interpreting the data. The transport sub-index consists of 11 indicators.

Table 12. Transport Indicators

Data Period	Transport	Source
2022	Bicycle Lane Length	Istanbul University Urban Policy Research Center database
2022	Number of İETT Stops	İETT
	Number of Metrobus Stops	
2022	Number of Car Parking	Prepared by compiling IMM data.
	Car Parking Capacity	
2023	Metro Station	METRO İstanbul
	Tram Stop	
2023	Number of Taxi Stops	İstanbul University Urban Policy Research Center database
	Number of Yellow Taxis	
	Diversity of Transport	
2022	Number of Lines	İETT

**** İstanbul Electricity, Tramway and Tunnel Administration

Secondary data sources were used in the study. Secondary data is data compiled by institutions. Within the scope of this study, secondary data obtained by different methods were used and data obtained from public institutions such as TURKSTAT, İstanbul Metropolitan Municipality, Eyüpsultan Municipality, Republic of Türkiye Ministry of National Education Eyüpsultan District National Education Directorate, Republic of Türkiye Ministry of Health Eyüpsultan District Health Directorate were utilised.

1.2. Methodology

When the methods of the studies in the literature are analysed, different methods have been used within the framework of different fields, aims and objectives. Studies using Z score transformation, standardisation of the data set, weighting of index scores as a result of expert interviews and literature review, clustering analysis (k-means technique) to reveal the similarities of the districts/cities/regions subject to the studies; Şeker (2015; 2022) Quality of Life Index: A Case Study Of İstanbul, Quality of Life Index: İstanbul 2020 (Şeker et al., 2015; Şeker et al., 2022).

Indexing and taxonomy methods were used in the first studies (1991, 1996, 2003) by the Republic of Türkiye Ministry of Industry and Technology (2022) in which the levels of provinces were measured within the scope of

socio-economic development of the State Planning Organization (SPO). In these methods, weighting was determined by the subjective decision of the researcher. Therefore, it is partly not possible to talk about the objectivity of the research results. As in 2011, Strong Principal Component Analysis (PBA) was used as a method in the research conducted in 2017. With this method, a large number and size of information sets are collected and analysed.

While constructing the OECD Regional Well-Being Index, the standardisation method was used primarily to convert the data to the same scale. Normalisation method was applied with min- max formulas for each indicator. After the weighting of the processed data, composite indicators were calculated. Thus, their linkages with other variables were calculated (OECD, 2022). The Economist Intelligence Unit (EIU) Liveability Rankings index was calculated according to the relative performance of a location using expert opinions for qualitative indicators and external data for the ranking of quantitative variables. Category weights are calculated equally to arrive at the index (EIU, 2022).

The Gender Equality Index at District Level (2020) consists of 4 stages: calculating the index method indicators proportionally, taking these ratios into the equality measure, taking the weight average of the indicators and calculating the index score (Şeker et al., 2020). Arcadis Sustainable Cities Index consists of 3 sub-indices (planet, profit and people). Each metric and indicator in the indices have equal weights. Since the measurement units of the collected data differ, the standardisation method was used to enable direct and fair comparison of scores. To calculate the score of the main and sub-indices, the indicators in each category were averaged. The index was created using the weighted averages method (Arcadis, 2022).

The European Commission Directorate-General for Regional and Urban Policy's Quality of Life in European Cities survey was carried out using a questionnaire method with various groups. Data collected from secondary sources were used to increase knowledge about cities and to support subjective information with objective information. The index was created by weighting the survey results and data collected from secondary sources (European Commission, 2020). The Numbeo Quality of Life Index is based on user surveys. The surveys reveal the perceptions and experiences of website visitors on various aspects of quality of life. The index is calculated using an empirical formula that assigns weights to each factor according to its importance (Numbeo, 2022). The Eurofound European Quality of Life Survey is based on a questionnaire survey of people aged 18 and over (Eurofound, 2016). Mercer Quality of Living Ranking was carried out using the survey method in cooperation with multinational companies and experts in the field (Mercer, 2019). Again, in the Life Satisfaction Survey (2022) conducted by TURKSTAT, a household survey was conducted

on all individuals aged 18 years and over in households selected as a sample throughout Türkiye. Stratified two-stage systematic cluster sampling method was used in the sampling and selection method. Since there are unequal selection probabilities as a result of the data set selected from the sample, the weighting process was carried out (TURKSTAT, 2022).

