Evaluation of Shopping Malls in Istanbul with Respect to the Sustainable Sites Initiative Criteria

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Abstract
Severe interplays between the environmental dynamics and human beings provoke designers to search for new ways to handle the issue of sustainability. This study interrogates ways to evaluate landscape sustainability and focuses on certification systems. SITES appears as the certification system that this study considers as it comprehensively handles all scales of the landscape studies. Studying on the Shopping Malls of Istanbul Megacity, the projects are graded according to the nine major parameters as “site selection”, “pre-design assessment and planning”, “water”, “soil and vegetation”, “materials selection”, “human health and well-being”, “construction”, “operations and maintenance”, and “monitoring - innovation”. Benefitting from the background of the certification system, within this study, four different techniques developed, which are structured as weighted, unweighted, prerequisites regarded and disregarded. Through these techniques, six selected shopping malls are evaluated for their sustainability levels to generate an available platform to compare both the techniques’ credibility and the projects’ sustainability. Following the implementation of the techniques, 3 of the projects examine higher sustainability levels than the others. Results of the applied techniques represent that among all techniques, weighted ones are more successful due to the details they forward. In the case of Istanbul, shopping malls have problems with meeting some of the significant prerequisites. Therefore, using both the prerequisite regarded and disregarded weighted techniques is recommended to discover the prerequisite based failure levels and identify the properties to upgrade. This study scrutinizes the generation of a quick to implement a pre-evaluation tool. This tool is expected to be both for the benefit of new up to construct projects and the already constructed ones to upgrade the sustainability levels.

Keywords
shopping malls; sustainable sites initiative; Istanbul; landscape planning, landscape sustainability

1. Introduction

Challenges of the 21st century bring about chaotic interplays between the environmental dynamics and human beings, which provoke designers to search for new ways to handle the issue of sustainability. With their specific concern on limited energy consumption, limited water usage and waste production, sustainable studies have got minor impacts on the territory than the common design, construction and management studies (Yates and Castro-Lacouture, 2018).Thus, regarding its specific concern on ecology, the profession of landscape architecture inevitably has to play an active role in the studies on sustainability to avert environmental problems.

According to Calkins (2008), Gauzin-Müller & Favet, (2002) and Venhaus (2012), sustainable landscape design has got several benefits, including environmental benefits, such as improving and protecting natural resources together with biodiversity and ecosystems, providing waste management, and enhancing air-water quality. Besides the environmental benefits, economic and social ones are also specific. Reducing operating costs, increasing user

productivity, land value, and profit appear as the economic benefits, while increasing the employee participation, the health, and comfort of users, reducing the burden on local infrastructure, and improving the quality of life come up as the social benefits.

On the sustainability of landscape areas; research and selection of suitable land and water resources, productivity studies, standards-setting, preparation and development of master plans for land use including drainage, irrigation, planting are essential to consider aesthetic concerns as well as to keep functionality in mind while performing these studies (Rogers, 2010) Sustainable landscape architecture creates ecological designs in a multi-scale fiction ranging from urban to rural, from open spaces to semi-open and even closed spaces, holding function, budget, energy efficiency, aesthetic, and environment-oriented systems as a whole. Agglomeration of the quantitative evaluations towards these issues inevitably brings about the possibility of using certification systems.

This study interrogates the role of certification systems within the sustainability studies. Thus, it attempts to benefit from them to criticize the current projects then debug them for the sustainability of future studies. Today, there are many global certification systems developed in different countries. However, some of the most widely used and well-known certification systems are BREEAM, LEED, Green Star, and CASBEE, which are accepted by the many member countries of the World Green Building Council. Besides these, the SBTool certification system is used in various countries as it is adaptable to national conditions. However, among all these certification systems above-mentioned, the Sustainable Sites Initiative (SSI) supported system stands as a significant one by its emphasis on landscape sustainability.

This certification system was established in 2005 as a result of the studies conducted together with the American Society of Landscape Architects, Lady Bird Johnson Wildflower Center, University of Texas, and United States Botanic Garden. SSI aims to obtain sustainable conservation and amelioration of green areas by considering the issues of design, construction, and management (VanDerZanden and Cook, 2010).

Over the years, as expectations and needs change, certificate systems also update and develop themselves. Following the consideration of several systems, this study interrogates SITES as a set of guidelines and a rating system that can be applied to the varying type of areas with or without buildings. When we regard the interplay between the demand and supply approaches, this selected certification system is the one that stands on ecosystem services.

According to SITES v2 (2014: vi), “The central message of the SITES program is that any project—whether the site of a university campus, large subdivision, shopping mall, park, commercial center, or even a home—holds the potential to protect, improve, and regenerate the benefits and services provided by healthy ecosystems”.

TEEB (2010) defines the ecosystem services as the direct and specifically the indirect contributions of ecosystems to human well-being. Regarding the benefits people acquire from ecosystems, MA (2005) identifies four types of ecosystem services. “These include provisioning services such as food, water, timber, and fiber; regulating services that affect climate, floods, disease, wastes, and water quality; cultural services that provide recreational, aesthetic, and spiritual benefits; and supporting services such as soil formation, photosynthesis, and nutrient cycling” (MA, 2005: v).

