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Resident satisfaction for sustainable urban regeneration

Yasemin Afacan PhD
Assistant Professor, Department of Interior Architecture and Environmental Design, Faculty of Art, Design and Architecture, Bilkent University, Bilkent, Ankara, Turkey

In Turkey, there has been increasing construction activity since 2002, and the urban environment is being altered through a range of construction activities. Both the public and private sectors have contributed directly to these activities through urban regeneration projects and by transforming the negative impacts of poorly planned projects through urban rehabilitation. However, there are negative impacts of these urban regeneration developments. Little attention has been paid to user needs and expectations or to managing regeneration in sustainable ways. Understanding resident satisfaction in regenerated urban areas is a prerequisite for reducing the environmental impact of buildings, increasing sustainable quality and creating healthy urban environments. Thus, in this study, resident satisfaction is investigated through a field survey with 200 residents in Ankara, Turkey. Çukurambar, a regenerated urban area of 4·2 ha, was chosen as the study location. The study, which aimed to determine how to provide housing and commercial areas, was conducted by the Ankara Metropolitan Municipality, and began in 2006 and was completed in 2009. By means of statistical analyses, resident satisfaction and importance levels were calculated. The study confirmed the multidimensional nature of sustainable urban development and correlated relationships of different dimensions for neighbourhood satisfaction.

1. Introduction

Urban regeneration, which refers to improving the overall quality of urban areas with a focus on resolving physical, social and economic problems, has long been a major subject in planning, urban design, sociology and related disciplines. It comprises comprehensive strategies, actions, processes and visions to tackle urban problems, to understand better the process of decline and revitalise declining economic activity, improve social function and reverse environmental deprivation (Litchfield, 2000; Roberts and Sykes, 2000). The literature review on urban regeneration reveals the essential role of sustainability. Over the past two decades, there has been increasing research on sustainably planning urban neighbourhoods. Despite the growing importance of sustainable planning worldwide, its implications for regeneration have not been deeply analysed. To ensure sustainability in regenerated urban areas, resident satisfaction cannot be disregarded. 'There is no point in studying a single subject, for example, low-energy design, community development, eco-architecture or sustainable methods of transport, unless you combine everything and think about people first' (Thompson, 2012: p. 49). Understanding resident satisfaction for and in regenerated urban areas is a prerequisite for reducing the environmental impact of buildings, increasing sustainable quality and creating healthy urban environments. In Turkey, construction activity has increased since 2002 and the urban environment is being changed as a result. Both the public and private sectors have contributed directly to these activities through urban regeneration projects, which can be defined as housing and commercial developments on brownfields, creating recreational areas, renewing the old city, regenerating squatter areas and reversing the negative impacts of poorly planned development. However, there are negative impacts of these urban regeneration projects, and there are still questions about whether they are successful in improving (or will improve) all aspects of urban life and satisfy inhabitants' needs.

In this study, such a regeneration process is criticised through a case example of neighbourhood regeneration in Turkey that differs from many transformations because of its strategic, social and physical character. The significance of sustainable urban development is highlighted to overcome urbanisation problems in Turkey and eliminate some negative effects, such as displacement of existing population, increase of prices in the area and the disappearance of social diversity. It is criticised because in Turkey little attention has been paid in these developments to user needs and expectations or to managing regeneration in more sustainable ways. Thus, this study aims to analyse the environmental and social factors and their relationships that influence user satisfaction in the Turkish context. The study also proposes the application of a sustainable development concept to identify the importance residents place on

sustainable criteria crucial to the success of urban regeneration projects. To do so, the study focuses on a strategic location in Ankara, the Çukurambar neighbourhood, which is an interesting case and an original squatter area, where the land is privately owned and has been left to market mechanisms with no organised urban transformation plan.

First, the study reviews the literature on resident satisfaction to understand the quality of urban and community life. Then, it examines urban change and the processes of urban regeneration in Turkey. Next, the Çukurambar neighbourhood is presented as the case study. The characteristics of the site in terms of its physical, environmental, social and economic aspects are analysed, and the methodology of the study is described in detail. In the results section, by means of statistical analyses, resident satisfaction and importance levels are calculated and correlation matrices are constructed. The study confirmed the multidimensional nature of sustainable urban development and correlated the relationships between and among different dimensions for neighbourhood satisfaction. In conclusion, the implications of urban renewal policies are discussed with respect to sustainable planning.

2. Resident satisfaction with urban neighbourhoods

Achieving resident satisfaction with urban neighbourhoods is a multifaceted and challenging task, and to be successful, must address many different physical, social and economic factors, including relationships with neighbours, the local physical environment (especially its functionality (i.e. safety, the presence of and access to services)), aesthetics (appearance) and health features (air quality and pollution). In most studies, neighbourhood satisfaction refers to obtained ratings of resident evaluations from physically measuring environmental attributes (i.e. number of parks, apartments, trees), social characteristics of the urban space (i.e. interaction with others, feelings of safety) and perceptions of those attributes (Chapman and Lombard, 2006; Hur and Morrow-Jones, 2008). However, a review of the literature reveals that studies on neighbourhood satisfaction are contradictory because of the multidimensional nature of satisfaction. While some studies relate the definition of residential satisfaction to the evaluation of physical and social features within that urban environment (Mesch and Manor, 1998), others linked the situation of being satisfied to the intentions of residents to move (or not) (Brower, 2003; Langdon, 1988; Sirgy and Cornwell, 2002), which necessarily affects quality of life (Marans and Rodgers, 1975).

