Gender Issues in the Built Environment: A Study on the Role of Architecture for a Sustainable Society

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Abstract: Societies are sustainable if they consist of a mixture of users with various interests, needs, and abilities. Sustainable societies are defined as structures that include different elements in a balance to remain healthy over the long term. One of the key elements of a sustainable society is gender equality. It can be maintained through various factors where architectural design and the built environment can become effective instruments. Although the role of architecture in gender issues is sometimes ignored, its reflection can be seen in the built environment in many different instances. Therefore, architecture has the responsibility to remark gender issues in the built environment to aid in meeting the needs of a sustainable society. This paper presents a study that examines the importance and the role of architectural design in a sustainable society through gender equality in the built environment. The hypothesis of the paper states that the built environment is perceived differently by women and men, and it needs to be designed accordingly. The methodology consists of a literature review on the relationship of gender and architecture, and a quantitative analysis of a questionnaire conducted in Istanbul, Turkey among women and men. Outcomes of the study reveal that gender equality in the built environment and gender equality in the society have a mutual relationship, so that architecture needs to consider them as primary input data in design.

Keywords: Built environment, architectural design, sustainable society, social sustainability, gendered space.

1. INTRODUCTION

Societies are the backbones of human civilization. Therefore their health and sustainability are crucial regarding the survival of civilization. Especially under the effects of technological and scientific development, the sustainability of contemporary societies is a subject of debate for a long time. Some approached the changing structure of the society as the natural result of development and growth, as others stated that due to limitations, there cannot be progress in certain aspects of the society without regression in others (Mies 1997). Nowadays, since the resource limits of the planet started to be recognized, the awareness of maintaining the balance between growth and sustainability is raising. This approach requires sustainability to be handled from different perspectives that cover economic, ecological, political, technological, and social issues, including elements like energy, water, mineral resources, climate, urban congestion, population, pollution, industrialization, technological development, public policy, health, education, and employment (Slaus & Jacobs 2011). Consequently, the sustainability of the society cannot be handled apart from the other aspects of sustainability. Each aspect or element provides advantages and disadvantages for the concept. For instance, the development in science and technology provided most human beings with long and prosperous lives, and in the meantime, it also

helped them with creating tools for energy efficiency in buildings and constructions to support the ecological aspects of sustainability. But on the other hand, this development resulted in overgrowth in the world population and demand for higher living standards and energy consumption by society.

The evolution of society also caused it to gain a complex and overlapping structure. Human groups from the past, consisting of people with the same background, same motivations, and similar duties have transformed into complex communities with members from different geographical, as well as cultural foundations. Thence it has become harder to maintain a balance between the young and old, rich and poor, educated and uneducated; to sustain the society healthily. Among the others, one of the most important elements within the society is gender, caused by the different roles given to male and female members. In the modern world, the patriarchal society introduces gender issues and women's rights as problems of sustainability. Gender is a socially constructed system of dynamic differences, as well as an innate source of fixed and universal male/female differences (Hanson 2010). The problem is multi-faceted with different corresponding aspects, architecture being one of them. Architecture is effective in gender equality in a society mostly in terms of its reflections on the built environment. Greed (2005) argues that the integration of gender into spatial-policy-making would result in a more sustainable, equal, and accessible built environment for all members of society. This study examines gender equality as a key factor in the

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existence of a society and its sustainability, looking at it from a perspective of the architecture and its reflections on the built environment.

1.1. Aim of the Study

The design has a significant role in creating sustainable societies. However, its interpretation through gender issues still needs addressing. This study aims to examine how gender influences the character of the built environment, and what kind of contribution or effect it has on the understanding of a sustainable society. From the perspective of the designer -who is responsible for the creation of socially sustainable spaces- it potentially has various effects on the spatial organization, distribution of functions, or choice of materials and colour. From the user's point of view, gender becomes an element of the built environment, affecting its use as a sufficient and appealing place.

The study also aims to explore the perception of space according to female and male members of the society. As the users of the built environment, different genders presumably have different understandings of their surroundings. How this understanding transforms into perception and behaviour within the built environment and how it may reflect on the design of space is one of the important interest areas of this research.

1.2. The Scope of the Problem

The relationship between design and sustainable societies has many dimensions. It reflects on the built environment through various implications such as the planning of gathering spaces or co-activity areas, and organization of functional spaces according to their effects on the community. However, the scope of the problem in this research consists of the interpretation of the effect of design on sustainable societies through the perspective of gender, which also has a multi-layered relationship with society. The interrelation between the three concepts; architectural design, gender, and sustainable society, constitute the frame of the study. Therefore, the other aspects of sustainable societies are not within the scope.

Additionally, as sustainable societies and gender issues have location-related characteristics, the scope of the study is formed regarding society in a certain geographical location. Due to the global contemporary world order, societies share common specifications, interests, and structures. However, local characters

and values of the societies need to be taken into account as much as common global factors. Therefore, the scope of the research is limited to a certain location and society, concentrating on its characteristics and local values, as much as global and common ones.

2. SUSTAINABILITY AND SUSTAINABLE SOCIETIES

As a subject in the spotlight recently, sustainability is being approached from various directions. Although the definition of sustainability has a common general frame, every discipline develops its unique perspective to approach the concept. In this chapter, the author tries to define sustainability through its social aspects, and sustainable society as a concept with a set of elements including gender. Additionally, the relationship between architectural design and sustainable society is also discussed in the following subchapters.