Such an ecosystem services oriented approach brings about vibrant parameters for the establishment of sustainability, including some prerequisites and credits under nine main topics as “Site Selection”, “Pre-Design Assessment and Planning”, “Site Design – Water”, “Site Design- Soil and Vegetation”, “Site Design – Materials Selection”, “Site Design – Human Health and Well-Being”, “Construction”, “Operations and Maintenance”, “Monitoring and Innovation” (SITES v2, 2014; Sustainable Sites Initiative, 2009).

Figure 1 shows/ represents the parameters to evaluate landscape sustainability and forwards summaries pertinent to them. Although this information is produced or compiled from the principles of Sustainable Sites Initiatives, it is representing the general base for the sustainability

assessment tools.

Among all parameters, site selection stands as the first major parameter and is directly related to the principle of “do no harm” and concentrates on the protection of the ecosystems by regarding a risk-sensitive approach toward the habitat degradation and environmental disasters. Therefore, it also discourages explicitly the usages of greenfields, sites away from the existing built-up spaces and sites depending on motorized transportation (MA, 2005; SITES v2, 2014; Sustainable Sites Initiative, 2009; UNDESA, 2022).

Parameter of “pre-design assessment and planning” comes before the site design process and involves exhaustive assessments on-site conditions to support decision makings that will be conducted by a multidisciplinary team in collaboration with the stakeholders (Sustainable Sites Initiative, 2009).

The site design process is composed of 4 sub-processes involving “water”, “soil and vegetation”, “materials selection”, and “human health and well-being”, correspondingly. Minimizing the usage of potable water for landscape irrigation by varying percentages is essential for protecting the natural water units with their surrounding ecosystems. Therefore precautions and interventions are credible not only to protect/conserve but also to rehabilitate these water-based features together with the proposals of management them even at the stormwater level. Alternative irrigation methods and conservation strategies for water-dominant landscapes bring about some key study subjects such as “riparian, wetland, and shoreline buffers”, “flood and erosion controls”, “geomorphological and vegetative methods”, “stormwater and pollutants management”, and “landscape amenity” (Li et.al, 2019; Prudencio & Null, 2018; SITES v2, 2014; Sustainable Sites Initiative, 2009; UNDESA, 2022)

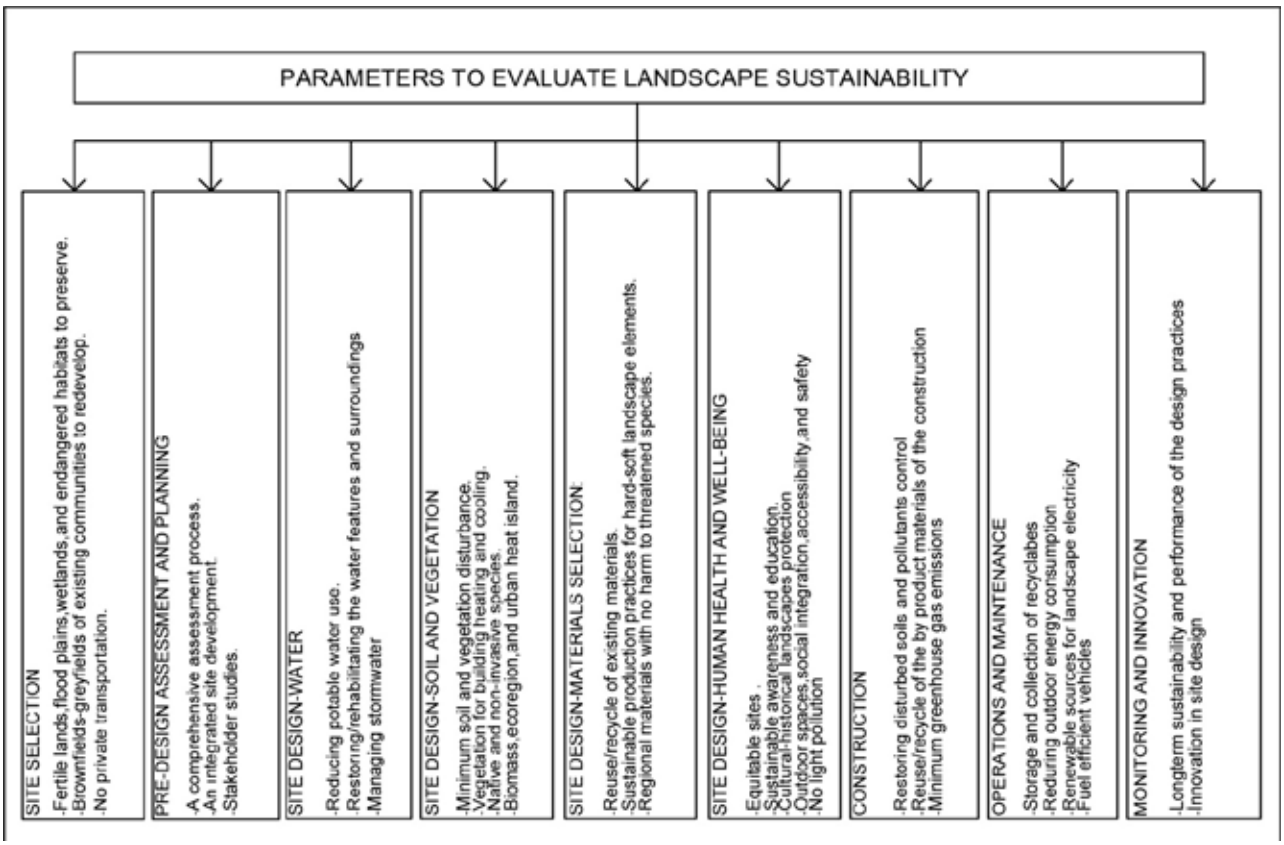

Figure 1. Primary parameters with their summarized contexts ranging from the site selection phase of the project to the last one as monitoring and innovation (Sustainable Sites Initiative, 2009).