When the studies conducted at the district level in İstanbul (Şeker, 2015; Şeker et al., 2020) are analysed, it is observed that Eyüpsultan is in the same group (Group 3). In Şeker et al. (2020), Quality of Life Index: İstanbul 2020 study, it was observed that Eyüpsultan district ranked 21st among 39 districts with an index score of -0.011.

In this study, some directly observed variables were used to measure the concept of urban quality of life at the neighbourhood level. For example, observed variables such as population, surface area, age dependency ratio will be used to measure the demographic structure, which is one of the sub-dimensions of the concept of quality of life. Thus, both theme and general urban quality of life index scores were calculated for 22 neighbourhoods of Eyüpsultan district.

In the first stage of the index study, the first data set was created by collecting secondary data on the indicators determined as a result of the literature review. In order to ensure that the indicators in the obtained data set are not biased according to the differentiating characteristics of the neighbourhoods such as geographical characteristics, demographic structure, etc., data validation was carried out by proportioning the indicators deemed necessary to the area, population, number of dwellings, etc. values of the neighbourhoods. In the data cleaning phase after validation, especially outliers were analysed and the data were reviewed again. Finally, all data were classified according to the themes determined in the literature review and methodology determination process, and a raw data set was created.

$$T_i$$
$$(i:1..... k)$$

The raw data set included variables with different units of measurement such as time, kwh, kilometer. Therefore, in order to reveal meaningful relationships among the data masses with data mining, the data were made independent of the unit of measurement. For this purpose, the data were standardised since the observations of the variables in the data matrix have different means and different variances. Standardised values were calculated by dividing the distance of each indicator value from the related indicator mean by the standard deviation. Thus, a scaled data set independent of the unit of measurement was obtained.

Standardisation

Z: Indicator Standardised Value

μ : Indicator Average

σ : Indicator Standard Deviation

i: Neighbourhood 1,2,3,4, ...,22

j: Indicator 1,2,3,4, n

$$Z(i)_j = \frac{x(i)_j - \mu_j}{\sigma_j}$$

With the data transformed in the scaled dataset, it was possible to define the common and basic meaning covered by a large number of information sets with different dimensions in a single dimension. The theme index scores of each neighbourhood were calculated by taking the weighted averages of the theme indicators classified in such a way that separate score values were measured for all themes, using the weights determined in the previous step.

Theme Index Calculation

Z: Indicator Standardised Value

μ : Indicator Average

ω : Indicator Weight

i: Neighbourhood 1,2,3,4, ,22

j: Indicator 1,2,3,4, n

$$T(i) = \frac{\sum_{j=1}^n \omega_j Z(i)_j}{\sum_{j=1}^n \omega_j}$$

It is assumed that measurable indicators compiled from secondary data measure more objective values than indicators based on perception (e.g. satisfaction), which are more fragile. In addition, the fragility of the indicator's measuring perception is considered to be affected more quickly and harshly by any social, political, etc. current events. To reach a healthier result by balancing this situation, it is aimed to calculate the weight scores of the indicators in the variable list with the opinions and suggestions of the relevant experts.

From the indices determined at the neighbourhood level, district indices and the general index score to represent Eyüpsultan in general were calculated. In the calculation of these scores, 3 different weightings were used. Firstly, a calculation was made for each theme based on the indicators that constitute it. In this calculation, the weights obtained because of the search conference mentioned above were taken into consideration in the inclusion of the relevant indicators. Thus, the relevant *Theme Index* scores were obtained

for each neighbourhood. Secondly, the theme indices calculated in the previous stage were calculated using the weights specified in the table below. Thus, *General Index* scores were obtained for each neighbourhood.

