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A Perception Survey for the Evaluation of Urban Quality of Life in Kocaeli and a Comparison of the Life Satisfaction with the European Cities

Nihal Senlier · Reyhan Yildiz · E. Diğdem Aktaş

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Abstract Studies on urban quality of life (QoL) have been attracting lots of attention from various countries due to the deterioration of urban environment and decrease of the urban QoL. These studies that have been supported by international organizations such as United Nations, World Bank, OECD, European Commission and EUROSTAT (European Statistics) involve comparative assessment of life satisfaction in the European cities and comparing cities facilitate the exchange of experiment and improve the quality of local policies. The main objective of this study is to measure the local perceptions of QoL in Kocaeli, which is one of the important industrial cities of Turkey and compare the life satisfaction with the European cities. Generally, two different types of indicators have been used: objective and subjective indicators. The objective indicators cover five fields: socio-economic aspects, participation in civic life, education and training, environment and culture, and leisure. The subjective indicators are mainly for valuation of QoL perceptions in a city. In this research, a perception survey will be carried out to measure the local perceptions of QoL in Kocaeli. This survey will present on issues for which the residents in the Kocaeli had widely diverging opinions: employment opportunities, housing costs, safety, cleanliness of city, public transport, air quality and overall satisfaction with the QoL of their city. Thus, the study will become a major reference for local officials to improve QoL in Kocaeli and contribute to researches on QoL in cities.

Keywords Urban quality of life · Objective indicators · Subjective indicators · Perception survey · European cities · Kocaeli

N. Senlier (✉) · R. Yildiz · E. D. Aktaş
Department of City and Regional Planning, Faculty of Architecture, Gebze Institute of Technology,
Cayirova, No. 101, Gebze, Kocaeli, Turkey
e-mail: nsenlier@tnn.net

R. Yildiz
e-mail: ryildiz@gyte.edu.tr

E. D. Aktaş
e-mail: daktas@gyte.edu.tr

1 Introduction

Solutions to the social, economical and cultural problems, and responses to the needs of those living in the cities, that are arising as a result of uncontrolled growth of cities, constitute the most important and basic topics of Urban Planning. The concepts of livability and urban QoL, which are the basic units of urban sustainability, have priority in planning and political agenda of today, and appear among the most important factors of the competition between the cities.

Protection and healing of urban environment, and subjects related to improvements in urban QoL, all in order to provide global and local sustainability, take important place in Europe's current planning and political agenda. In the European Spatial Development Perspective Report, which was prepared by European Commission in 1999, it is stressed that today most of the cities are fighting against environmental problems like noise, air and water pollution, traffic, waste, extreme water consumption and that there exists a necessity to improve the environmental quality in most of the urban areas (Commission of the European Communities 1999).

The basic principles of sustainability of European Union for increasing the urban QoL, were stated in the report of Guiding Principles for Sustainable Spatial Development of European Continent, which was published in 2000, as follows:

1. Promoting territorial cohesion through a more balanced social and economic development of regions and improved competitiveness,
2. Encouraging development generated by urban functions and improving the relationship between urban and countryside,
3. Promoting more balanced accessibility,
4. Developing access to information and knowledge,
5. Reducing environmental damage,
6. Enhancing and protecting natural resources and natural heritage,
7. Enhancing the cultural heritage as a factor for development,
8. Developing energy resources while maintaining safety,
9. Encouraging high quality, sustainable tourism,
10. Limitation of the impacts of natural disasters.

To realize these principles, researches are continuing and existing studies are being updated for many European cities. These studies, which are conducted by Urban Audit in cooperation with European Union and EUROSTAT (European Statistics), make comparisons among cities by using subjective and objective indicators in evaluation of urban QoL.