There are also models of satisfaction that consider the physical characteristics of urban space as the most important attribute (Langdon, 1988; Sirgy and Cornwell, 2002). The satisfaction value placed on an urban environment is closely related to residents' background. Residents new to the neighbourhood identified physical appearance as the most important factor, but long-time residents emphasised the importance of interaction with others for being satisfied with the urban environment (Potter and Cantarero, 2006). According to Lansing and Marans (1969), residents judge social factors as the most important satisfaction criteria, whereas planners give higher values to physical attributes of the urban environment. Aesthetic appearance has been identified by many researchers as one of the most important factors in neighbourhood satisfaction (Kaplan, 1985; Kearney, 2006; Langdon, 1988; Nasar, 1988). Density of housing as a part of aesthetic appearance also plays a significant role in neighbourhood satisfaction. Research has also found that there is a close relationship between satisfaction and vegetation rate (naturalness). Naturalness, defined as ecological patterns (Woolley, 2003), has effects on the physical qualities (such as usage of urban space; Sirgy and Cornwell, 2002) and social qualities (such as sense of safety and place attachment; Kuo and Sullivan, 1998; Woolley, 2003) of the urban environment.

During the past decades, to maximise resident satisfaction and minimise the negative impacts of an urban environment's environmental and social aspects, there have been great efforts around sustainable planning and rethinking urban regeneration from a sustainable perspective. There are many definitions of urban sustainability. The common understanding of sustainable urban planning highlights the importance of symbiotic and synergistic relationships among the elements of a city; that is, meeting the needs of all citizens in urban areas and enhancing wellbeing without damaging the natural world now or in the future (Carmagni *et al.*, 2001; Girardet, 1999). Sustainable urban planning makes people feel integrated and satisfied with the following life potentialities and healthy conditions: well-designed public spaces such as parks and squares free from motorised traffic; a natural green environment; priority and enough space for pedestrians to walk unimpeded; an inclusive public transportation system; lower carbon dioxide output; use of solar power; renewable energy installations; comfort with the neighbourhood and promotion of equal opportunities for all, regardless of age, size or ability (Bott, 2012). Thus, developing a green infrastructure within urban environments does not always promote increased human integration, ecological sustainability and economic regeneration (Natividade-Jesus *et al.*, 2013). To provide a number of beneficial functions and increase resident satisfaction, it should be viewed as a process through which a broad range of ecological, political and social factors have been taken into account. Despite growing awareness of sustainable planning and its effects on resident satisfaction, in Turkey, a rapidly urbanising country, there are still urban regenerations that are left to market mechanisms, and thus that fail to meet residents' physical, social and economic

needs and that cause dissatisfaction with the neighbourhood. Too often, regeneration processes are undertaken with inadequate involvement of relevant stakeholders and without planning for all sustainability issues. This study has chosen such a neighbourhood as a case example, where regeneration has been done without an organised transformation plan and has not considered the needs and expectations of the population living there. The study analyses the environmental and social factors influencing resident satisfaction and their relationships in terms of sustainable planning in the Turkish context.

3. Urban regeneration in Turkey

Turkey experienced mass migration from rural areas to cities between 1950 and 1980, which caused rapid urbanisation, including the construction of squatter neighbourhoods and change in the population's spatial organisation. After 1960, new legislation was implemented to overcome the negative effects of the squatters and transform these settings into legal residential zones (Act No. 307 Municipal Law (1963), Act No. 775 Squatters Law (1966), Act No. 6735 Construction Law (1972) are some of the legislation). These urban transformations were implemented in three stages: stage 1, upgrading, in which squatter areas were improved through infrastructural implementations; stage 2, redevelopment, in which people were moved to newly constructed residential areas; and stage 3, urban renewal, during which squatter areas were demolished and new apartments and wide roads were constructed (Ataöv and Osmay, 2007). Between the 1980s and 2000, these stages were carried out in the form of comprehensive planning and construction activities, which also improved quality of life and increased income for the people of these areas. After 2000, this urban transformation process lost its legitimacy, with current urban conservation plans being ignored, new transformation plans being prepared and the continuity of the process becoming an unauthorised urban problem (Guzey, 2009; Ozdemirli, 2014). However, the volume of construction activity increased substantially after 2002, and the urban environment was further built up through a range of construction activities (including urban regeneration projects) until the economic crisis in 2008 (Balaban, 2012). The public and private sectors contributed directly to these activities, but this construction boom has had negative effects on urban planning and the environment, with the result that sustainable construction and planning at national and local levels is urgently needed (Balaban, 2012).