Site design- soil and vegetation parameter embodies both the preservation and restoration issues related to “usage of non-invasive plants appropriate to site conditions”, “plant communities native to the ecoregion”, “plant biomass”, and “minimizing both the building scale energy consumption and urban scale heat island”. Vegetation component of a landscape is inseparable from the other components of its ecosystem but the soil layer. Thus, the preparation of a soil management plan to minimize the impacts of the project on land is the starting point of all the preservation and restoration issues. A multiscale approach is inevitable for the management and evaluation of eco-sensitive spatial studies as it is noticeable from the so far mentioned principles about the sustainability assessment (Calkins, 2012; SITES v2, 2014; Sustainable Sites Initiative, 2009; UNDESA, 2022).

Site Design materials selection starts with searching for the possibilities to benefit from the reuse and recycle potentials of the on-site structures. It is acutely recommended to use certified regional materials with no harmful effects both to human health and the threatened species. Thus, it brings about support to environmentally friendly practices in materials manufacturing (Calkins, 2008; SITES v2, 2014; Sustainable Sites Initiative, 2009; UNDESA, 2022).

Parameter of site design- human health and well-being regards the social, cultural, and economic impacts of the project, which makes it strategically significant within the whole sustainability assessment process. With its concern on even cognitive and human-scale issues, it focuses on providing the fair site usage, protection of the historical and cultural components of the landscape character, awareness and education on sustainability, safe access, social integration through design (Rogers et al., 2012; SITES v2, 2014; Sustainable Sites Initiative, 2009; UNDESA, 2022).

Construction is expected to be successful at restoring disturbed soils to benefit from them in the following processes, together with conducting comprehensive control on pollutants, even the air pollutants and greenhouse gas emissions. Byproducts are carrying reuse/recycle potentials, which should not be disregarded. Following the construction, long-term studies take place (Calkins, 2008; SITES v2, 2014; Sustainable Sites Initiative, 2009; UNDESA, 2022).

Long-term strategies and short-term actions to achieve sustainable operations and maintenance mainly focus on benefiting from recyclables, reducing outdoor energy consumption and emissions while benefiting renewable sources for landscape electricity. Long term monitoring generates an improvement in knowledge and performance evaluation over time, which enables innovation in site design (Calkins, 2012; Deeb et al. 2020; UNDESA, 2022; SITES v2, 2014; Sustainable Sites Initiative, 2009).

Considering the sustainability performances of our living environments, this study interrogates the stance of the public spaces in the form of shopping malls towards the sustainability goals. Paköz, Sözer, & Doğan (2021) define public spaces as the heart of the cities due to their being one of the major indicators of the urban image. Besides, social sharing usually occurs in these public spaces. Thus, public space has a critical importance for the city and society as it generates a sense of community.

In the digital era, the privatization of public spaces has become the focus of the discussions. Langstraat & Van Melik (2013) define a pseudo-public space as any space that is owned and managed by enterprises with a profit in mind. Therefore, shopping malls are the most common examples of pseudo-public spaces with their increasing numbers. Since the quality of urban life can be evaluated from the quality of public spaces, planning and design of these pseudo-public spaces are vital both in the agenda of urban planning and landscape sustainability.

Today, it is still hard to handle the issue of evaluating the level of landscape sustainability apart from the comprehensive and multifaceted processes. Thus, revealing the sustainability capacities of the projects deserves to study on in order to highlight the necessity to develop more tools to benefit from them through the evaluation processes.

2. Materials and Method

This study interrogates ways to evaluate sustainability. Thus, it focuses on certification systems. As the one that is comprehensively handling all scales of the

landscape studies, SITES appears as the certification system that this study considers. Besides the selection of it, another one is the identification of the study areas.

Significant with its chaotic dynamics, the megacity of Istanbul is a perfect coarse-scale study area. It is an ever-expanding coastal megacity that has got a dynamic topography, bringing about lots of streams, estuaries, peninsulas, and islands. Thus, the city is vibrant about its biodiversity and landscape character areas, which requires multiscale water management under the adverse impact of the expanding built-up spaces (Turer Baskaya, 2018).
Transformed into most preffered gathering public places by the citizens of Istanbul, number of shopping malls is enormous in Istanbul. According to Emlak Kulisi (2015), as the first half of 2019, there are 121 shopping centers in Istanbul, and planning studies represent that there will be 11 new shopping centers by the end of 2021. Regarding this increase, it is getting more important to understand their current level of sustainability. Only in this way is it possible to develop landscape management strategies that will enable sustainability to be improved.

This study investigates the identified sustainability rating system on selected Shopping Mall Landscapes in Istanbul. Figure 2 represents the phases of the evaluation process conducted within this study.