The objective of this study is to evaluate the QoL of Kocaeli, one of the most important industrial cities of Turkey, and its comparison with similar European cities. As Turkey is in the integration period to European Union, the QoL studies made by Urban Audit for 31 European cities, was taken as the basis of methodology utilized in this study. In this study, which compares the European cities and metropolitan areas from the points of opportunities that they provide to their inhabitants, subjective indicators related to the urban QoL, such as job opportunities, housing costs, security, cleanliness of cities, public transportation, air pollution, integration of immigrants, are utilized (Urban Audit Perception Survey 2004).

Kocaeli city, which constitute the subject of this study, takes place in the Marmara Region of Turkey, which receives the highest amount of internal migration (Fig. 1). Economical activities in the Marmara Region are the main reason for migration. This region, covering also Istanbul Metropolitan area, is a country wide attraction point, with its



Fig. 1 Marmara region and the location of Kocaeli city

commercial capacity, developed transportation possibilities, technical substructure, and high employment opportunities. The economical structure of Kocaeli, in a similar manner to Marmara Region, is based on activities in industrial, commercial, and services sectors. With its %13 contribution to the Turkey's total manufacturing production, Kocaeli is the second important industrial city of the country after Istanbul for the last 20 years.

The increase in population as a result of developments in industrialization and the consequential rapid structuring to meet the housing needs resulted with decreases in the environmental and urban QoL. Therefore, the fact of rapid structuring emerged as the topic to be handled in priority for the sustainable development of the city. The basic aim of this study is to enlighten this subject, to display the subjective perceptions of the inhabitants on urban QoL, to compare Kocaeli with European cities having similar qualifications, and thus presenting a general perspective to help introducing sustainable development principles for the city of Kocaeli.

2 Literature Review on Urban Quality of Life

Livability and urban QoL appear as important indicators on the sustainable development of settlements. Many scientific researches and institutional studies made until today on these subjects build up principles on increasing urban QoL.

While in 1970s, during the first studies on urban QoL in the United States and in England, the definition of life quality was the main topic (Wish 1986), in time, studies began to focus on measuring the urban QoL and determination of objective and subjective indicators (Stimson et al. 1999; Yuan et al. 1999; Cummins 1999; Seik 2000; Diener and Lucas 2000; Moller 2001; Mee 2002; Kamp et al. 2003; Lee 2005; McCrea et al. 2006).

The urban QoL can be described as “the relation between the individual perceptions and the feelings of people, and their experiences within the space they live in”. Although there are many cultural, social, economical, environmental, personal factors that have an effect on the QoL, there exist some basic factors (Wish 1986):

1. Economic vitality,
2. Feeling of space,
3. Cultural activities,
4. Good quality housing stock,
5. Easy access to services like health, sports, education, shopping, child-care,
6. Social organizations,
7. Need for forming a sustainable environment,
8. Security and privacy.

The most important point in evaluating these factors, that appear as the objective indicators, is to measure how they are perceived by that population, as that may change from one culture to another and from one country to another. All research studies emphasize that the QoL is very much connected to the perceptions, feelings, and subjective values of the persons. Satisfaction and happiness indicators are accepted to be the most important criterion in measuring the subjective values.

After 1980s, urban QoL studies began to focus on definitions of objective and gradually subjective indicators for measuring the QoL. The objective indicators are those economical and social indicators, obtained through utilization of data of institutional reports and statistics, and are utilized by planners and economists in order to benefit the findings especially on the levels of region, city, and environment (Yuan et al. 1999). The subjective indicators on the other hand, are obtained from the opinion surveys and survey research reports made to measure the perceptions of QoL and satisfaction of the urban inhabitants.

Cummins (1999), in his definition of QoL in both objective and subjective manner, states that seven important topics arise, such as, welfare, health, productivity, privacy, security, population, and emotional welfare. Objective area covers criterion related with the culture. Subjective area on the other hand has a wider coverage with perceptions.

Kamp et al. (2003), emphasize that urban QoL is associated with several components like personal and communal development, health, security, physical environment, and natural resources (Fig. 2).