What distinguishes the regeneration applications in Turkey from other models was regarding the urban transformations as a form of project-based housing supply, rather than a holistic restructuring process (Guzey, 2009). The city of Ankara is an important example in terms of its experiences with this housing construction boom, which has been mostly poorly planned regeneration. Guzey (2009) identified 31 urban regeneration projects in Ankara that have either been approved or are still in the application process. Like other cities in Turkey, Ankara also experienced rapid urbanisation between 1950 and 1980. In contrast to other cities, however, because of Ankara's political and governmental character, the industry sector was not much developed, which forced newcomers to live and work near the city centre, building squatter accommodation in those areas (Akcura, 1971; Ozdemirli, 2014; Senyapılı, 1996). After the 1980s, various regeneration projects supported by local authorities, the private sector and the public housing administration (TOKI) were implemented, and the city was reshaped (Guzey, 2009). Areas close to the city centre have higher rent and environmental values, and were thus transformed in a very short period of time and became prestigious urban environments, whereas neighbourhoods on the city's periphery did not enjoy such quick improvements. Moreover, most of the transformation process was based on a similar model, which ignored location differences and physical, social and economic problems (Guzey, 2009; Kurtulus, 2006; Senyapılı, 1996).

The Çukurambar neighbourhood is one of the transformed areas near the city centre. Within the context of other examples of neighbourhood regeneration in Turkey, Çukurambar regeneration is differentiated from other projects in the following aspects: (*a*) it has gone through a very fast transformation period; (*b*) this area has been transformed with the revision of an improvement plan instead of a regeneration project; (*c*) in contrast to other squatter areas developed on governmental land, the land here is owned predominantly by the private sector; (*d*) unlike the other regeneration areas in Turkey, new developments take place at a parcel level; (*e*) the region is left as an unorganised space without public participation. These five aspects place the neighbourhood in a special position among the other squatter regeneration projects in the past few decades in Turkey. Therefore, the Çukurambar neighbourhood eventually presents a different urban settlement character that is still developing as a continuing construction site. This unfinished structure of the neighbourhood also causes difficulties in the sociospatial character of the area that result in isolated housing blocks without any common urban language.

In the 1960s, there was a large increase in the squatter housing areas in the Çukurambar neighbourhood. The 1967–1974 period is the early phase of the transformation period of Çukurambar that had severe urban problems of a lack of electricity, running water, and so on. In 1972, Çukurambar became an independent neighbourhood of the metropolitan municipality, which was a turning point for its regeneration project (Koroğlu and Ercoskun, 2006). Until 1970, the Çukurambar neighbourhood was the least crowded region of Ankara. After the 1970s, however, the area became important because of its location at highway junction points and its proximity to the city centre and the parliament, and the number of squatter settlements increased (Senyapılı, 1996).

Neighbourhood solidarity and assurance had played a key role in the 1980s' transformation of the area (Koroğlu and Ercoskun, 2006).

In the first half of the 1980s, illegal houses were legitimised and an improvement plan was prepared for Çukurambar at a 1/1000 scale. In 1984, this plan was approved to transform the squatter housing areas (Senyapılı, 1996). In this plan, the minimum plot area was 2500 m^2, the minimum distance between houses and the road was 10 m and the minimum distance between the houses was 5 m. In this improvement plan, two-storey houses were planned. Besides this, it accepted the local development plan and allowed the development decision only for planned areas (Senyapılı, 1996). However, the implementation of revision plans prepared by the Ankara Metropolitan Municipality in 1993 increased population density, changing the sociospatial character of the area. The revision plan was a parcel-based solution, rather than an integrated urban planning approach.

At the beginning of the 1980s, the population was 2400 in 2000, 4919 in 0000 and now it is said to be more than 6000 (http://www.tuik.gov.tr/). Now the squatters of Çukurambar have been replaced by blocks of high-rise flats. It is one of Ankara's most prestigious areas, with an upper-middle class population. According to Koroğlu and Ercoskun (2006), there are two reasons why low-income groups left the neighbourhood. First, some squatter owners sold their land at a high price and moved to the periphery; second, because the area lost its sense of community, those who had at first chosen to stay could not adapt to the new character of the neighbourhood and left. Now, the spatial character of Çukurambar reflects three different characteristics: a residential district with luxury multi-storey apartments; a commercial zone composed of cafes, restaurants and supermarkets; and a continuing construction site.

4. Methodology

4.1 Study area and sample

Çukurambar is located in the southwest of Ankara's city centre. It is at the junction of the Eskisehir and Konya highways, which are the city's main arteries. The study participants were chosen by random sampling among the apartment block residents who live on the neighbourhood's main axis (Figure 1). This section of the neighbourhood was selected as the survey area for several reasons. First, it is the densest and most populous in terms of urban redevelopment. Second, residents there experience more diverse building and urban facilities compared to those of the inner streets (such as different vehicular and pedestrian traffic patterns, access points to public transport, pedestrian facilities, access to parks and prestigious cafes and restaurants). Third, residents purchased or rented their dwellings after the redevelopment.