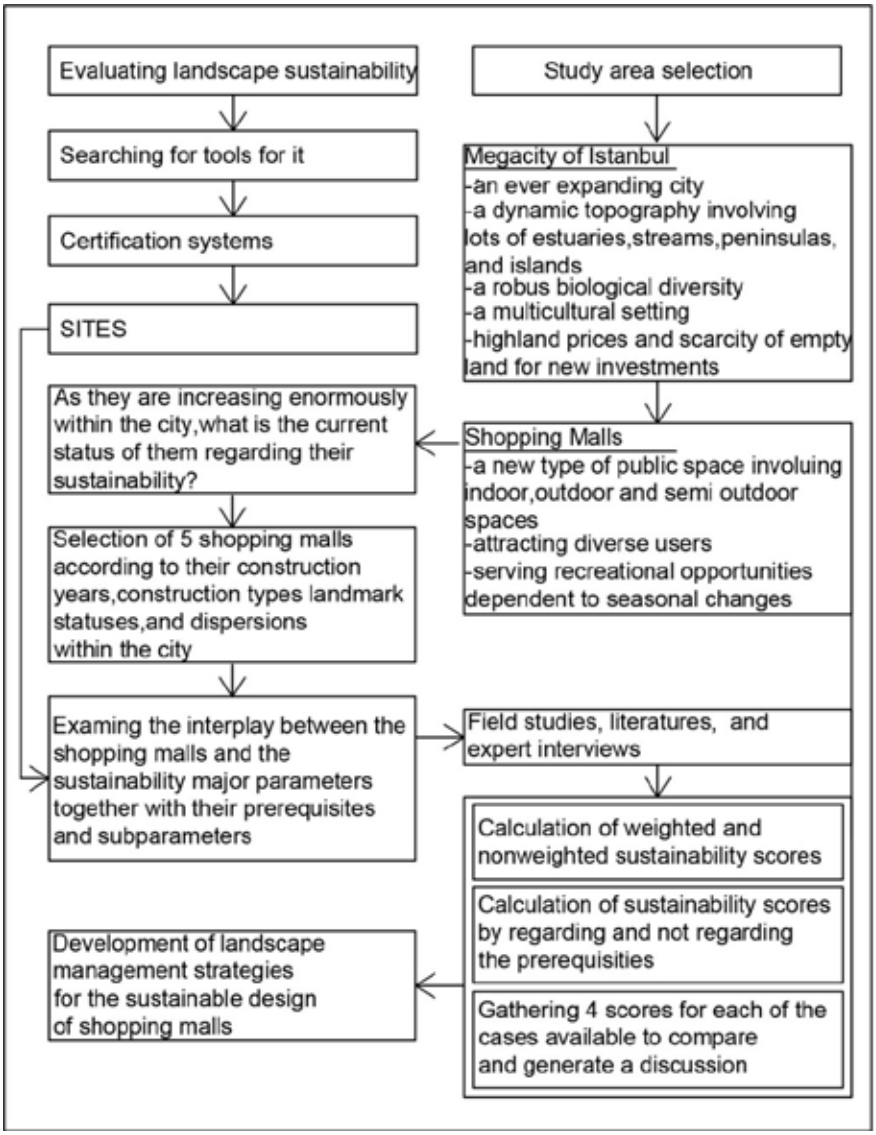

Figure 2. Phases of this study (developed by authors).