2.1. Definition and Background

The most commonly known definition of sustainability is made in the Brundtland Report, also known as *Our Common Future*, as a concept to satisfy the needs of the existing generation without compromising the needs of the future generations (WCED 1987). However, its historical background lies back in the philosophies of ancient cultures. Despite having different contexts and structures, ancient traditions believed in the importance of living in harmony with nature; which is one of the fundamental principles of the contemporary sustainability concept (Mebratu 1998). Therefore, one can assert that sustainability has always been a part of human culture. However, nowadays humankind is living in a much more complicated and dynamic world where everything is undergoing a process of change. Consequently, the definition of sustainability needs to be revised again and again depending on the context. Sustainability from an anthropometric point of view comprises the following 3 elements:

- *Depletion of resources; in order not to leave future generations empty-handed,*

- *Environmental and ecological aspects; to enable present and future generations to live in a clean and healthy environment, in harmony with nature,*

- *Quality of life; to ensure human well-being for the present and future generations. (Van de Kerk & Manuel 2008)*

IUCN, UNEP, and WWF's report for a strategy for sustainable living *Caring for the Earth* defines sustainable development as *improving the quality of life of humans while living within the carrying capacity of supporting ecosystems* (IUCN, UNEP & WWF 1991).

The perspective from the social aspects of sustainability allocates quality of life in the society into the focal point. Environmental aspects of sustainability are useless if the quality of life is not sustained. Therefore social aspects of sustainability such as balance, harmony, transparency, and freedom of the members of the society are emphasized. A sustainable society is one that ensures the health and vitality of human life and culture and nature's capital for present and future generations (Viederman 1993). Van de Kerk and Manuel (2008) define a sustainable society as one in which every member lives in a safe, well-balanced, and clean environment obtains proper education and contributes to sustainability so that future generations also benefit from similar opportunities. Sustainable societies have mutually reinforcing policies that protect the environment, create jobs, and build scaled growth economies aiming altogether to achieve a high quality of life which has to be sustained and constantly improved (Saisana & Philippas, 2012). Thence, sustainable societies are defined through indicators that are gathered in different indices according to existing literature.

2.2. Indicators of a Sustainable Society

The formation of a sustainable society is based on certain criteria and indicators. The indicators are generally divided into two categories: Physical and non-physical ones, or tangible and intangible ones. Some of the tangible factors are pedestrian-friendly neighbourhoods, attractive public realm, and decent housing, as intangible factors are participation and local democracy, safety, employment, and residential stability (Dempsey *et al*., 2011). Pope *et al*. (2004) define indicators of a sustainable society through equity, human rights, settlement efficiency, quality of life, sense of place, and the common good. Some other indicators of a sustainable society are accessibility, health and well-being, safety and security, employment, local democracy, cultural heritage, equal opportunities, connectivity and movement, social justice, and an attractive public realm (Weingaertner and Moberg, 2014).

There are also institutional approaches to the social aspects of sustainability and sustainable societies.

Sustainable Development Goals (SDG) Programme initiated by the United Nations consists of 17 interconnected criteria that constitute a sustainable society, such as good health and well-being, quality education, gender equality, reduced inequalities, and peace justice and strong institutions (SDG Knowledge Platform, 2015). SDG provides a framework for a sustainable future for societies and countries all over the world. On the other hand, they also raised critical questions of how equality, inclusion, and participation would be embedded in a world that was structured around grave inequalities and exclusions (Dhar, 2018). Additionally, the Sustainable Society Index (SSI) was launched in 2006 by the Sustainable Society Foundation to provide a tool for the measurement of sustainability criteria of a society (Sironen *et al*., 2014). Along with human, environmental, and economic wellbeing criteria, it includes social and personal development criteria such as education, income distribution, good governance, and gender equality (Saisana & Philippas, 2012). SSI is calculated for 151 countries accounting for 99% of the world population, with regular two-year updates that demonstrate developments over time (Savic *et al*., 2016).

Based on the information derived from previous research and studies, one can assume that social equality or justice between different groups is an important indicator and factor in sustainable societies. It is a situation where all people in society have the same status in all aspects of life, including civil rights, freedom of speech, and equal access to social services and goods. Sustainable societies must rest on the basic values of equality and democracy, as an effective appropriation of all human rights by all people (Becker & Jahn, 1999). Equality between the younger and the older, the rich and poor, or different races are important indicators. As important as these, gender equality is crucial to constitute a sustainable society.

2.3. Gender Issues in the Society

The relationship between the founding elements of society is one of the factors that define its quality and wellbeing. It is an indicator of a sustainable society as well. Equality and justice among the male and female members of the society must be maintained to raise healthy future generations. Sustainable Society Index includes gender equality as one of the indicators under the *Human Wellbeing* dimension and under the *Personal & Social Development* subsection. It is considered a condition for the balanced development of individuals and society (Van de Kerk & Manuel, 2008).

Although the measurements to show the results of this indicator are not clear, SSI builds a method to include gender equality as a factor of a sustainable society. Based on this, one can assume that gender equality must be seen as an important factor.

The importance of gender equality in society is expressed in the Sustainable Development Goals Programme. It is one of the 17 goals mentioned in the framework due to its importance and role in ending all kinds of discrimination against women and promoting the empowerment of women in society. However, according to the report of SDG Knowledge Platform (2015), *insufficient progress on structural issues at the root of gender inequality, such as legal discrimination, unfair social norms and attitudes, decision-making on sexual and reproductive issues, and low levels of political participation, are undermining the ability to achieve this goal*. Although governments have the main responsibility in achieving the SDGs, by providing a bridge for the creation and protection of socio-economic rights for disadvantaged sections of society (Meintjes, 2005), civil initiatives also need to play their role. Therefore, all kinds of dynamics including legal codes, social norms, or community engagement initiatives within the society must be activated to achieve the goal, including the composition of the built environment towards gender equality.