Stimson et al. (1999), defined urban QoL and its dimensions as economical, social and environmental livability and developed an urban metabolism model. In this model that they

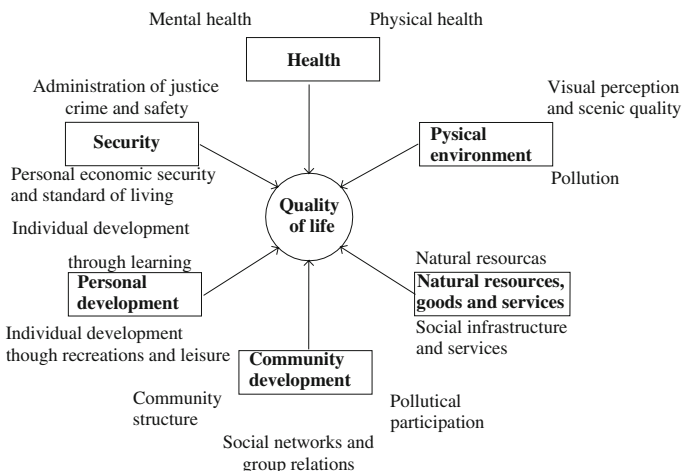


Fig. 2 Quality of life components Kamp et al. 2003

developed by focusing on the urban QoL in parallel to the sustainable development, they build up a theoretical frame to analyze the performance of the city as a complex and dynamic formation. They utilized the urban metabolism approach to display the conceptual basis of developing the functionality of cities, measuring changes, growth, and QoL.

In the recent researches on urban QoL, next to the studies on determination of subjective perceptions (Rapley and Hopgood 1997; Seik 2000; Moller 2001; Lee 2005), and explanations on relations among subjective and objective data (Kamp et al. 2003; Marans 2003; McCrea et al. 2006), studies on comparisons among different cities of the world (Sinden 1982; Sufian 1993; Giannias 1998) rise to notice. In these studies, researchers utilize different techniques and methodologies like ANNOVA, NULL hypothesis, LISREL, SEM, and Regression Analysis.

In the last years the studies are focusing on developing countries and cities becoming newly industrialized (Lee 2005). The city of Kocaeli, the subject of this study, is one of the most important industry cities of Turkey.

3 Method

In this study aiming to evaluate the urban QoL for the sustainable development of Kocaeli city, the urban QoL studies made for European cities by Urban Audit, an organization executing its studies in collaboration with European Union and EUROSTAT (European Statistics), are taken as the starting point. In the studies made by Urban Audit for 31 European cities through utilizing subjective indicators, satisfaction levels related with urban QoL in European cities were measured from the points of employment opportunities, housing costs, urban safety, cleanliness of cities, satisfaction with public transport, air quality, integration of inhabitants, and comparisons among the cities were made. In this study, taking the surveys of Urban Audit as basis, total 300 perception surveys were made with the inhabitants of Kocaeli. Figure 3 shows that research area. It cover different function of the city center, such as open space, industrial area, commercial area and housing area. Considering the specific differences of Turkey and Kocaeli city, new questions were added to the survey.

Survey results were evaluated by factor analysis and regression analysis by utilizing SPSS (Statistical Package for Social Sciences) statistical analysis software. Through the factor analysis method, which is a multivariable type of analysis, factor structure of urban QoL variables of Kocaeli were displayed.

Factor analysis is a methodology used to transform interrelated data structures to less number of non-related data structures, and to determine common factors by grouping the variables. In order to find out the functional relation among the variables, Linear Regression Analysis which display the causality relation among one related and one non-related two variables. If non-related variable is X and the related variable is Y , the functional relation among the two variables can be expressed as $Y = f(X)$. Y can be obtained by giving a value X_i to the variable X .

$$F(X) = B_0 + B_1X_i$$

In the study, to display the variables and the relations among these variables, the research model shown in Fig. 4 is developed.