Study participants were chosen by stratified sampling among clusters in the Çukurambar neighbourhood with the same income level. First, apartments in the neighbourhood were stratified according to resident income level. Then dwelling clusters were identified in each medium to high-level income

Figure 1. Aerial view of the study area taken from www.maps.google.com

stratum. The next step was a random sampling of the dwellings and residents in each cluster. A total of 200 randomly selected residents from a resident population of 5500 residents participated in the 4-week field study from mid-June to mid-July 2014. As after the regeneration process, the Çukurambar neighbourhood is represented as a prestigious urban area with the high-income groups, the study ensured that the sample is representative of the characteristics of the neighbourhood. Table 4 illustrates the percentages related to participants' demographic information, which is later discussed in the Q2 Results section. None of the participants needs institutional care or has mental disability. Each participant was also asked to sign a consent form to satisfy ethical procedures.

4.2 Data collection

The author conducted a quantitative study, developing a survey instrument with a comprehensive list of 55 items to gather the data (see Appendix (Tables 1–3)). First, a self-assessment questionnaire was developed with a resident focus group, then was tested and refined using the interviewing method. The questionnaire involved three sections: background information; resident satisfaction evaluations; and resident identification of importance levels. The indicators used to measure neighbourhood satisfaction are grouped under two dimensions: physical and social. The term 'dimension' refers to the aspects, characteristics and features of the neighbourhood. Physical dimension is assessed as the residents' level of satisfaction with green areas, pedestrian access, traffic, density, accessibility and lighting as well as satisfaction with local government services. Social dimension is assessed as the residents' level of satisfaction with interaction with others, safety from crime and traffic, comfort and safe usage as well as satisfaction with feeling sense of belonging.

Two hundred residents of the apartments on the main axis were visited in their flats and asked to rate their satisfaction and importance level for each item on a scale of one to five for satisfaction (five being very dissatisfied and one very satisfied); and for importance (five being the least important and one the most important). Residents were also asked to mark the appropriate boxes to identify how satisfactory and important each feature is in living successfully within a sustainable urban environment. Items that may not have been clear to participants were explained. Further information for the study was obtained through an unstructured interview, which helped examine the results comprehensively. To avoid bias, the interviews were conducted with one person at each time alone.

5. Results

Participants' ratings of the 55 items were analysed with the statistical package for the social sciences (SPSS). By means of the statistical analyses, frequency distributions, χ^2 and correlation matrices were calculated. The alpha coefficient for all items was 0·867, suggesting that they have relatively high internal consistency. The study also conducted exploratory factor analyses to investigate correlated variables of dimensions of satisfaction and importance. Because a ratio as low as five subjects per variable is appropriate for distribution (Bentler and Chou, 1987), the study sample size can be considered adequate in terms of sample representativeness and estimation accuracy. Through the Varimax method, a frequently used rotation option (Argyrous, 2005), a rotated component matrix was constructed to identify the number of factors among the set of correlations within the obtained data. The study includes two steps of data analyses. First, two factor analyses were performed. Twenty-eight items on satisfaction were reduced to satisfaction factors, and then 27 items on importance were reduced to importance factors and their related dimensions. Factor analysis is used to examine the interrelationships among items of physical and social features of the Çukurambar neighbourhood. It identifies clusters of physical and social features measuring satisfaction levels. Second, correlation matrices for each factor group were computed to find overall associations among the factor variables. The correlation matrix in the study indicates association between the two satisfaction items. A correlation coefficient of 0·5 would indicate a moderate relationship between two variables, whereas a correlation of 1·0 indicates a perfect association (Argyrous, 2005).

5.1 Descriptive statistics

All participants were native-born Turkish citizens. There were 110 women and 90 men ranging from 22 to 88 years of age (mean = 43·67, SD = 16·98). Table 4 illustrates the percentages related to participants' demographic information.

Nearly all participants were very dissatisfied with traffic safety (94·5%) and with congestion and outdoor noise (91·5%). The neighbourhood is very crowded in terms of traffic, and cars occupy too much urban space, causing noise and pollution and threatening the urban environment through high carbon dioxide output. The other urban variables with which participants are mostly dissatisfied were as follows: local government services (mean = 4·53); comfort with the neighbourhood (mean = 4·44); presence of trees (mean = 4·41); presence of green areas and parks (mean = 4·39); pedestrian access to stores and cafes (mean = 4·36); general appearance of the area (mean = 4·18); and accessibility for all regardless of age or circumstance (mean = 4·1). The variables people were most satisfied with were access to public transport (76·5% of participants were satisfied) and distance to shops (66·2% of participants were satisfied). According to Costa Lobo (2012), good public transportation and a sufficient offer of cultural and public activities are the most sustainable conditions. Regarding social satisfaction, there is a statistically significant relationship between feeling a sense of belonging in the neighbourhood and interaction with other residents ($\chi^2 = 76·837$, df = 9, $\alpha = 0$,

00, two-tailed). There is no statistically significant relationship between comfort with the neighbourhood and social support from neighbours ($\chi^2 = 3{\cdot}241$, df = 2, $\alpha = 0{\cdot}198$, two-tailed), whereas social support from neighbours has a statistically significant relationship with feeling a sense of belonging ($\chi^2 = 26{\cdot}972$, df = 6, $\alpha = 0$, 00, two-tailed). There is no statistical relationship between gender and any of the satisfaction items.