3. GENDER ISSUES IN THE BUILT ENVIRONMENT

The world is going through times of rapid change in the understanding of social interactions and demographic data. Accordingly, societies are changing and their structures are evolving towards a complex form. On one hand, society is growing larger and more diverse every day, as on the other hand, its building blocks are getting smaller, more unique, and isolated. The reflections of the changes in society are visible in the built environment. Nowadays, the urban public space becomes a stage for the cultural and social exchange of knowledge, regardless of the age, ethnicity, or gender of the users. The relationship between the built environment and the user is mutual. Space defines the people in it, as the presence of individuals in space determines its nature (Ardener, 2000). Therefore, the results of the evolving gender relations in society are seen in the built environment. The model that separates the public and private spheres reflected on male and female domains is the product of a long history (Bumbaris, 2019). The changing role of women in society caused an increase in some building functions and other changes in the built environment. Economic conditions and the requirement for financial growth make women an essential part of working life. Therefore, private and public zones in the built environment are designed to meet the needs of both men and women.

However, gender inequality in the built environment persists in certain areas. Women constitute about 50 percent of the users of the built environment, yet they have a negligible influence on their architectural forms (Weisman, 2000). Especially in traditional societies, the role of women mostly has a domestic character, taking care of children, and staying in the private zone. The concept of domesticity has long since been linked to notions of gender, especially femininity (Sparke, 2014). Even in the public and urban spaces, gender inequality is obvious. For instance, in many societies, male groups can gather and play games in public open spaces, as it is not considered appropriate for women to do the same. The inequality of gender is also visible in the private interior zones and residential spaces. Based on their role as a mother, more privacy is used in spaces that are being used by the women, and the spaces are more introverted, as the spaces for the men are more transparent and extraverted. Even though the situation is undergoing a process of change, it is still available in most of the current societies.

Gender differences reflect on all aspects of spatial planning and the design of the built environment, from the interior design of housing to the planning of entire cities (Burgess, 2008). According to Lico (2001), even the building façade, ornaments, and materials are signifiers of gender. Gender issues in the built environment are better studied under different categories based on the privacy level and functionality of the space. The next subchapters present the gender issues in residential, working, and urban public spaces with examples from different contemporary societies.

3.1. Gender Issues in Residential Spaces

The most basic appearance of gender issues in the built environment is in the residential zone. According to Kandiyoti (1997), studies of the family and gender relations can mirror the templates of modernization theory by linking extendedness and gender hierarchy with tradition and nuclearity. Houses are places where the nuclear family comes together and meets their basic needs for a living. In the past, urban houses had multi-functional rooms based on gender segregation where the better furnished and organized spaces were occupied by men (Özbay, 1999). Even though we are

currently living in a democratic era, the segregation between the roles within the family, and its reflection on the architecture of the house persists. The built environment reflects and reinforces a domestic ideal that emphasizes the importance of a home as a woman's place and a man's haven (Wajcman, 2001).

On the other hand, it is a fact that women have joined the labour force in the 20th century. Nowadays, women are an essential part of working life, just like men. According to Hayden (2000), the conventional home is not sufficient to serve the employed woman and needs to change. Additionally, the built environment in workspaces also needs to evolve for the better use of women. The changes in and current situation of the workplaces in terms of gender issues need to be addressed in the scope of this study.

3.2. Gender Issues in Working Spaces

The role of women in the work-life has been changing under new economic and social conditions. In the past, the nature of the working woman was mostly secretarial duties that require open offices and common spaces, as the men were working behind closed doors and in privacy as they were the decision-makers (Spain, 2000). Nowadays, the situation has changed, and especially among the white collars, the equality between women and men has been established. Accordingly, the physical environment in the workspaces has changed to meet the needs of the working women. There is more room for personalization or socialization, and workspaces are more suitable for multiple functions.

However, there are still some types of jobs that are considered not suitable for women for various reasons. One of the reasons is that jobs like construction work or mechanic services require physical strength so that those workspaces are still under male preponderance. Even if they do not have to be directly engaged in physical work, women are not the preferred architects or civil engineers in construction sites, especially in less developed countries. Another reason is the traditional recognition of society. For instance, driving public transportation is mostly recognized as the duty of men, so that in the 21st century, the majority of the drivers are still men, even though there are some female drivers on the streets. Besides the office duties of the white collars, jobs that are considered appropriate for women are mostly based on caretaking services such as teaching or nursing. Enoch (2008) states that women teachers transform the classroom

into a home environment. Consequently, the workspaces of these jobs tend to be designed considering the needs of the women. The transformation of workspaces which is based on the changes in women's way of living and getting more engaged in public life also requires the transformation of the urban spaces as they are the socialization areas for all workers and other members of society. Gender issues in urban spaces are the most important aspects of gender issues in the built environment.

3.3. Gender Issues in Urban Spaces

Urban areas are the places where all the members of a society come together. Therefore their physical qualities need to answer the needs of all groups. In the times when *the place of the woman was her home*, gender issues were not an important factor in urban design. However, as the healthy urban environment is an important element of a sustainable society in the 21st-century world, gender problems in the urban space need to be dealt with from a more equitable perspective. But nowadays, the way the urban environment is designed and built is imbued with particular understandings of how they will be used that are not gender-neutral (Burgess, 2008). Urban infrastructure needs to be redesigned to promote greater gender equality in the use and benefits of urban space, beyond the male perspective that handles the role of women as primary caregivers within the families and nearby communities (Jaeckel, & van Geldermalsen, 2006). Women's leadership in organizations rebuilding communities and neighbourhoods and their creation of new paradigms make them important actors in the design process of the urban areas (Torre, 2000). However, according to Wilson (2000), women, along with minorities, are still not full citizens, in the sense that they have not been granted full and free access to the streets. Therefore, the built environment in urban areas such as squares, malls, streets, sports areas, green areas, and playgrounds need to be transformed, considering gender issues.