In the research model, in order to determine overall satisfaction with the quality of life of the city, the below given hypotheses were introduced:

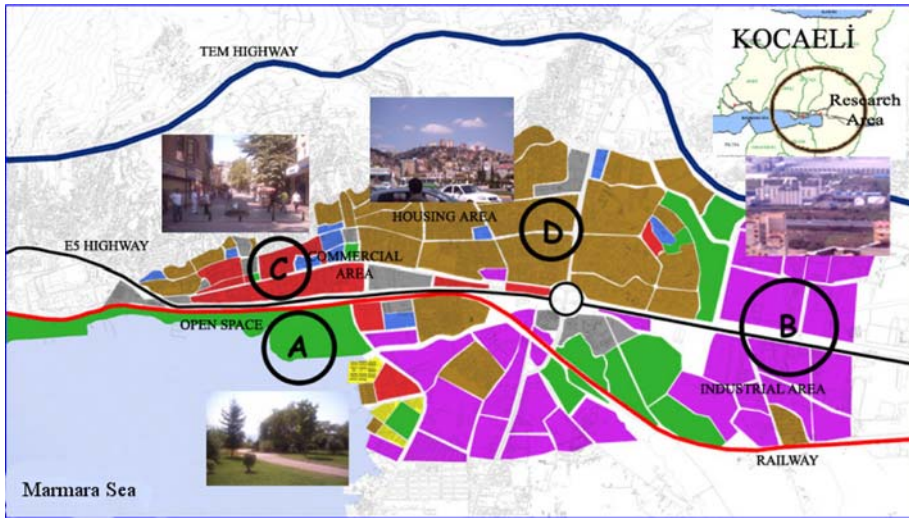


Fig. 3 Research area. *A* Open space (60 surveys), *B* industrial area (80 surveys), *C* commercial area (80 surveys), *D* housing area (80 surveys)

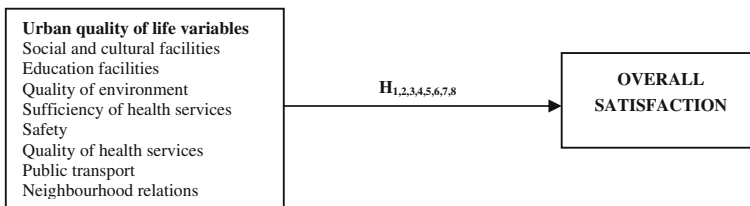


Fig. 4 Theoretical research model

- H₁:** As social and cultural facilities increase, overall satisfaction increases.
H₂: As educational facilities increase, overall satisfaction increases.
H₃: As quality of environment increases, overall satisfaction increases.
H₄: As the sufficiency of health services increase, overall satisfaction increases.
H₅: As the feeling of safety in the city increases, overall satisfaction increases.
H₆: As the quality of health services increase, overall satisfaction increases.
H₇: As transportation possibilities in the city increase, overall satisfaction increases.
H₈: As neighborhood relations improve, overall satisfaction increases.

4 Evaluation of Survey Data

In order to determine the factor structure related to the urban QoL variables, varimax rotating factor analysis is applied. At the end of the analysis, questions related to the QoL are loaded to eight factors, namely, social and cultural facilities, educational facilities, quality of environment, quality of health services, safety, sufficiency of health services, public transport, and neighborhood relations. As some of the questions corrupt the factor