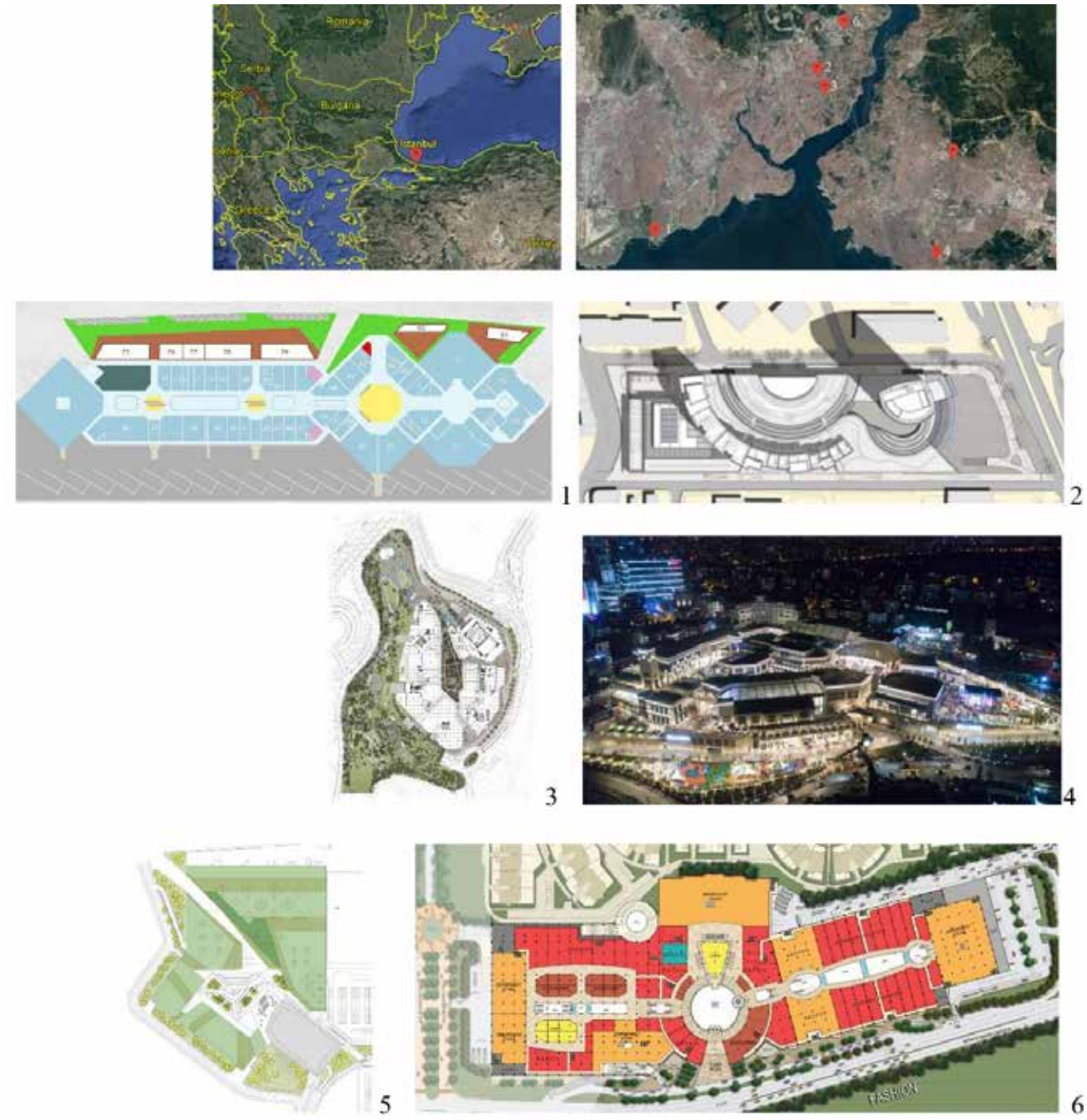

Figure 3. The locations and bird views of the study areas in Istanbul, Turkey (Galleria, 2018; Merdim, 2013; Itez, 2013; Archdaily, 2019; BACnet, 2018; DDG, 2019)

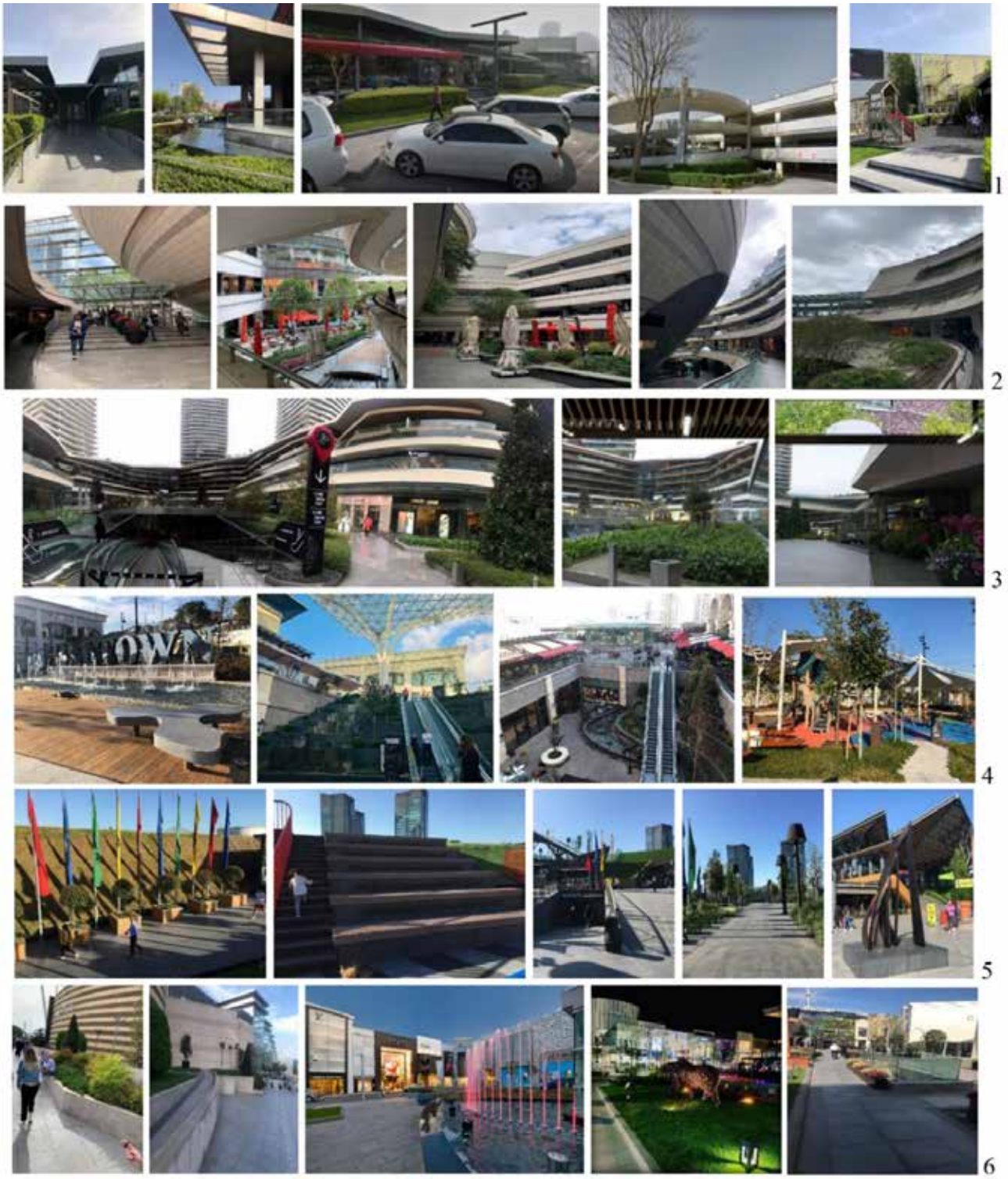

Figure 4. The study areas and the related human-scale images (photographs by authors).