Gender relationship in urban areas is one of the most important dimensions of current urban studies and considers the wider relationship between urban areas and culture (Moghadam & Rafieian, 2019). The moment a person sets foot outside her/his home or work, she/he is in an urban environment. Therefore, street patterns constitute the majority of urban space. At the same time, they are places that are under the least control and surveillance. Women's problems in

urban areas are related to safety and transportation (Chant, 2013). Streets, along with urban squares, need to be designed in a way that every user feels safe and secure and can access all the elements on them. For instance, the lack of width and distance between buildings in the streets, and in the evening times the lack of artificial lighting causes a lack of security and safety feelings. Especially in the inner city, women feel less safe being out alone after dark (Whitzman, 2007). Physical comfort is also very important for the users. Disorder and distortion on the pedestrian grounds make it hard for everyone, but especially for people with disabilities and for the ones who are carrying their children on strollers.

Urban squares that are places that are something more than the crossing points of streets have various functions in addition to circulation and movement. In addition to feeling safe and secure, other issues need to be considered in the scope of gender issues. The availability of the urban square for sitting, resting, and spending time in proper ways such as on ergonomic seating elements and in shaded areas is important. Other than that, the functionality and beauty of the urban places are most probably taken seriously by the women using that place. Accordingly, the main and supportive functions in an urban square need to be designed in an effective and aesthetically attractive way.

One of the popular urban spaces of contemporary societies is the shopping mall. There is an ongoing debate on the shopping malls whether they are public or commercial spaces. In any case, shopping malls are a part of the urban space and they have a variety of users. Therefore, they must be designed in a way that answers the needs of every user that has its share in that space. Especially in shopping malls, the woman is the target for the retailers, planners, developers, sociologists, and market researchers (Morris, 2000). The areas are generally designed in a way to satisfy their demands. However, there is still a need for upgrades for the everyday needs in the circulation areas, shops, restaurants, cafes, and resting areas. On the other hand, one can argue that the needs of men are ignored in the design of shopping malls as they are not considered the primary user in those spaces. So, there may be some room for improvement to make malls a more democratic place for everyone, not for only the target consumer profiles.

On the intersection of urban and rural, there are green areas. They are at the same time the rural

environment within an urban space. Contemporary urban green areas and parks host recreational activities like jogging, walking, doing yoga, playing ball games, having a picnic, etc. Therefore, they need to be planned and built in an inclusive way for every user profile. Safety, security, and accessibility issues need to be primary concerns in the design of urban parks. The spaces need to be well lit, allowing the users to find shelter on sunny and rainy days. They should have a moderate topography to provide accessible areas and supporting functional areas like children's playgrounds, restrooms, and cafes for the users to spend quality time in the urban parks. On the other hand, it is also important for the users to have their personal space defined and social distance preserved due to the emerging global problems.

Gender issues in urban and residential areas, as well as workspaces, have their unique implications and reflections on every society. They need to be studied within their context so that the obtained data has some benefit for society. For this reason, this paper presents a case study on the gender-related perception of the built environment in Istanbul, Turkey. The next chapter explains the background of the study sites along with the hypotheses and findings of the study.

4. THE QUESTIONNAIRE

Although the widespread understanding about architecture practice presumes its field of interest as buildings and construction, the primary field of interest for architecture as a social practice, are human beings. Their actions, activities, and social relations define the working area of architects. Exploring the cultural aspects of architecture is essential to comprehend the meaning of space and social relations (Zalloom, 2019). The key to understanding the built environment lays with the due comprehension of the society and culture they exist in (Yaneva, 2012). Therefore, architects need to understand and initialize the variety and diversity in society to contribute to its health and wellbeing. In the scope of this paper, gender issues are defined as decisive factors in society and consequently in the appearance of the built environment. Accordingly, a questionnaire was conducted to investigate the differences between women and men in the understanding of the built environment. Due to the pandemic conditions in 2020, the questionnaire was held online with a limited number of participants. Despite the restrictions, the questionnaire points out important differences between men and women in the understanding of architecture and design, giving a lead

to strategies and design decisions for a socially sustainable built environment.

4.1. Scope and Background

The general frame of the questionnaire was composed to reveal the potential differences in the perception of the environment between women and men. Their nature necessitates two genders to evaluate their surroundings with distinct understanding. Thus, it is usual that they have different opinions about the same image or concept that they confront. Architecture needs to work on the built environment to answer the needs of every member of society. Consequently, the scope of the survey was defined by the fragments of the built environment that the everyday users find themselves in throughout their daily life. The statements linked to the images or concepts were also chosen from the basic needs and concerns of the people.

The participants of the questionnaire were selected randomly to reflect the diversity of the society itself. However, even though the questionnaire was conducted online, the participants are from a certain social background: Turkish citizens living in Istanbul. Therefore, the participants share a social and cultural background, referring to the fact that architecture needs to reflect and contribute to the society and culture it exists in. The only concern was about the participation rate of men and women as it needs to be similar numbers for a fair comparison. Other personal information except the gender was neglected.

4.2. Research Questions and Hypotheses

The main aim of the survey is to investigate the differences between women and men in the perception and understanding of the built environment. The research questions are: What are the differences between men and women in the perception of the built environment? How do women and men evaluate their surrounding interior and exterior spaces regarding different feelings and opinions? How do the preferences of men and women alternate in different parts of the built environment? Therefore, the questionnaire includes statements about residential, work, and urban spaces questioning their safety, functionality, cleanliness, comfortability, etc. from the user perspective. In this way, the study aims to come up with strategies and changes in the design decisions to satisfy the needs of both genders in the built environment they exist.

The hypothesis of the study, connected to the outcomes of the survey is that the quality of the built environment can be improved if the needs of both genders are taken into account when designing spaces. In residences, workspaces, or public urban spaces the reflections may be different, but the main approach needs to be based on the consult the needs of every user group of that built environment.