Table 1 Factor analysis

Urban QoL variables	Factor weights
Social and cultural facilities (Cronbach α : 0.74)	
Movie theaters	0.716
Cultural possibilities like concert halls, theaters, museums, and libraries	0.715
Sports possibilities like sports grounds, gymnasiums	0.665
Public internet access like internet cafes and libraries	0.648
Green area like public parks and gardens	0.605
Internet access at home	0.577
Educational facilities (Cronbach α : 0.79)	
Number of schools is sufficient	0.837
Access to schools is easy	0.833
Schools are not crowded	0.722
Quality of environment (Cronbach α : 0.75)	
Noise pollution is a serious problem in Kocaeli city	0.863
Air pollution is a serious problem in Kocaeli city	0.813
Water pollution is a serious problem in Kocaeli city	0.753
Sufficiency of health services (Cronbach α : 0.84)	
The number of doctors in hospitals is sufficient	0.843
The number of hospitals in the city is sufficient	0.841
Safety (Cronbach α : 0.83)	
You feel safe in the neighborhood you are living in	0.910
You feel safe in Kocaeli	0.869
Quality of health services (Cronbach α : 0.78)	
Quality of service provided by doctors	0.905
Quality of service provided by hospitals	0.873
Public transport (Cronbach α : 0.61)	
Public transportation fees are appropriate	0.731
Parking areas are sufficient	0.712
Access to public transportation is easy	0.703
Neighborhood relations (Cronbach α : 0.73)	
Your neighbors did not disturb you by making noise, etc.	0.863
Your relations with your neighbors are good	0.800
Overall Satisfaction (Cronbach α : 0.62)	
Are you happy for living in Kocaeli	0.786
In the coming 5 years living in Kocaeli will be better	0.716

structure and their factor loads were low, they were taken out of survey and most suitable factor structure was obtained (Table 1).

Reliability test (cronbach alfa) results, displaying the reliability of the developed criterion, are shown in Table 1. The results of the factor analysis evaluation give the reliability coefficients (cronbach alfa) over 70% for the factors of social and cultural facilities, sufficiency of education, environmental and health services, quality of security and health services and neighborhood relations. Although the reliability coefficients for transportation factors are between 60 and 70%, it is known from literature that the

reliability coefficients in this range are acceptable (Hair et al. 1998; Santos 1999). The most effective factors in different factor groups can also be observed from Table 1. As an example, in the subject of environment, while noise pollution is the first effective factor, second effective factor is air pollution. On the other hand, safety subject attracts attention as one of the most important factors determining the QoL in Kocaeli city.

A regression analysis is made to explain the functional relation among the urban QoL and the variables. The regression model to test the hypotheses is as follows:

$$S = \beta_0 + \beta_1 \times \text{SCF} + \beta_2 \text{EF} + \beta_3 \times \text{QE} + \beta_4 \times \text{SHS} \\ + \beta_5 \times s + \beta_6 \times \text{QHS} + \beta_7 \times \text{PT} + \beta_8 \times N + e$$

(*S*, overall satisfaction; SCF, social and cultural facilities; EF, education facilities; QE, quality of environment; SHS, sufficiency of health services; *s*, safety; QHS, quality of health services; PT, public transport; *N*, neighborhood relations).

Model 1, which inquires the effects of social and cultural facilities, sufficiency of educational, environmental and health services, quality of safety and health services, transportation and neighborhood relations, on urban QoL and satisfaction, is statistically found meaningful ($F = 11.946$; $p < 0.001$). Evaluation of regression parameters demonstrate that educational facilities ($p < 0.01$), security ($p < 0.01$), transportation possibilities ($p < 0.01$), and neighborhood relations ($p < 0.01$) increase the urban QoL positively, whereas social and cultural possibilities, quality and sufficiency of health services did not have a statistically meaningful effect on urban QoL ($p > 0.05$). Effect of environmental quality on urban QoL is statistically meaningful but in the negative way. That is, as the quality of environment decreases, the satisfaction of the inhabitants decreases ($\beta = -2.437$, $p < 0.01$). Through the findings obtained from the sampling, H_2 , H_3 , H_5 , H_7 , and H_8 hypotheses are supported whereas H_1 , H_4 , and H_6 hypotheses are not supported (Table 2).

An examination of β coefficients of Model 1 demonstrates that the variable security has the highest effect on urban QoL. It is followed, in decreasing order, by variables of educational facilities, neighborhood relations, quality of environment, and public transport.