Six shopping malls are selected according to their construction years, construction types, design concepts, landmark statuses, and dispersions within the city. In figures 3 and 4, the layout plans and site photographs of these malls are available. However, due to the commercial statuses, they have got, the names of the case studies are not going to be mentioned through this study.

Table 1. General comparison of the case studies according to their basic characteristics (improved by authors)

	1	2	3	4	5	6
Location	40.97ºN, 28.87ºE	41.08ºN, 29.01ºE	41.07ºN, 29.02ºE	40.95ºN, 29.12ºE	41.02ºN, 29.13ºE	
Project Category	AVM	AVM	AVM	AVM	AVM	AVM
Opened	1988	2006	2013	2017	2007	2007
Project Size (m^2) **Total Area** **Landscape Area**	120.000 36.000	250.000	620.000 108.200	63.000	80.000	276.000
Project Type	Shopping Mall	Shopping Mall	Shopping Mall	Shopping Mall	Shopping Mall	
Certificate	-	Breeam Very Good-2012	-	Leed Gold-2018	-	-
Access Proximity to Public Transport	+	+	+	+	+	+
Car Park (vehicle capacity)	+ +	+ +	+ +	+ +	+ +	+ +
Major Activity Areas	Playgrounds, water features, ramp entrance, grass fields	Green roof, planting on roads, sunshades at the southern facades	Green roof, recreation area, swimming pool, kids club	3 squares, playground	Playgrounds, fountains, seating groups, amphitheatre, squares, sculptures	
Sustainability properties	Not any evident work	Energy use, Water	Not available data	Landscaping with low water	Natural ventilation, natural lighting, solar control, green roofs and geothermal energy use	Not any evident work

Case study number 1, which opened in 1988, is the first shopping mall in Turkey. Regarding its locational advantages, together with the educational and income levels of the surrounding citizens, it addresses the classes A, B+, and B according to the international standards. Due to these attributes, this mall is inevitably involved in the evaluation process to represent the time period it constructed.

Study area 2, 5, and 6 are constructed at similar years. The shopping center 2 is located in the city center and recognized with its green roofs and vertical gardens together with the energy efficient approach. The shopping mall 5 handles a concept of “development of a city square together with its surroundings” and stands as a significant open air activity center. The shopping mall 6 stands significant among the shopping malls in Istanbul due to its size and store composition. Its most significant features are a glass dome and the interfaces between the open and built spaces.

With its 2013 construction year, the shopping mall 3 involves a massive area. It is a mixed-use project that includes the areas for hotel, residence, shopping, and cultural land uses together with the business centers. Finally, 2017 dated the 4th shopping mall is advertised as the one existing in the new generation shopping mall category. Its design concepts forward opportunities to the users to benefit from the semi-open restaurants, commercial streets, and public open spaces open to sea panoramas.

The number of certifications and awards that they have gathered appeared as another important determinant. Two of them have got certifications on sustainability while the other four have got no certification. Table 1 represents the basic characteristics of the case studies.

Through field studies, literature readings, and expert interviews, data are gathered about the selected sites to start the performance calculations. Interviews and field studies are conducted through the time period in between September to December of 2018. Expert interviews conducted with the administrative team members of the shopping malls together with the park and county officials.

It is striking to observe that for such megastructures in a megacity like Istanbul; there are no or limited available data about their sustainability, which should have been highly accessible. A process of revealing the sustainability capacities begins with the identifications of the parameters.

Landscape sustainability parameters based on the logic of SITES initiatives exist of nine primary parameters, as described in the introduction section with the summary of their subparameters. The subparameters’ and thus, the primary parameters’ power within the evaluation system are not the same. They stand as the components of a multicriteria analyze. The number and credits of the subparameters vary according to the declared evaluation system.

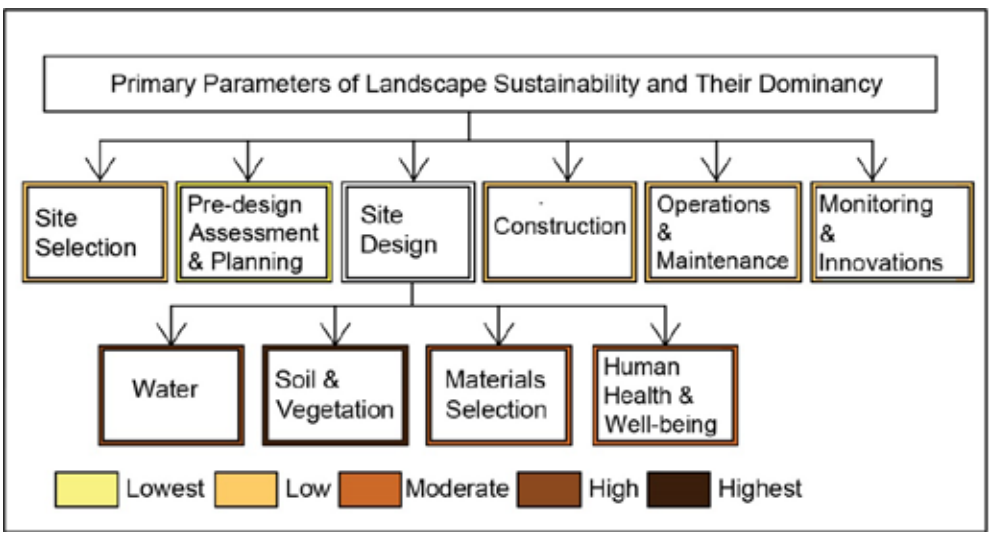

Figure 5. Weights of the primary parameters (improved by authors).