4.3. The Structure of the Questionnaire

The questionnaire was done online using Google Forms. It is split into 3 parts, defined by the research questions mentioned above. One part is about residential interior spaces, as the second part is about workspaces and the third part about public urban spaces. Every part includes generic pictures of certain spaces that provoke to reveal the concept of that space in the mind of the user. For example; the questionnaire shows a generic picture of an open office, to trigger the imaginative concept of an open office in the user so that the user can reflect her/his opinion of an open office. For every image in the questionnaire, the participants are asked to what extent they agree with certain statements that speak about the safety, cleanliness, comfort, complexity, fun, and order. Additionally, they are also asked about to what extent they feel relaxed and comfortable in that place and how much they like to spend time in there. A 5 point Likert scale is used in the questionnaire. Answers from the participants are organized in the same order with the questions and split between the answers from men and women for the analysis of the findings.

4.4. Findings

The questionnaire revealed remarkable findings. A total number of 134 people participated in the questionnaire, 72 of them being women and 62 men. All the answers were transformed into numerical values depending on the 5 points Likert scale and the arithmetic means were calculated. Important findings of the questionnaire based on different categories are summarized in the following chapters.

4.4.1. Residential Spaces

In residential spaces, the most significant differences in the perception of men and women occurred in the kitchen. Men define the kitchen as a complex place more than women (3.06 to 2.59), as women say in the kitchen they feel more relaxed than men (3.65 to 3.24). Women would like to spend time in the kitchen more than men (3.66 to 3.30). More women

Table 1:   Mean Values for the Results of the Questionnaire for Residential Spaces

	living room							
	safety	cleanliness	comfort	complexity	fun	orgnz	Here I'd feel relaxed	I'd like to spend time here
men	3.903	4.172	3.576	2.810	2.565	3.898	3.759	3.667
women	3.931	3.984	3.446	2.431	2.958	3.818	3.625	3.597
	kitchen							
	safety	cleanliness	comfort	complexity	fun	orgnz	Here I'd feel relaxed	I'd like to spend time here
men	3.864	4.279	3.800	3.065	3.516	3.484	3.242	3.306
women	3.688	4.111	3.540	2.594	3.621	3.594	3.656	3.662
	bedroom							
	safety	cleanliness	comfort	complexity	fun	orgnz	Here I'd feel relaxed	I'd like to spend time here
men	4.133	4.310	4.290	2.226	3.155	4.086	4.226	4.086
women	3.514	4.062	3.776	2.000	3.159	3.891	3.803	3.734

think they can have fun (2.96 to 2.56) in the living room, as men consider it a complex place more than women do (2.81 to 2.43). In the bedroom, the safety mean value of men is more than the one of the women (4.13 to 3.51), just like the comfort and relax values. Additionally, men state that they like spending time in the bedroom more than women (4.08 to 3.73).

In the overall evaluation of these results, the most interesting issue was that the women think that the living room is a safer place than the bedroom, as men put bedroom into the first position in terms of safety (see Table **1**).

4.4.2. Workspaces

The questionnaire reveals that in the workspaces both genders are looking for a healthy and organized environment. A well designed personal workspace is desirable by both men and women, even though men find a personal workspace less complex than women do (3.01 to 2.51). Women also think that personal workspace is a comfortable environment (3.25 to 2.83). The open office environment is found more organized by men than women (3.56 to 2.94), in addition to being safe (3.55 to 2.99). However, the results for the statement *"I would like to spend time in this place"* appears to be lower for men than women (2.40 to 3.01), just like the results for the place being a fun one (2.48 to 2.81).

The results for the classroom as a workspace revealed important differences based on gender. Women define the classroom as a fun place more than men do it (3.54 to 2.81), and they say they would like to spend time there more than men (3.39 to 2.72). More

men than women think that the classroom is a complicated space (3.48 to 3.24) and men find the classroom less comfortable than women (2.71 to 2.92).

The results for the construction site show interesting results as well, pointing out that women feel less safe than men there (2.31 to 2.90), and poor in terms of comfort (1.72 to 2.11). Additionally, more women than men think a construction site is a complex place (3.93 to 3.46).

Summarizing the findings of the questionnaire for workspaces, it can be asserted that the construction site is the least popular workspace for both genders, and the classroom steps forward as the favourite workspace of women, as the personal workspace appears to be the favourite workspace of men (see Table **2**).

4.4.3. Urban Spaces

The urban spaces category of the questionnaire had remarkable results as well. Women feel less safe than men in all the open spaces: 2.59 to 2.98 for streets, 1.97 to 2.66 for urban squares, 3.84 to 3.91 for urban parks, and 2.52 to 3.22 for shopping malls. Men think shopping malls are less fun and more complex, compared to the opinions of women. As a result, men don't like to spend time in shopping malls as much as women do (2.19 to 2.81). More women say they would like to spend in urban squares, even though they don't feel safe there (2.78 to 2.46). They also think urban spaces are more fun (3.21 to 2.93).

According to the questionnaire, the most beloved of urban spaces are urban parks. In general, men

Table 2:   **Mean Values for the Results of the Questionnaire for Workspaces**

		construction site						
	safety	Cleanliness	comfort	complexity	fun	orgnz	Here I'd feel relaxed	I'd like to spend time here
men	2.903	2.492	2.113	3.468	1.933	3.150	2.086	1.871
women	2.313	2.313	1.722	3.931	1.750	2.409	1.703	1.583
		personal workspace						
	safety	Cleanliness	comfort	complexity	fun	orgnz	Here I'd feel relaxed	I'd like to spend time here
men	3.517	3.741	2.839	3.016	2.586	3.129	3.086	2.881
women	3.431	3.667	3.250	2.514	2.532	3.625	3.015	2.859
		open office						
	safety	Cleanliness	comfort	complexity	fun	orgnz	Here I'd feel relaxed	I'd like to spend time here
men	3.548	3.733	2.517	2.949	2.483	3.565	2.860	2.403
women	2.986	3.585	2.828	2.683	2.813	2.944	2.806	3.014
		classroom						
	safety	Cleanliness	comfort	complexity	fun	orgnz	Here I'd feel relaxed	I'd like to spend time here
men	3.448	3.483	2.719	3.483	2.806	3.322	2.823	2.726
women	3.594	3.508	2.921	3.242	3.542	3.323	3.028	3.389