The study also investigated the satisfaction levels of different groups of the population. It has found different demographic characteristics to be related to resident satisfaction. In this study, the level of resident satisfaction has varied according to age, marital status, employment status and duration of stay. Elderly residents are less satisfied with traffic safety and crime than young residents. Because of their increasing frailty and greater vulnerability to crime and traffic dangers, neighbourhood safety is an important indicator for elderly residents (Kahana *et al.*, 2003). Married residents are less satisfied with density of buildings and accessibility for all than single and widowed residents. Married residents with children ($n = 80$) between the ages of 0 and 12 years found the neighbourhood inaccessible because of the unfriendly and problematic character of narrow footways, heavy traffic, poor connected streets and level changes without ramps. Regarding the employment status, housewives are least satisfied with the interaction with other residents of the Çukurambar neighbourhood through social activity. Moreover, all the retired residents are less satisfied with the presence of open spaces than employed and self-employed and housewives. Although each apartment block has its own green and open space, neither recreational areas nor infrastructure nor cultural areas exist in the neighbourhood at present. The long-term residents, who have stayed in the neighbourhood more than 10 years, are less satisfied with the general appearance of the area and comfort with the neighbourhood than the new residents. The absence of a comprehensive and systematic planning process, the rapid and continuously constructing character of the neighbourhood makes the long-term residents feel uncomfortable with their residential environment.

Regarding the importance variables, nearly all participants (94·5%) found traffic safety to be the most important variable for a sustainable neighbourhood. The other variables that were found very important in achieving sustainable urban planning were as follows: availability of acoustic barriers, such as planting and fencing (mean = 1·36); feeling of being integrated into the urban society (mean = 1·55); and comfort with the neighbourhood (mean = 1·56). According to 158 participants, the least important variable for a sustainable neighbourhood is the provision of community facilities. There is a statistical relationship between gender and the following important items: places and buildings with visible accessible entrances ($\chi^2 = 16{\cdot}684$, df = 2, $\alpha = 0$, 00, two-tailed); public space for cyclists ($\chi^2 = 31{\cdot}337$, df = 3, $\alpha = 0$, 00, two-tailed) and enclosed bus shelters ($\chi^2 = 27{\cdot}493$, df = 3, $\alpha = 0$, 00, two-tailed).

5.2 Neighbourhood satisfaction factors and dimensions of satisfaction

The results of the factor analysis of the 28 items on satisfaction produced four factors and explained 57·636% of the variance. These four factors refer to physical, social, facilities and maintenance dimensions. The physical dimension appears to be the most important level for satisfaction from sustainable urban planning because the largest variance (27·167%) is accounted for by factor 1, which defines this dimension. Factor 1 has five components related to design aspects of sustainability. The finding is consistent with previous studies. As mentioned earlier, a compact city is the most sustainable urban fabric (Bott, 2012). Density of housing, accessibility for all ages, presence of green areas, general appearance of the area and vehicular traffic are core satisfaction criteria for sustainable urban neighbourhoods. These values of this factor for the current study are because of Çukurambar's unsustainable spatial transformation process. The neighbourhood's unfinished infrastructure causes difficulties and satisfaction problems. There is a big gap between the new luxury high-rise buildings and the construction of streets, green areas and social facilities, which means that the neighbourhood's social dimension is factor 2 and factor 3. Factor 2 is related to interaction with other residents of the neighbourhood through social activity and social support from neighbours. As Çukurambar's transformation did not allow a simultaneous development process, the fulfilment of basic social needs could not be achieved. To tackle social exclusion it is necessary to ensure that all inhabitants have social resources that enable quality of life. A sustainable neighbourhood needs to consider improvements to the network of social relationships. Factor 3 has two components, which support factor 2: feeling a sense of belonging and comfort with the neighbourhood. Lack of these components could threaten people's wellbeing. Van Poll (1997) stated that urban quality not only depends on a space's physical characteristics but also its social aspects, such as social ties in the neighbourhood, safety and security. Factor 4 is related to the maintenance dimension, and this factor also supports previous studies. Satisfactory transport, adequate service facilities and feeling safe are repeatedly mentioned by city dwellers as important aspects of sustainable development (Rizk, 2003). The four factors highlight the significance of an integrated and simultaneous urban transformation process for unplanned urban areas like Çukurambar. According to Horelli (2006), a human-friendly environment is a complex multidimensional and multilevel concept, which refers to an urban environment and its support to residential satisfaction.

Table 5 summarises the correlation matrix with standard deviations for all factor components (Pearson correlation

cofficients, $n = 200$). All correlation coefficients that were significant at a 95% confidence level showed positive correlations. Social support has the largest overall association with housing density (0·665) and accessibility for all (0·578), followed by vehicular traffic (0·561), presence of greenspace (0·496) and interaction with others (0·451). The other important correlative finding is that the presence of green areas is correlated with housing density (0·470) and accessibility for all (0·405). Vehicular traffic is correlated with accessibility for all (0·482) and housing density (0·438). As expected, interaction with other residents is highly correlated with accessibility for all (0·542). The latter factor also plays an important role in sustainable urban development through enabling residents, regardless of age, size or ability, to spend time outdoors (Burton and Mitchell, 2006).