Method of this study stands on the interrogation of the role of these weights. This study develops four types of evaluation techniques, while the first two evaluation techniques concern the weighted calculations. At the original evaluation process of SITES, each primary parameter involves some prerequisites without any credits and several subparameters with varying credits. The difference among the credits depends on the importance of the parameter at the foundation of landscape sustainability. Thus in order to generate a basic, easy to apply way of sustainability evaluation, this study handles the total credit of a primary parameter and calculates the arithmetic mean by considering the number of its subunits. As the weights of the primary parameters range from four to 51 points, this technique reveals weight differences among the primary parameters, which are represented in figure 5.

As this study develops two weighted methods, the first one benefits from the prerequisites, while the other one disregards the prerequisites through their evaluation processes. Thus, when the properties of a case study can not meet the prerequisites of a major parameter, the case study gets eliminated from the evaluation procedures pertinent to that parameter and its subparameters. The last two techniques handle a similar approach but through an unweighted way. Thus, they consider the number of subparameters and record if they are merely met or not. The process of regarding and disregarding the prerequisites work similarly to the weighted calculation systems mentioned above.

3. Results and Discussion

To interrogate the validity of the techniques developed within this study, several spreadsheets are generated. These spreadsheets enabled us to make comparisons about the techniques, thus revealed the most convenient one to stand as a basic assessment tool to discover the level of landscape sustainability. Table 2 illustrates one of these spreadsheets, which involves the results of the unweighted technique disregarding the prerequisites. This spreadsheet is selected to represent as it is the plainest one to express the method of the study and compare the sustainability of case studies.

Table 2. A sample from the spreadsheets – an unweighted and prerequisites disregarded one generated through the study (developed by the authors)

Major Parameters	SHOPPING MALLS					
	1	**2**	**3**	**4**	**5**	**6**
1. Site Selection	Pr 4/4	Pr 3/4	Pr 2/4	Pr 4/4	Pr 4/4	Pr 2/4
	1/3	3/3	2/3	3/3	2/3	2/3
2. Pre-Design	Pr 1/2	Pr 2/2	Pr 2/2	Pr 2/2	Pr 2/2	Pr 2/2
	0/1	1/1	1/1	0/1	1/1	1/1
3. Site Design Water	Pr 0/1	Pr 1/1	Pr 1/1	Pr 1/1	Pr 0/1	Pr 0/1
	4/7	5/7	2/7	2/7	2/7	1/7
4. Site Design Soil & Vegetation	Pr 3/3	Pr 3/3	Pr 2/3	Pr 2/3	Pr 2/3	Pr 3/3
	3/10	4/10	7/10	3/10	8/10	2/10
5. Site Design Materials Selection	Pr 0/1	Pr 1/1	Pr 1/1	Pr 1/1	Pr 1/1	Pr 1/1
	2/9	7/9	9/9	5/9	8/9	7/9
6. Human Health& Well-Being	Pr 0/0	Pr 0/0	Pr 0/0	Pr 0/0	Pr 0/0	Pr 0/0
	4/9	7/9	7/9	7/9	8/9	7/9
7. Construction	Pr 1/2	Pr 1/2	Pr 2/2	Pr 1/2	Pr 2/2	Pr 1/2
	0/4	2/4	3/4	1/4	4/4	2/4
8. Operations & Maintenance	Pr 2/2	Pr 2/2	Pr 2/2	Pr 2/2	Pr 2/2	Pr 1/2
	1/6	5/6	6/6	1/6	4/6	1/6
9. Monitoring	Pr 0/0	Pr 0/0	Pr 0/0	Pr 0/0	Pr 0/0	Pr 0/0
	0/2	2/2	2/2	1/2	2/2	0/2
Total	Pr 11/15	Pr 13/15	Pr 12/15	Pr 13/15	Pr 13/15	Pr 9/15
	15/51	36/51	39/51	23/51	39/51	23/51

Pr x/y
Pr: Prerequisites
X: Number of met prerequisites
y: Total prerequisites

c/z
c: Number of met subparameters
z: Total number of subparameters

Examining the landscape sustainability of 6 shopping malls by benefiting from 4 different evaluation techniques forwards several advantages such as;

- Comparing the case studies according to their landscape sustainability,
- Identification of the most reliable and easy to implement technique,
- Interrogation of the most successful and unsuccessful case studies through their design and planning features,
- Identify the weaknesses and strengths of shopping centers throughout Istanbul.

One of the evaluation techniques used in this study is the one concerning the weighted calculations and disregarding the prerequisites. Through this technique, the overall success of these six shopping malls highlights that they are specifically successful at 5 of the major parameters, which are “human health and well-being,” “site selection,” “site design- materials selection,” “pre-design,” “monitoring” over 50% success.

In order to understand the efficiency of the prerequisites, at the second technique, prerequisites are regarded; thus, the shopping malls which cannot provide the prerequisites of a major parameter are excluded from the evaluation process of that corresponding parameter.