Table 3:   **Mean Values for the Results of the Questionnaire for Urban Spaces**

street							
safety	cleanliness	Comfort	complexity	fun	order	Here I'd feel relaxed	I'd like to spend time here
2.984	2.984	3.086	2.552	2.439	3.328	3.017	2.860
2.597	2.833	2.939	2.300	2.435	3.127	2.877	3.056
urban square							
safety	cleanliness	Comfort	complexity	fun	order	Here I'd feel relaxed	I'd like to spend time here
2.661	2.207	1.879	3.694	2.935	2.414	2.561	2.468
1.972	2.203	2.111	3.736	3.208	2.375	2.688	2.781
urban park							
safety	cleanliness	Comfort	complexity	fun	order	Here I'd feel relaxed	I'd like to spend time here
3.912	4.155	4.525	1.807	3.726	4.155	4.424	4.583
3.846	4.156	4.174	1.508	3.352	4.016	4.185	4.292
shopping mall							
safety	cleanliness	Comfort	complexity	fun	order	Here I'd feel relaxed	I'd like to spend time here
3.226	3.000	1.790	3.806	2.661	3.119	2.322	2.194
2.528	2.698	2.181	3.083	3.125	2.953	2.500	2.819

evaluated urban parks with higher grades than women, reflecting on every aspect of the questionnaire. The urban parks also appear to be the safest urban places with the highest average results. Additionally, urban parks also have the results for complexity, and the highest results for the statement "*I would feel relaxed here*" (See Table **3**).

4.5. Outcomes

The most obvious outcome of the questionnaire, independent from the gender perspective is that the people living in Istanbul are longing for urban green spaces. The results for urban parks show that small differences between men and women, mostly based on
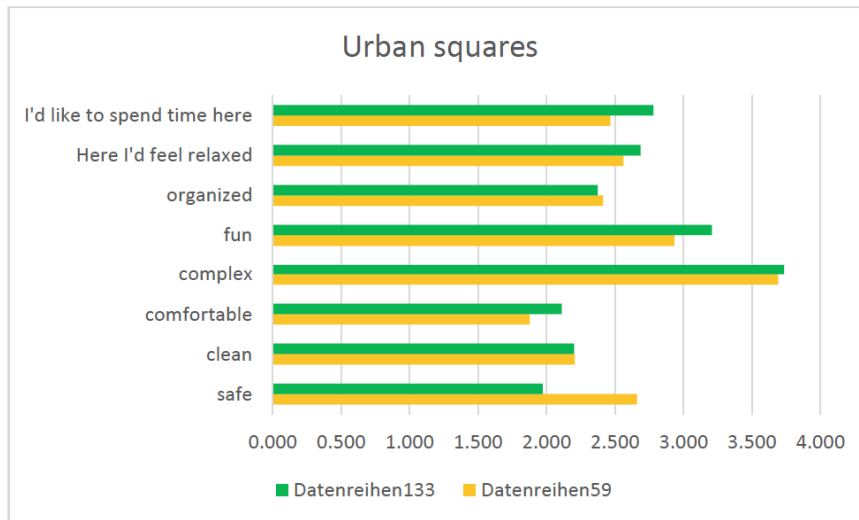
Figure 1: The results of the questionnaire for urban squares.

the comfortability, complexity, and pleasure levels. Both genders agree that urban parks are clean and safe urban spaces.

On the other hand, for urban squares and streets, there are contradicting results, especially from the aspect of safety. Women feel less safe than men in urban squares and streets; however, they still *like to spend time in those places* more than men. The reason for it may lay behind the results for pleasure and comfortability statements. More women said they can have fun in those urban spaces and they find those places more comfortable than men do (see Figure **1**).

Shopping malls must be given special attention regarding the outcomes of the questionnaire. The perception of women and men seem to be very different from each other speaking of shopping malls. Even though they assume that shopping malls are safe places, men don't like spending time there. Most possibly it is because they think a shopping mall is a complex place, and they feel less comfortable there. Contrarily, women evaluate the shopping mall a fun, comfortable, and less complex place, so that they like spending time there (see Figure **2**). Shopping malls are an important part of the daily life of Turkish people. Thus, it is a remarkable outcome of the study to see the opinions of men and women about them.

Regarding the results of the workspaces, the questionnaire finished as expected. Both genders' decisions about construction sites were lower than the other workspaces, although the results of men were slightly higher than the results of women (see Figure

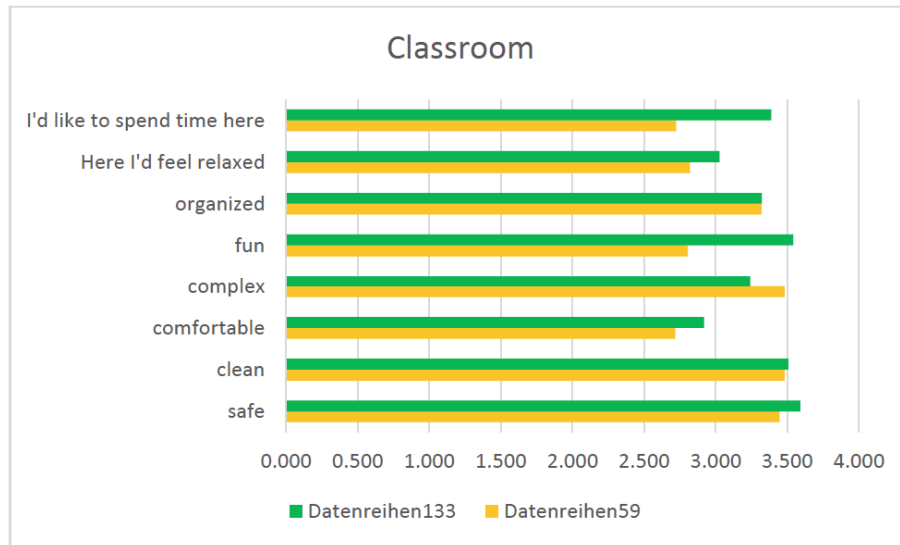**Figure 2:** The results of the questionnaire for shopping malls.