$$\bar{T}(i) = \frac{\sum_{j=1}^k \omega(i)_i \bar{T}(i)_j}{\sum_{j=1}^k \omega(i)_i}$$

$$\bar{T}(i) = \frac{\sum_{j=1}^{22} \bar{T}(i) N_i}{\sum_{j=1}^{22} N_i}$$

$\bar{T}$ = General Index Index Score

N: Population

ω =Theme Weight

i: Neighbourhood 1,2,3,4,,22

j: Indicator 1,2,3,4, n

The General Index score was calculated by considering the themes, not the indicators. The general index score is considered as a combination of themes, not as a whole of the indicators that make up the themes. Since the themes were evaluated within themselves in the creation of the general index score, the repetition of indicators did not have a direct effect on the general index score. In other words, themes were evaluated through indicators, and the general index was evaluated through theme scores. In the broadest framework, if an indicator is included in more than one theme, it is interpreted that the importance of that indicator is higher than the others and its impact should be higher.

Finally, the General Index scores calculated for each neighbourhood were weighted in proportion to the neighbourhood populations and the Eyüpsultan Overall Index score was obtained. By calculating both the themes and the general index scores at the neighbourhood level of Eyüpsultan district, the development of the neighbourhoods over the years can be followed and by examining their scores according to the themes, it is possible to follow policies to improve the quality of urban life at the neighbourhood level.

2. FINDINGS

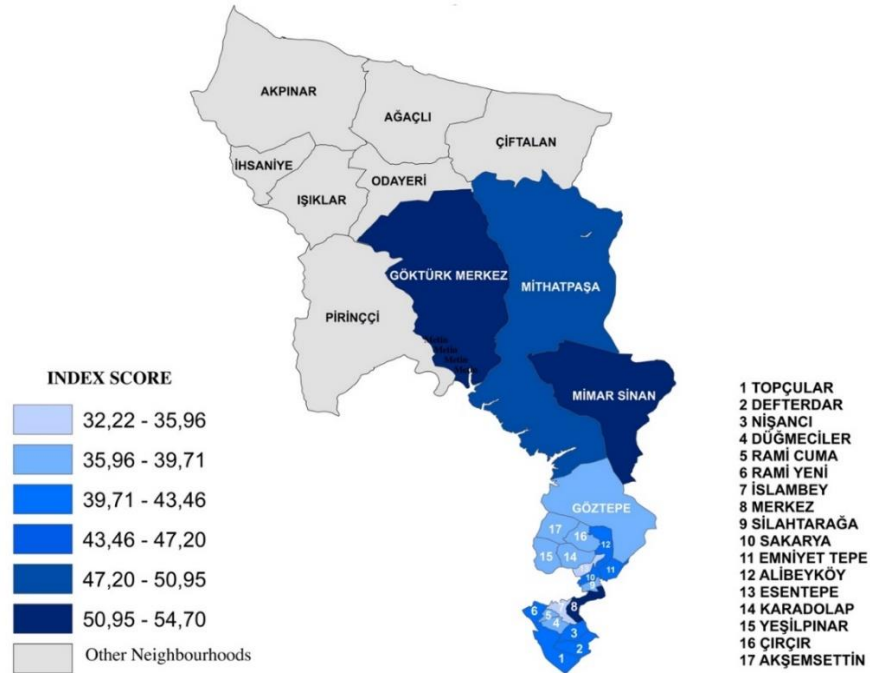
When the results of the Urban Quality of Life Index are examined, Göktürk Merkez is the neighbourhood with the highest quality of life in Eyüpsultan with an index score of 54.70. In the main index, Göktürk Merkez neighbourhood is followed by Mimar Sinan neighbourhood with 54.34 index score, Merkez neighbourhood with 52.61 index score and 5. Levent neighbourhood with 52.30 index score. On the other hand, the neighbourhoods with the lowest quality of life among the 22 neighbourhoods analysed are Döğmeciler neighbourhood with an index score of 36.34, İslambey neighbourhood with an index score of 33.63 and Esentepe neighbourhood with an index score of 32.22.