5.3 Residents' importance factors for sustainable planning and dimensions of importance

The results of the factor analysis of the 27 items on importance produced five factors and explained 68·08% of the variance. The factors referred to the facilities, physical, environmental quality, design and maintenance dimensions. Factor 1 has four components dealing with the facilities dimension: provision of community facilities; an inclusive public transportation system; enclosed bus shelters; and public seating areas. All four components address the importance of community involvement in planning. Residents can participate more in urban life if public facilities are available for strengthening and enhancing sustainable development. Factor 2 is related to the physical dimension of sustainable urban planning. Solar power and renewable, recycled and reused energy can reduce pollution and minimise energy consumption. These components play a significant role in tackling urban climate problems. As Çukurambar is still being constructed with high 'carbon footprint' buildings, there is a need for bioclimatic design. Factor 3 deals with environmental quality. To create healthy urban environments, green roofs, lower carbon dioxide output and natural ventilation are prerequisites. There is constant debate about the potential negative effects of poor environmental quality on health and quality of life. Factor 4 is related to the design dimension: priority to and enough space for pedestrians; places and buildings with visible entrances; and well-designed public spaces. An urban environment that is well designed, planned and managed helps not only elderly and disabled people to feel free, independent and more in control, but also leads to greater inclusion of groups often neglected in the urban development process (Afacan, 2013). Gehl (1987) highlights the significance of using public space and pedestrian access for a healthy housing life. Rather than a car-dominated city, a pedestrian-oriented city is essential for the quality of life in an urban environment (Gehl, 1987). Factor 5 deals with the maintenance dimension. As in the satisfaction factors above, maintenance also plays a significant role in the importance factors. According to the study by Jonah *et al.* (1981) with 1150 individuals, traffic safety is closely related to neighbourhood satisfaction. Concerns about traffic accidents decrease satisfaction.

Table 6 summarises the correlation matrix with standard deviations for all factor components (Pearson correlation cofficients, $n = 200$). All correlation coefficients that are significant at a 95% confidence level showed positive correlations. Recycled energy has the largest overall association with solar power (0·995) and renewable energy (0·995). The second-largest association appeared between an inclusive public transportation system and the provision of community facilities (0·855). Lower carbon dioxide output is correlated with community facilities (0·778), inclusive public transportation (0·749), enclosed bus shelters (0·707) and public seating (0·700). All four components are directly related to urban open spaces, which are essential in daily urban life and provide many of the social, health, environmental, educational and economic benefits (Woolley, 2003). Public seating is correlated with provision of community facilities (0·678), an inclusive public transportation system (0·618) and enclosed bus shelters (0·614). Enclosed bus shelters are correlated with provision of community facilities (0·651) and an inclusive public transportation system (0·548). As discussed by many researchers, another correlation in this study is found between a naturally ventilated urban form and green roofs (0·470). Green roofs allow fresh air from the colder and cleaner outskirts enter the city core using urban wind and natural ventilation, and also reduce the negative impacts of pollution and higher temperatures (Bott, 2012).

6. Discussion and conclusion

The study confirmed the multidimensional nature of sustainable urban development and correlated the relationships among different dimensions for neighbourhood satisfaction. It involves complex decisions of technical requirements, safety concerns, socioeconomic, environmental, aesthetic and political impacts (Natividade-Jesus *et al.*, 2013). It should not be forgotten that the interactions between these dimensions are also dynamic, with changes in one dimension impacting another. All five importance factors, along with four satisfaction factors and their related dimensions, elaborate that sustainable urban developments include more than designing physical environmental attributes; they are judged a success only if they lead to resident satisfaction, stimulate social cohesion, support social welfare and enhance personal, community and global health. In that sense, the Çukurambar case is an interesting example for analysing the impacts of the physical, social, design and maintenance dimensions of sustainable urban transformation. It highlights the importance of making urban areas more sustainable by maximising the interaction between physical attributes, design aspects, social facilities and

maintenance requirements. Planners should avoid unsustainable transformation forms and redevelopments based only on market demand implementation as these have no overall concept and do not consider a neighbourhood's sociospatial characteristics.

The results of this study also identified key lessons for Turkish planning and regeneration policies. In Turkey, urban regeneration is defined as an essential tool for regaining squatter areas and shaping the cities with the effects of global trends. With the effect of new legislation squatter housing areas and dilapidated industrial areas are integrated into the land market. The housing sector is revitalised through different urban transformation types. However, at this point, discussions focus on the unforeseen and unplanned character of those transformations. These regeneration processes in Turkish urban planning result in an unqualified urban space without elements of urban identity, irrespective of social development and displacement of old tenants and low-income groups. Thus, in order to achieve success and continuity in urban regeneration projects both in Turkey and all over the world, a sustainable regeneration model is inevitable for urban planning policies and municipalities. The developed satisfaction and importance factors in the study support the multidimensional nature of sustainable development at physical, social, maintenance and design dimensions. They are significant to increase the environmental quality of neighbourhoods and life patterns of its residents regardless of their demographic characteristics. Hence, regeneration policies should be determined according to the socioeconomic structure of the neighbourhoods indicating the profile of the inhabitants and their quality of life. Municipalities should be essential coordinators to realise all these five importance factors along with four satisfaction factors and their related dimensions in cooperation with other government institutions and the private sector. Besides the municipalities, representatives of the inhabitants, representatives of the private sector and non-governmental organisations should be the other partners of the sustainable regeneration process.