Figure 3: The results of the questionnaire for the classroom.

3). Another noticeable outcome was that women tended to work in classrooms more than men did, proving the traditional approach that puts the woman into the classroom as a workspace and makes the classroom an extension of the home environment; as mentioned by Enoch (2008).

There was little difference between the perception of men and women regarding office spaces. However, the personal workspace was evaluated more organized but less fun by the women, as the open office was treated similarly by men. These opinions resulted in more men wanting to spend time in a personal workspace then open office, but with more women preferring to work in the open office rather than in personal workspaces. Therefore, one can interpret that

women are more likely to work is socialized spaces rather than organized and isolated spaces, as men tend to choose to stay alone when working (see Figure **4**).

The category about the residential spaces also provided interesting outcomes for the study. The first important outcome is safety in the residential environment. The bedroom appeared to be the safest place for men, as for women it was the living room. The reason behind this is a subject for a further and more comprehensive study. Another point about residential spaces is the living room: Men find the living room more complicated and less fun, as the women have opposite opinions. Although the is not necessarily a direct correlation between these two values, one can
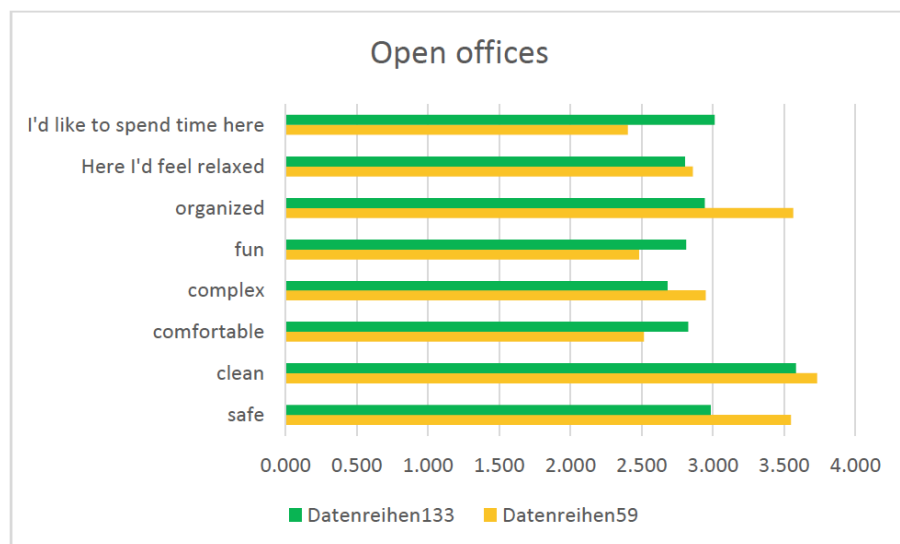

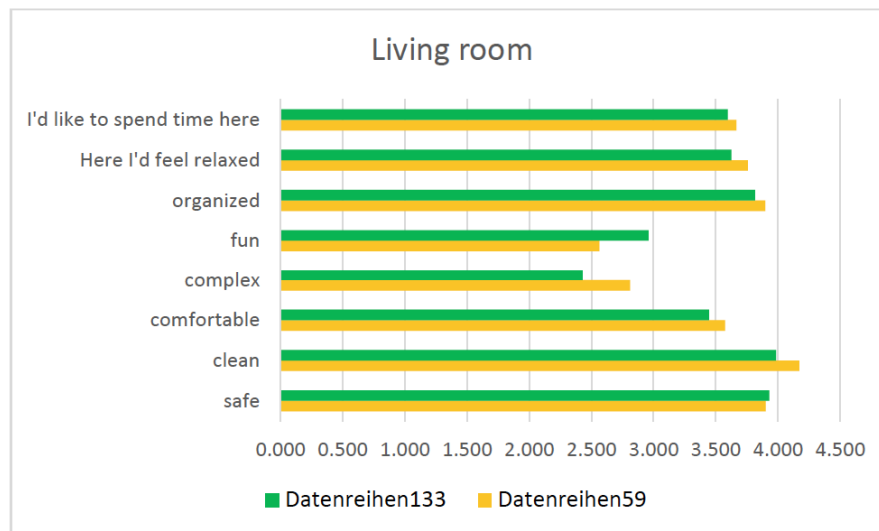**Figure 4:** The results of the questionnaire for open offices.

Figure 5: The results of the questionnaire for living rooms.

assume that less complex living space with defined functions may help men to have better experience in it (see Figure **5**).

The results of the questionnaire regarding the opinions of men and women about the kitchen show that it is a beloved part of the house, yet still a little away from the men. Men think the kitchen is a safe, clean, and comfortable, yet complicated place. However, women don't think it is that complex and they think it is a fun but organized space and the place helps them to relax. Although nowadays men are getting more familiar with kitchen work, obviously they still have a long way to go; at least in Turkish society.

5. RESULTS AND DISCUSSION

This paper presents the role of the built environment in a sustainable society, based on a perspective of gender issues. Therefore, the responsibility of architecture for a sustainable society needs to be clarified. ODPM (2006) defines the *well-designed built environment* as one of the key factors for a sustainable society. The decisions about the design of space dictate human behaviour and social relationships in that space. Therefore, architecture as the discipline responsible for the design of the built environment has an important role in sustainable societies. The mutual relationship between society and architecture causes different elements of society, such as women and men, to be affected by the built environment.