Table 13. Eyüpsultan Urban Quality of Life Index

Sequence	Neighbourhood	Index Score	Sequence	Neighbourhood	Index Score
1	Göktürk Merkez	54,70	12	Rami Yeni	40,15
2	Mimar Sinan	54,34	13	Karadolap	39,60
3	Merkez	52,61	14	Akşemsettin	38,25
4	5. Levent	52,30	15	Yeşilpınar	38,12
5	Mithatpaşa	47,80	16	Çırçır	37,36
6	Emniyettepe	41,94	17	Silahtarağa	37,22
7	Defterdar	41,16	18	Rami Cuma	36,88
8	Topçular	41,12	19	Güzeltepe	36,60
9	Sakarya	41,02	20	Düğmeciler	36,34
10	Nişancı	40,84	21	İslambey	33,63
11	Alibeyköy	40,21	22	Esenteppe	32,22

Map 1 shows the distribution of Eyüpsultan neighbourhoods subject to the study according to their general index scores.

Map 1. Eyüpsultan Urban Quality of Life Index at Neighborhood Level



There are 12 sub-indices under the main index. The sub-indices forming the main index also consist of various indicators. Disaster and Infrastructure Index consists of 12 indicators. The sub-index results are given in Table 14 5. Levent neighbourhood ranked first in the Disaster and Infrastructure Index. 5. Levent neighbourhood was followed by Mimar Sinan, Sakarya, Çırçır and Akşemsettin neighbourhoods. In the neighbourhoods ranked first in the Index, it can be shown that the ground is suitable for earthquakes, the newly built houses are located more in these areas, the emergency gathering area capacities are more and the infrastructure is sufficient.

Satisfaction with Urban Services Index consists of 10 indicators. The neighbourhood ranked first in this index is the 5. Levent neighbourhood. 5. Levent neighbourhood is followed by Deftardar, Mimar Sinan, Silahtarağa and Rami Cuma. Among the factors affecting the index results are the applications of individuals to IMM, İGDAŞ and İSKİ institutions. Expectations, demands and complaints of the individuals living in the region are reflected in the index results. Environment and Green Space Index consists of 5 indicators. In this index, Mimar Sinan, Deftardar, Merkez, Mithatpaşa and Silahtarağa neighbourhoods have the highest scores. Among the indicators affecting the index, the number of parks in the neighbourhood, the areas covered by the parks and the geographical location of the neighbourhoods were effective.

Education Demography Index consists of 7 indicators. In this index, Göktürk Merkez neighbourhood ranked first with an index score of 84.97. Göktürk Merkez was followed by Mimar Sinan (43.5) and 5. Levent-Güzeltepe (39.5) neighbourhoods with the same index score. The socio-economic factor is responsible for the high difference between the neighbourhood ranked first in this index and the other neighbourhoods. The Education Infrastructure Index consists of 13 indicators. The neighbourhoods ranked first in this sub-index are Merkez, 5. Levent, Karadolap, Emniyetetepe and Nişancı. The reason why these neighbourhoods rank first is that most of the population is concentrated in these neighbourhoods, they are close to the centre of the İstanbul metropolis in terms of geographical location, and depending on the number of schools, there are indicators such as libraries, books, student services, and sports halls. Education should not be seen as an aim to find a job or to develop technology. It is also an important public service to contribute to the development of society, to live in harmony with the society, to ensure self-improvement and self-realisation of the individual, to protect the environment, to live in positive interactions with other cultures and to benefit from more advanced urban services. In this framework, a general deterioration in the educational situation in a city can be expected to have negative repercussions on the functioning of the city in many respects.

Commercial Capacity Index consists of 18 indicators. The neighbourhoods ranked first in the index are Topçular, 5. Levent, Deftardar, Göktürk Merkez and Merkez, respectively. Among the reasons why these neighbourhoods ranked first are the indicators in Table 7 and the population of the neighbourhoods. Economic

Welfare Sub-index consists of 13 indicators. 5.Levent, Göktürk Merkez, Mithatpaşa, Mimar Sinan and Topçular are the neighbourhoods ranked first in the index.

While the security index consists of 3 indicators, Sakarya, Rami Yeni, Rami Cuma, Düğmeciler and 5. Levent were the leading neighbourhoods in the index ranking. The indicators affecting the ranking of these neighbourhoods in the first place were the type of crime, the total crime committed in the district and the population of the neighbourhoods.