This study also points out the importance of resident satisfaction. The findings clearly show that to (re)develop a neighbourhood with a strong, healthy identity and one that is energy efficient and has high environmental quality and social facilities, planners and residents must both be involved. To secure a better quality of life for the community, municipalities, policy-makers, governments and all related bodies should consider user needs, requirements and expectations. A healthy city depends on a good relationship between urban planners and designers and the city itself, another kind of living organism (Lerner, 2014). Key decision-makers must become more responsible for the negative impacts of urban transformation processes and pay more attention to where to embed the sustainability in that process. Policy principles and impacts of existing renewal projects should be revisited (Granger, 2010). Determining such issues from post-occupancy evaluations may be too late (and more expensive) to remedy mistakes. To avoid a diffused link between residents and neighbourhoods, there is a need to embark on user-centred design strategies and methods. Therefore, achieving sustainable performance within urban neighbourhoods is highly correlated with implementing an appropriate design strategy along with an overall consideration of a range of environmental design concerns, such as sustainable design checklists, ergonomics guidelines, accessibility standards, building energy codes and sustainable urban planning specifications. In this context, sustainability within urbanism can lead to the inclusion of many groups often neglected in the sustainable urban development process. Although there is a growing awareness of sustainable urban regeneration, these findings also suggest the need for developing new policies to support future urban redevelopment activities. Collaboration between planning authorities is necessary for each development activity. The essence of sustainable planning lies in the process of understanding, engaging and creating complete integration between spatial, planning, physical design, social network and economic environments (Afacan and Afacan, 2011). To create well-integrated communities, it is vital to adopt a holistic approach, take urban macro-economic and social processes into account and search for methods of social interaction.

Appendix. Resident satisfaction survey in Çukurambar as a regenerated area

Age: years	30 or under	31–50	Over 50			
Gender	F	M				
Education level	Elementary	High school	University		Master's degree	Doctorate degree
Marital status	Single	Married	Widowed		Divorced	
Income status	Low	Middle	Upper-middle		Upper	
Employment status	Employed	Self-employed	Unemployed	Housewife	Student	Retired
Duration of stay in the current residence	Less than 1 year	1–5 years	6–15 years		Over 15 years	
Ownership of residence	Owner	Tenant				
Household size	2	3	4		5	6 or more

Table 1. Background information

	Very dissatisfied (−2)	(−1)	Neutral (0)	(+1)	Very satisfied (+2)	NA
Physical **s**atisfaction						
1. Presence of trees						
2. Presence of green areas and parks						
3. Presence of open spaces (such as bike paths, bazaars)						
4. Presence of public toilets						
5. Pedestrian access to stores and cafes						
6. Vehicular traffic						
7. Access to public transport						
8. Signage systems						
9. Distance to work						
10. Distance to family and friends						
11. Distance to shops						
12. General appearance of the area						
13. Density of buildings						
14. Accessibility for all regardless of age or circumstance (elderly, disabled, pregnant, etc.)						
15. Cleanliness						
16. Local government services (such as rubbish collection)						
17. Street lighting						
18. Crowdness and outdoor noise						
Social satisfaction						
19. Interaction with other residents of your neighbourhood through a social activity						
20. Interaction with other residents of your neighbourhood through a favor						
21. Taking part in any kind of organised neighbourhood activity						
22. Social support from neighbours						
23. Safety from crime						
24. Traffic safety						
25. Safe usage after dark						
26. Feeling a sense of belonging						
27. Respect for privacy						
28. Comfort with the neighbourhood (a calm and welcoming feeling)						

Table 2. For each statement below (1–28) please identify your level of satisfaction

	Least important (−2)	(−1)	Neutral (0)	+1	Most important (+2)	NA
29. Well-designed public spaces such as parks and squares free from motorised traffic						
30. Presence of natural green environment						
31. Priority to and enough space for pedestrians to walk unimpeded						
32. Places and buildings with visible accessible entrances						
33. Public space for cyclists						
34. An inclusive public transportation system						
35. Lower carbon dioxide output						
36. Availability of acoustic barriers, such as planting and fencing						
37. Enclosed bus shelters						
38. Public seating areas						
39. Separated household waste collection						
40. Recycled or reused energy for heating or electric power generation						
41. Use of solar power for heating and hot water generation						
42. Renewable energy installations						
43. Green roofs and facades						
44. Rainwater collection system (such as underground gravel and stone tanks)						
45. A naturally ventilated urban form						
46. Feeling of being integrated into the urban society						
47. Provision of community facilities						
48. Promotion of equal opportunities for women and men						
49. Safety from crime						
50. Safety from traffic						
51. Safe usage during the night time						
52. Feeling a sense of belonging						
53. Respect for privacy						
54. Comfort with the neighbourhood (a calm and welcoming feel)						
55. Legible street layouts not causing disorientation, confusion and anxiety						

Table 3. For each statement below (29–55) please identify your level of importance