Table 2 Effects of urban QoL variables on satisfaction

Satisfaction (Model 1)		
Independent variables	Dependent variable	
	β	<i>T</i>
Constant	0.308	0.856
Social and cultural facilities	0.015	0.161
Education facilities	0.161	2.968**
Quality of environment	-0.126	-2.437**
Sufficiency of health services	0.043	0.461
Safety	0.210	3.762**
Quality of health services	0.078	1.385
Public transport	0.111	1.948**
Neighborhood	0.160	2.913**
Model <i>F</i>	11.946	
R^2	0.247	
Adjusted R^2	0.227	

** 0.01; * 0.05

5 Comparative Assessment of Urban QoL in Kocaeli and European Cities

In this part of the article, European cities that are similar in size with Kocaeli, Lisboa, Torino, Helsinki, Rotterdam, Kobenhavn, Stockholm, Bruxelles, München, Wien and Marseille are compared from the point of urban QoL. In this comparison, important topics of urban QoL, such as, employment opportunities, housing cost, urban safety, cleanliness of the city, satisfaction with public transport, air quality, are considered.

When European cities are evaluated from the point of employment opportunities, it is observed that there exists a general pessimism for in the labor market. Although employment opportunities are higher in the cities, it is observed that the process of job search is not easy in the cities and unemployment rates are higher in the cities comparing to suburban areas. In the English speaking cities, limited majority thinks that they can find a job easily. There exists a common opinion that difficulties exist in finding a job in Lisboa. It is observed that in the cities of Helsinki, Stockholm, Bruxelles, employment opportunities are relatively better comparing to the other cities. On the other hand, in the city of Kocaeli, 55% of the participants to the survey stated that they it is not possible to find a job easily, whereas 35% believes that they can easily find a job. Although the city of Kocaeli, as can be observed from Fig. 5, offers more employment opportunities comparing to the European cities of Torino and Lisbaö, those participants to the survey who believe that they can easily find a job stated that this opinion is valid only for low wage jobs.

It is observed that in European cities having better employment opportunities, housing costs are higher. Nonetheless, in the districts of the cities, which are perceived as having high QoL and more secure, the housing costs have an increasing tendency. In the city of Kocaeli, in a similar manner to European cities, there exist pessimism on the subject of finding an appropriate housing (Fig. 6). Seventy six percentage of the participants of the survey think that it is not possible to find a good housing at appropriate cost. Comparing with the European cities, Kocaeli has better possibilities for finding housing than Kobenhavn, München, and Helsinki. On the other hand Wien, and Rotterdam are better than Kocaeli on this issue.

Urban safety, as one of the most important topics of urban QoL, is observed to be an important problem in European cities (Fig. 7). While Lisboa takes notice for being among the cities where the feeling of safety is lowest, in the cities of Munich, Wien, Helsinki, and Kobenhavn feeling of safety is relatively better. For the city of Kocaeli, almost 70% of