Table 14. Eyüpsultan Urban Quality of Life Sub-Index Results

Disaster and Infrastructure Index		Satisfaction Index for Urban Services		Environment and Green Space Index		Education Demographics Index	
Neighbourhood	Score	Neighbourhood	Score	Neighbourhood	Score	Neighbourhood	Score
5.Levent	77,40	5.Levent	78,13	Mimar Sinan	57,67	Göktürk Merkez	84,97
Mimar Sinan	74,93	Defterdar	64,68	Defterdar	53,47	Mimar Sinan	43,50
Sakarya	69,73	Mimar Sinan	54,50	Merkez	48,37	5.Levent	39,50
Çırçır	57,56	Silahtarağa	52,92	Mithatpaşa	47,81	Güzeltepe	39,50
Akşemsettin	55,63	Rami Cuma	52,51	Silahtarağa	42,25	Mithatpaşa	38,92

Education Infrastructure Index		Commercial Capacity Index		Economic Welfare Index		Safety Index	
Neighbourhood	Score	Neighbourhood	Score	Neighbourhood	Score	Neighbourhood	Score
Merkez	61,15	Topçular	57,04	5.Levent	81,18	Sakarya	98,32
5.Levent	60,36	5.Levent	54,31	Göktürk Merkez	76,85	Rami Yeni	92,91
Karadolap	59,82	Defterdar	44,53	Mithatpaşa	70,72	Rami Cuma	90,74
Emniyetetepe	59,74	Göktürk Merkez	44,32	Mimar Sinan	62,56	Düğmeciler	89,87
Nişancı	55,04	Merkez	42,56	Topçular	53,24	5.Levent	89,27

Health Index		Social Life Index		Transport Index		Population Demography Index	
Neighbourhood	Score	Neighbourhood	Score	Neighbourhood	Score	Neighbourhood	Score
Merkez	95,22	Merkez	74,74	Alibeykoy	80,47	Mithatpaşa	75,23
Mimar Sinan	92,04	Rami Yeni	49,94	Merkez	77,59	Mimar Sinan	71,13
Göktürk Merkez	74,53	Göktürk Merkez	47,74	Karadolap	71,35	Göktürk Merkez	53,83
Mithatpaşa	67,53	Yeşilpınar	46,17	Göktürk Merkez	69,24	Topçular	48,59
Rami Cuma	63,48	Alibeyköy	40,38	Defterdar	67,49	Defterdar	48,24

The health index includes 5 indicators. There are two neighbourhoods that stand out in this index and have high index scores compared to other neighbourhoods. These neighbourhoods are Merkez with an index score of 95.22 and Mimar Sinan with an index score of 92.04. Göktürk Merkez, Mithatpaşa and Rami Cuma neighbourhoods are the other leading neighbourhoods in the Health Index. Especially in metropolises, health services are likely to create costs that are inaccessible to various segments of the society. It is thought that the health problems of individuals will gradually increase due to the ever-increasing costs of transport, food and housing needs. In this framework, the services of local governments come into an even more important focus.

Social Life Index consists of 17 indicators. Merkez neighbourhood has a high score compared to other neighbourhoods with an index score of 74.74. Merkez neighbourhood is followed by Yeni Rami, Göktürk Merkez, Yeşilpınar and Alibeyköy.

Transport index consists of 11 indicators. The neighbourhoods ranked first in the index are Alibeyköy, Merkez, Karadolap, Göktürk Merkez and Defterdar. Indicators such as transport diversity, number of stops, number of lines are included in the index. In the studies, İstanbul is not in a good position in terms of transport times and ease of transport. In this framework, indicators related to the time spent in transportation gain importance. It should also be considered that these may be the source of other problems in many aspects such as labour force participation and access to job opportunities, access to housing opportunities, access to health and education services, and should be evaluated as a strategic area. Population demography index consists of 15 indicators. The neighbourhoods ranking first in this sub-index are Mithatpasa, Mimar Sinan, Göktürk Merkez, Topçular and Defterdar.

CONCLUSION

The Urban Quality of Life Index constructed at the neighbourhood level has been studied as an example of Eyüpsultan district in İstanbul metropolis. With the study conducted in Eyüpsultan district at neighbourhood level, weak and strong aspects of Eyüpsultan district within the framework of quality of life have been determined. Within the framework of quality of life, analyses have been carried out on the direction of municipal services, the direction of investments, environmental regulations, housing demographics.