In case of failure to meet the prerequisites, the most significant parameters appear to be “human health and well-being,” “site design- materials selection,” and “monitoring,” respectively. These are the only ones that examine success over 50%. Drastic failures are observed at all of the parameters except two of them involving no prerequisites, which are “human health and well-being,” and “monitoring.” Although the “site design-materials selection” parameter stood above the 50% success, its success failed from 83.3 to 66.7.

These alterations prove the impacts of the prerequisites on the validity of the landscape sustainabilities of the case studies. In the case of Istanbul, this study shows that sample sites represent weaknesses at the prerequisites of the major parameters they are successful. This issue brings about an unsteady design sphere for the overall case studies.

Another meaningful discourse from the comparison of the weghted and uweighted techniques is that although they do have a no dominant changing impact on the success order of the case studies, they affect the intervals. Unweighted evaluations come up with very narrow intervals, which are bringing about comparisons vulnerable to errors. Weighted comparisons care for the numbers of the subparameters with their importance levels. Thus, they handle an evaluation as a fundamental multicriteria analysis quick to conduct. The clarity of the intervals eliminates the error probability. Therefore the weighted system stands as the recommended technique.

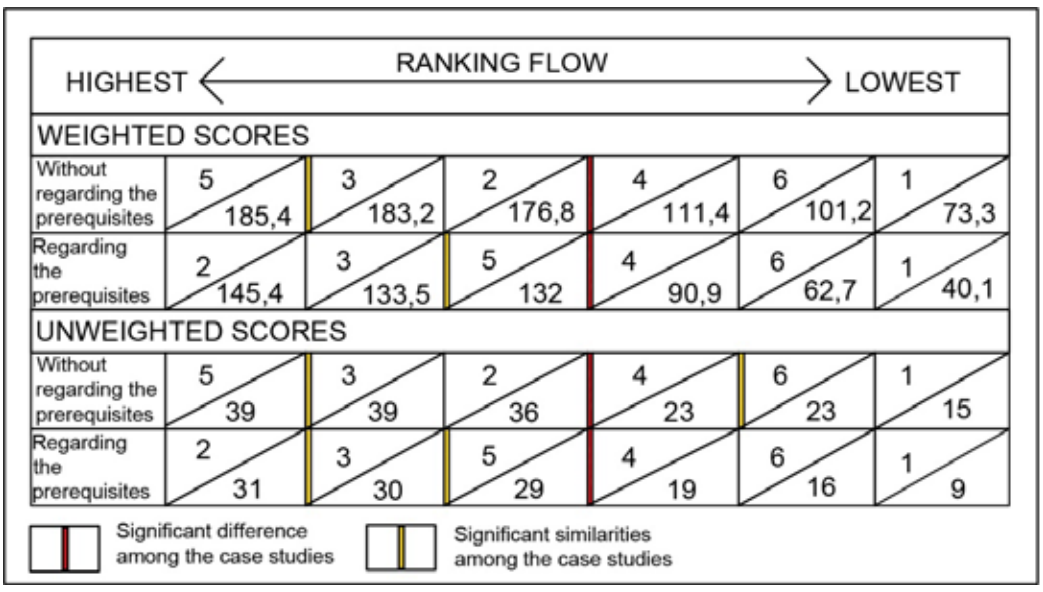

Figure 6. Sustainability scores of the case studies together with their ranks and significant interplays (improved by authors).

As this study aims to interrogate the generation of a quick to implement pre-evaluation tool, this tool is expected to be both for the benefit of new up to construct ones and the already constructed ones to upgrade their sustainability levels. Thus if the evaluation system just depends on the weighted and prerequisites regarded one, in case they can not meet the prerequisites, the case studies encounter an obstacle to test their all properties in the way of sustainability. They need to see both the prerequisite regarded and disregarded one, to understand their failure levels and identify the properties they need to upgrade. Benefiting from two of the techniques will motivate them to heal their vulnerabilities.

Weights of the primary parameters, as they are represented in figure 5 above, appear to be another essential issue within the evaluation process. Site design- water and site design- soil and vegetation, which are the dominant weighted parameters, are decisive in the success orders of the case studies, as illustrated in figure 3. The shopping malls stand at the three highest ranks are the ones that are more or less successful on these parameters. Shopping Mall 1, which received the lowest rank, is the first shopping mall of Istanbul and examines the disadvantage of its construction techniques and design approaches of those periods. However, even from the parameters of "monitoring" and "operations and maintenance," which represent the intention to upgrade the current status, it has got minimum credits. The subparameters it fails reveals the insufficient purpose on the way to sustainability development. Another interesting result comes related to the 4th shopping mall, which is not standing in between the successful malls but owning an international certification on sustainability. This result brings about questioning the correlation between the certification systems, thus may act as a step for further studies.

4. Conclusions

Increasing environmental issues require the concern of planning and design disciplines to generate sustainability strategies, techniques, and tools to mitigate these problems. This study regards the quality of the landscape with an ecosystem service sensitive approach. Revealing the quality and, thus, the sustainability capacities of the projects is significant for both the almost completed projects to upgrade them and the oncoming ones to be initially arranged sustainably. Certification systems stand as an essential tool for the evaluation of sustainability. Thus, this study attempts to generate a pre-evaluation tool to identify the level of landscape sustainability of the projects with a hope that the findings of this study will be a step for further studies for the benefit of landscape sustainability establishment.

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