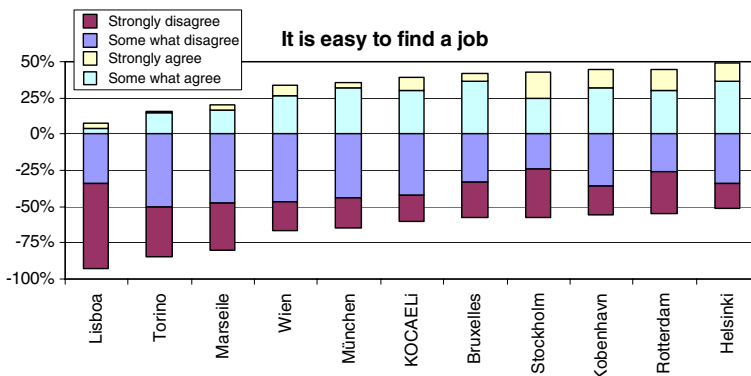


Fig. 5 Employment opportunities



Fig. 6 Housing cost

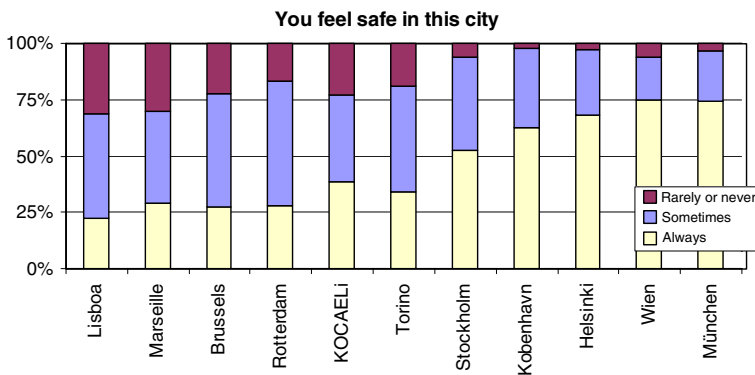


Fig. 7 Urban safety

inhabitants stated that they did not feel safe. This situation is resulting particularly from the fact that the city is located in the 1st degree earthquake zone, and had an earthquake disaster in 1999.

When the European cities are evaluated from the point of public transportation possibilities, it is observed that generally the inhabitants think positively (Fig. 8). It is observed that Helsinki, and Vienna provide good possibilities to make inhabitants happy, but the possibilities that Torino and Kopenhagen provide are relatively insufficient. Inhabitants of Kopenhagen mentioned that high rates of increase in transportation fees caused serious dissatisfaction. In the city of Kocaeli only 2% are satisfied from public transportation. With this rate Kocaeli is far behind other European cities. Eventhough the public transportation means are sufficient in European cities, continuation of new investments on this issue increases the satisfaction of inhabitants. In contrast to this, inhabitants of Kocaeli think that necessary studies and investment is not being done in order to develop the public transportation possibilities of their city.

As expected, air pollution appears as a serious problem in European cities (Fig. 9). Capitals and big cities take notice as locations of heaviest air pollution. Lisboa and Torino are the cities with serious air pollution problem whereas München and Stockholm are relatively better. In a similar manner in the industrial city of Kocaeli air pollution is a serious problem. thirty nine percentage of inhabitants definitely agree that the air pollution caused by industry is an important problem.