When analysed within the framework of the sub-index, there are 14 neighbourhoods that are below the index average in the Disaster and Infrastructure Index. Local and central administrations should identify the infrastructure, temporary shelter stocks, emergency gathering areas, buildings that may be damaged in a possible earthquake in these neighbourhoods and necessary measures should be taken. Disaster and

Infrastructure Index is of great importance in terms of resilience against natural and technological disasters and climate crisis. It is possible to make some risks related to the quality of life more visible with indicators such as the composite indicators of the index indicators in question, for example, the ratio of the number of houses at risk of being lost due to climate change in the total number of houses. In this way, it becomes possible to make more meaningful assessments in terms of planning. It is considered that such indicator sets should be transferred to quality of life assessments as soon as they are available.

There are 15 neighbourhoods below the index average in the Environment and Green Space Index. Considering the indicators included in the index, the green areas of the neighbourhoods should be increased, and new parks and green areas should be increased in addition to the existing parks and green areas. The cleanliness and regularity of circulation areas and green areas are issues that are generally not fully questioned. Generally, proximity to green areas is considered as the only criterion. However, the quality, cleanliness and tidiness of these areas is an important dimension, and it is thought that it would be useful to be addressed separately.

There are 7 neighbourhoods below the index average in the Education Infrastructure Index. Deficiencies in schools in these neighbourhoods should be identified, and necessary measures should be taken to improve the existing infrastructure. If only indicators related to education are taken into consideration, increases/decreases in these indicators may not fully reflect the increases/decreases in the quality of life. Therefore, taking into account the difficulty in accessing data, it is important to monitor the results of education on individuals as well as accessibility to education.

There are 12 neighbourhoods below the index average in the Commercial Capacity Index and 15 neighbourhoods below the index average in the Economic Prosperity Index. Necessary improvements should be made in these neighbourhoods and new investments should be made in the neighbourhoods where they are relatively more inadequate to maintain the balance within the district. In terms of quality of life, monitoring indicators on whether individuals have opportunities for self-improvement, the formation of qualified and new job opportunities, improving the accessibility of lifelong education, and whether advanced technology or knowledge- intensive business lines are developed should be among the important issues for future studies.

In the Health Index, 14 neighbourhoods are below the index average. Within the framework of the sub-components of the index, improvements such as increasing the number of doctors and pharmacies should be made in the neighbourhoods below the index average depending on the population. Problems such as air pollution and energy crises observed in cities will cause health problems and significant deterioration in individuals. In metropolises, the limited green areas and the general quality of these areas and the facilities they offer are also becoming larger, and the inability to establish a work-life balance and the associated decrease in



physical activities lead to an increase in health problems. Therefore, health services should be handled in a holistic manner.

When the Social Life Index is examined, there are 14 neighbourhoods below the index average. In order to strengthen the neighbourhoods that are below the index average, district and metropolitan municipalities, NGOs and private organisations should cooperate together for the realisation and capacity building of social facilities in these areas. Thus, it will be possible to eliminate the imbalance between neighbourhoods within the index as much as possible.

Finally, there are 10 neighbourhoods below the index average in the Transportation Index. Again, when evaluated within the framework of the index components, the ministry, district and metropolitan municipality should work in cooperation for the development of these neighbourhoods, which are below the index average. This will help to eliminate the imbalances that may occur within the neighbourhoods such as transportation diversity, number of stops, length of bicycle paths, number of car parks and number of taxis.

As a result of this study, it was concluded that the quality-of-life index at the neighbourhood level would be applicable in İstanbul and that there is a need for İstanbul metropolis with the example of Eyüpsultan district. When compared to other cities, İstanbul is a city where differences are encountered to a great extent. When compared with other cities, especially in terms of development, competitiveness, socio-economic structure, the results of the study pointed out that different readings/studies should be carried out. Therefore, it is concluded that İstanbul should be examined at the neighbourhood level. Thus, with this study, it is aimed to guide policy makers, researchers, actors who live/will live in the city, public decision makers and to enable the course of policies to be implemented in this context and the accessibility of research and studies within the scope of data.

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