Based on the outcomes of the questionnaire in the scope of this paper and theoretical research, the author can suggest some strategies for the development of the built environment to contribute to the better functionality for women and men:

- Regarding residential spaces, the least favourite space for men appears to be the kitchen and for women the bedroom. Therefore, the environment in the kitchen can be improved to reduce its complexity for men, probably by creating a simpler space that is understandable with its equipment and tools, as well as its materials and colours. Likewise, the environment in the bedroom needs to be altered to be appreciated by women. The most important problem for women in the bedroom seems to be safety. The reason may cause by its isolation from the other parts of a home environment. From an architectural perspective, a stronger connection of the bedroom with other rooms can be a good step to provide a safer environment for women in the bedroom. Architects may also think about linking the bedroom and the living room with each other. However, the safety issues in women's opinions about bedrooms may be caused by different aspects of social relations.

- Linking the bedroom and the living room may serve another objective as well. Because surprisingly, the living room is considered the least joyful place in residential space by both genders. Therefore, the profession of architecture may take responsibility to design more enjoyable living rooms, making it more vivid, alive, and full of surprises.

- Workspaces obviously need more personalization and less monotony. Especially

men think open offices are too organized and accordingly, less fun. The conventional approaches in the design of the offices are already being taken over by the contemporary approach of co-working spaces that depends on flexibility and temporariness. The idea of open offices must be fed with those ideas.

- Women find personal workspaces more comfortable and more organized. However, they think open office environments are more fun and they like to spend time in open offices more than in personal workspaces. It is most probably caused by women's strong need for socialization. Therefore, the environment in workspaces needs to be designed in a way that allows people to socialize and interact with each other.

- Construction sites are not preferred by both genders, but women seem a bit more away from the construction site as a workplace. Safety, cleanliness, comfort, and fun are the biggest issues in construction sites for women. Therefore construction sites need big improvements to be more desirable by women. Although the current nature of construction sites don't allow many improvements, technological solutions that provide visual connections and needless physical contact can be used in the architecture of the construction sites. Additionally, combining office spaces with the construction site itself can also be a way to overcome the problem of comfort and safety in these environments.

- Women tend to spend time in urban spaces even though they don't feel safe. Therefore, it is an important responsibility of urban planners to create better urban spaces that allow everyone to spend a safe and secure times. Longer lines of sight, better-lit spaces and streets, and a more balanced distribution of population can be appropriate strategies for this aim.

- The questionnaire reflects the importance of urban spaces in our daily lives. First of all, independent of genders, urban parks are beloved places for most people. This information is strongly related to the location, as the participants of the questionnaire were from Istanbul and Istanbul is a city that lacks urban parks and green spaces. In Istanbul, the amount and size of urban parks need to be increased for a better quality in the urban areas.

To sum up, it can be asserted that every piece of the built environment needs to be designed in a way that responds to the needs of every user. Gender is an important and essential issue for society, but the perspective in architecture is still under development, especially in developing countries. Therefore, studies on the architecture and design that allocate gender issues in the focal point need to increase in amount and quality to create better-built environments. Especially, multidisciplinary studies are required for better understanding and solutions to these issues.

The questionnaire has interesting outcomes that cannot be explained from the architectural perspective alone and needs further discussion. One of those outcomes is the difference between the opinions of men and women about workspaces. The average response of men to the statement *I would like to spend time here* for workspaces was significantly lower than women's responses (2.64 to 2.93). The reasons for this situation cannot be explained only from architecture. The social and psychological reasons behind the situation may be a subject for further studies.

Another interesting outcome of the questionnaire is that the bedroom feels the least safe residential space for women. Beyond the architectural perspective, the reasons behind this may cause by the social roles of women and men in society, as well as their relationship within the family. The bedroom may be considered a space for relaxation and intimate relations for men, but for women, it is still a place of duties and service such as tidy up and cleaning. Beyond its social and gender-based background, it would be interesting to study how the built environment can contribute to making sure that the woman feels safe in her bedroom.

It is a fact that society does not only consist of men and women. From the gender perspective, trans-genders, homosexuals, etc. are respected members of the society as well. The reason for the limitation of the study on men and women lies behind the fact that these two genders still constitute the majority of the society, especially in the location where the survey was conducted. A study on the relationship between the other genders and the built environment is a promising field of research. Additionally, other major or minor groups of the society also need to be recognized and listened to. Especially, the needs of the groups that require special attention such as the elderly, children, disabled people, etc. must be met to come up with a sustainable society.

6. CONCLUSION

Every piece of the built environment needs to be designed in a way that responds to the needs of every user. Types of users may vary between different age groups, cultural and ethnic backgrounds, and gender. Gender is an important and essential issue for society, but the perspective in architecture is still under development, especially in developing countries. Therefore, studies on the architecture and design that allocate gender concerns in the focal point need to increase in amount and quality to create better-built environments. Especially, multidisciplinary studies are required for better understanding and solutions to these issues.

6.1. Limitations

Because of the Covid-19 pandemic, the survey could not be done face to face, so respondents needed to fill out an online survey. The pictures were chosen from the most well-known urban spaces and generic images that exemplify different spatial characteristics to trigger the imagination of the participants. Pandemic also affected the questionnaire participation and analysis processes, causing temporal restrictions. The effects of the Covid-19 pandemic on the built environment is a brand new field of work for designers, and it would be an interesting topic for further studies.

The participants of the questionnaire were Turkish people living in the city of Istanbul. Therefore, the questionnaire reflects their opinions and impressions. Although some issues about the built environment are global, it still is strongly connected to the cultural and social backgrounds of the people. The outcomes and conclusions of the paper based on the questionnaire need to be evaluated under these circumstances.

The following spaces where the men and women are categorically separated from each other were left out of the scope of this paper: religious places, hair salons, military areas, etc. Additionally, in Turkey, some buildings have scheduled use by men and women such as gyms and swimming pools. The design decisions about these parts of the built environment are mostly not subject to change by gender differences, consequently, they were not a part of this study.

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