Fig. 8 Satisfaction with public transport

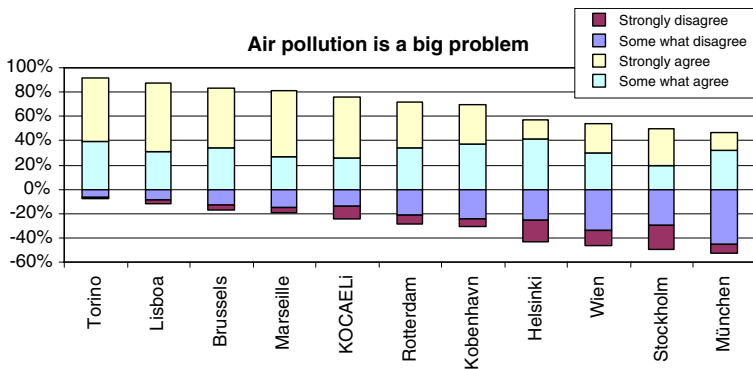


Fig. 9 Air quality

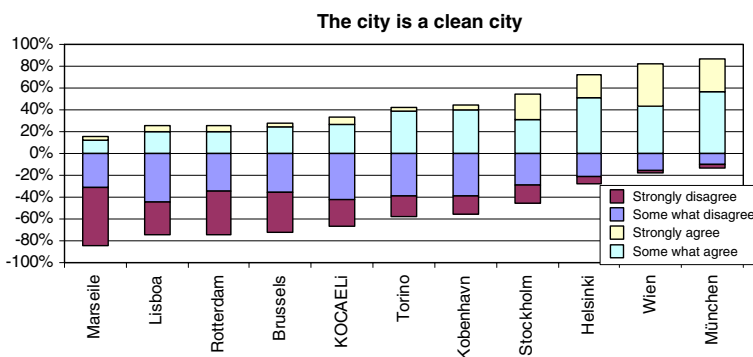


Fig. 10 A clean city

From the point of cleanliness, majority of inhabitants of European cities think that they are not living in a clean city (Fig. 10). While München and Wien appear as the cleanest cities, majority of inhabitants of Marseille stated that they definitely did not live in a clean city. In Kocaeli, 64% of inhabitants think that they did not live in a clean city.



Fig. 11 Satisfaction of urban residents

A general evaluation of European cities show that majority of participants to the survey are satisfied and happy for living in their cities (Fig. 11). Cities like Kobhenvan, Wien, and Stokholm are in the first positions in this respect. Cities with highest QoL are in the same time cities with highest economic strength. Sixty six percentage of inhabitants of Kocaeli stated that they are happy for living in this city. With this rate, Kocaeli takes attention to be the city that inhabitants are least satisfied to live in.

6 Results and Discussion

Although Kocaeli, one of the biggest industrial cities of Turkey, has a strong economy from the point of evaluation of development of cities, urban QoL does not reflect this state of economical development.

It is observed that for the city of Kocaeli, the variable having the highest effect on urban QoL is safety. With the 1999 Marmara earthquake Kocaeli suffered serious life and property losses. Many buildings and the city center were damaged during this disaster. Inhabitants were asked if they feel safe after this earthquake. Almost 70% of the inhabitants stated that they did not feel safe and happy after the earthquake. Another reason for this result is the ongoing increase in the crime ratios in the recent years. The other variables having gradually decreasing importance that effect the QoL in Kocaeli are observed to be educational facilities, neighborhood relations, quality of environment, and public transport. Neighborhood relations, is observed to be important for the inhabitants of Kocaeli.

In the industrial city of Kocaeli, in time, the industrial and residential areas overlapped and developed in an unhealthy and unplanned manner. Shifting of development areas towards agricultural and forest areas as a result of rapid increase in population, and the continual decrease in the environmental quality are emerging as very important threats for the sustainable development of Kocaeli city. The main environmental problems are the pollution of the Gulf as a result of domestic and industrial wastes, and air, water and noise pollutions resulting from the industry. Dense accommodation structure of the city, and inadequacy of green areas in the urban area are important factors in the decrease in the air quality. On the other hand, D-100 highway and the railway passing through the center of the city cause noise pollution.

An evaluation of European cities from the point of QoL, although there exist considerable differences in the topics of employment opportunities, housing costs, urban safety,

cleanliness of cities, satisfaction with public transport, air quality, and general satisfaction, it is observed that majority of the participants to the survey are satisfied in living in their cities. Cities like Kobhenvan, Wien, and Stokholm are in the first positions in this respect. Cities with highest QoL are in the same time cities with highest economic strength. Sixty six percentage of inhabitants of Kocaeli stated that they are happy for living in this city. With this rate, Kocaeli takes attention to be the city that inhabitants are least satisfied to live in.

In the planning policies to be developed for the sustainable development of the city of Kocaeli, policies aiming to increase the urban QoL, should be handled in a comprehensive approach, together with the policies for economical and social development of the city. While determining these policies, in addition to the subjective assessments of the inhabitants that need to be considered as guiding principles, criterion specific to the city should be developed under the light of the internationally accepted subjective indicators. In line with this, during the process of determination of the spatial development strategies of the city, collaboration and consensus of opinion of the regional public authorities, private enterprises, non-governmental organizations, and the residents, become very critical and important.

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