Participant characteristics	%
Age: years	
22–30	20
31–50	60
Over 50	20
Gender	
Female	55
Male	45
Education level	
High school	44·8
University	44·8
Master's degree	10·4
Marital status	
Single	19·2
Married	73·4
Widowed	7·4
Employment status	
Employed	32·0
Self-employed	16·3
Housewife	32·5
Retired	19·2
Duration of stay: years	
Less than 1	16·7
1–5	56·2
6–15	27·1
Ownership of residence	
Owner	43·8
Tenant	56·2

Table 4. Percentages related to participant demographics

		Factor 1 (F1)					Factor 2 (F2)		Factor 3 (F3)		Factor 4 (F4)		
		Density of housing	Accessibility for all	Presence of green	General appearance	Vehicular traffic	Interaction with other residents	Social support	Feeling a sense of belonging	Comfort with the neighbourhood	Access to public transport	Local government services	Safe usage during the night time
F1	Housing density (SD)	1·00											
	Accessibility for all (SD)	0·428**	1·00										
	Presence of green (SD)	0·470**	0·405**	1·00									
	General appearance (SD)	−0·058	−0·165*	−0·211**	1·00								
	Vehicular traffic (SD)	0·438**	0·482**	0·399**	−0·29	1·00							
F2	Interaction with other residents (SD)	0·258**	0·542**	0·323**	−0·125	0·459**	1·00						
	Social support (SD)	0·665**	0·578**	0·496**	−0·160*	0·561**	0·451**	1·00					
F3	Feeling a sense of belonging (SD)	−0·079	0·044	0·027	0·139*	0·215**	−0·259**	−0·021	1·00				
	Comfort with the neighbourhood (SD)	0·342	0·245**	0·092	0·108	0·280**	−0·002	−0·112	0·019	1·00			
F4	Access to public transport (SD)	0·140	−0·001	−0·012	0·025	0·128	0·203**	0·151	−0·367**	−0·119	1·00		
	Local government services (SD)	0·070	0·034	0·149**	−0·063	0·058	0·028	0·119	0·044	−0·022	0·150*	1·00	
	Safe usage after dark (SD)	0·185**	0·235**	0·225**	0·135	−0·093	−0·015	0·280	0·048	0·014	−0·202**	0·344**	1·00

*Correlation is significant at the 0·05 level (two-tailed)
**Correlation is significant at the 0·01 level (two-tailed)

Table 5. Correlation matrix of resident satisfaction with standard deviations (Pearson correlation coefficient, $n = 200$)

		Factor 1 (F1)				Factor 2 (F2)			Factor 3 (F3)			Factor 4 (F4)			Factor 5 (F5)		
		Community facilities	Inclusive transport	Enclosed shelters	Public seating	Solar power	Renewable energy	Recycled energy	Green roofs	Lower carbon dioxide	Ventilated urban form	Pedestrian priority	Accessible entrances	Well-designed public spaces	Safety from traffic	Safe night usage	Neighbourhood comfort
F1	Community facilities	1·00															
	Inclusive transport	0·855**	1·00														
	Enclosed shelters	0·651**	0·548**	1·00													
	Public seating	0·678**	0·618**	0·614**	1·00												
F2	Solar power	−0·116	−0·051	0·073	0·133	1·00											
	Renewable energy	−0·116	−0·051	0·073	0·133	0·995**	1·00										
	Recycled energy	−0·116	−0·051	0·073	0·133	0·995**	0·995**	1·00									
F3	Green roofs	0·078	0·088	0·080	0·125	0·114	0·114	0·114	1·00								
	Lower carbon dioxide	0·778**	0·749**	0·707**	0·700**	0·123	0·123	0·123	0·168*	1·00							
	Ventilated urban form	−0·077	0·005	−0·022	0·093	0·163*	0·163*	0·163	0·470**	0·059	1·00						
F4	Pedestrian priority	−0·167*	−0·172*	−0·034	−0·037	0·121	0·121	0·121	0·038	−0·004	0·114	1·00					
	Accessible entrances	0·347**	0·360**	0·368**	0·597**	0·144	0·144	0·144	0·021	0·477**	0·023	0·050	1·00				
	Well-designed public spaces	0·198**	0·293**	0·069	0·245**	−0·149*	−0·149*	−0·149*	−0·066	0·210**	−0·072	−0·066	0·361**	1·00			
F5	Safety from traffic	0·220**	0·120	0·148*	−0·032	−0·020	−0·020	−0·020	−0·230**	0·175*	−0·470**	−0·230**	0·008	0·066	1·00		
	Safe night usage	−0·047	−0·068	0·094	0·235**	0·088	0·088	0·088	−0·005	0·073	0·320**	0·216**	0·274**	0·120	−0·364**	1·00	
	Neighbourhood comfort	0·229**	0·272**	0·111	0·265**	0·001	0·001	0·001	0·057	0·272**	0·057	−0·023	0·257**	0·042	−0·177**	0·039	1·00

*Correlation is significant at the 0·05 level (two-tailed)
**Correlation is significant at the 0·01 level (two-tailed)

Table 6. Correlation matrix of resident importance factors (Pearson correlation coefficient, $n = 200$)

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