

Article

Urban Landscape Quality Assessment Criteria

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Abstract

The urban landscape is a constant presence in the daily lives of urban residents, and its quality is closely linked to their overall quality of life. Therefore, it is essential to provide municipalities with effective tools to assess urban landscape quality. The identification of evaluation criteria, validated by an expert panel, contributes to the development of urban landscape assessment policies and supports the construction of a multi-criteria evaluation model. This study acknowledges the multidimensional nature of the urban landscape and is grounded in the definition of “landscape” established by the European Landscape Convention. It proposes a methodology for assessing urban landscape quality through the identification of evaluation criteria using the Delphi method, based on a panel of 24 experts. The process resulted in the identification of five key criteria: Human Dimension, Functional Diversity, Natural Elements, Identity, and Maintenance.

Keywords: urban landscape; European Landscape Convention; Delphi method; multi-criteria evaluation model

1. Introduction

The urban landscape constitutes a key resource for individual and collective well-being and is intrinsically linked to citizens’ quality of life [1–8]. Consequently, it is essential to assess its condition and quality.

However, any assessment of the urban landscape must be guided by a clearly defined purpose [9]. In this regard, the European Landscape Convention [10], as interpreted in its Explanatory Report [11], states that landscape assessment should: (i) identify valuable landscape features that require protection; (ii) determine elements that should be managed to maintain landscape quality; and (iii) identify areas requiring improvement.

By emphasizing the need to maintain or enhance landscape quality, the Convention implicitly introduces the concept of “landscape quality” as the degree to which predefined requirements are satisfied. This, in turn, allows for the differentiation between higher and lower quality landscapes, measurable through the achievement of established objectives.

At the practical level, the implementation of policies aimed at improving quality of life occurs largely at the municipal scale, under the responsibility of local authorities. Accordingly, municipalities require robust tools to assess urban landscape quality, support decision-making processes, and evaluate the outcomes of implemented policies, particularly in relation to territorial cohesion and the correction of spatial asymmetries.

Existing landscape assessment methodologies have been primarily developed for rural and natural environments [12–14], where built elements are limited. As such, the direct application of ecological assessment models to urban contexts is inadequate, as these approaches often neglect the intrinsic role of human activity or consider it primarily as a



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source of disturbance [13]. Consequently, attributes such as “naturalness,” “disturbance,” and “maintenance” acquire different meanings in urban contexts, justifying the need for new conceptual frameworks and terminology tailored to urban environments) [15].

Given the multidimensional nature of the urban landscape, its assessment requires a multi-criteria approach. This study adopts an additive multi-criteria model, widely used due to its simplicity and practical applicability [12,13]. Such models enable comparisons across territorial units (e.g., neighbourhoods) and support the identification of priority areas for policy intervention.

The global value $V(a)$ of an alternative a is defined as the weighted sum of its performance across criteria:

$$V(a) = \sum_{i=1}^n v(a)_i \times K_i$$

where

a = alternative (territorial unit)

$v(a)_i$ = the value of alternative “ a ” for criterion “ i ”

i = criterion index (from 1 to “ n ”)

n = number of criteria

K_i = weighting coefficient for criterion “ i ”

Despite the importance of landscape assessment, the European Landscape Convention [10] does not prescribe specific methodologies for landscape identification, classification, monitoring, or evaluation, leaving these responsibilities to Member States.

In this context, the present study aims to contribute to the implementation of municipal policies by developing an assessment tool to support local authorities in defining strategies, allocating resources, and promoting public participation in landscape-related decision-making.

A review of existing case studies [3,16–23] reveals that identified landscape attributes are often context-specific and not easily transferable across different urban environments.

Moreover, the literature exhibits considerable terminological inconsistency, using terms such as “attributes”, “factors”, “components”, “variables” and “elements”. This lack of standardization hinders conceptual clarity in urban landscape evaluation.

Therefore, there is a need for a consistent methodological framework and standardized terminology applicable across diverse urban contexts. While previous studies provide valuable insights, particularly highlighting recurring attributes such as natural elements, maintenance, historical features, and leisure spaces, these must be systematically structured into a coherent evaluation model.

This paper presents the first phase in the development of such a model, focusing on the identification of evaluation criteria through the Delphi method. The process involved four iterative rounds with a panel of 24 experts, resulting in a validated set of criteria.

In a second phase, the methodology employs a procedure inspired by a decision conference, adapted to an interactive online process with the panel of experts. This phase presents a proposal for impact descriptors and the corresponding value functions for each criterion, enabling the operationalization and application of the constructed model. Using an adapted Swing Weighting method, the values of the weighting coefficients for the evaluation criteria are calculated [24].

A multi-criteria additive model is then proposed [24], which is the most widely used aggregation approach in practice due to its simplicity [25,26]. This model assigns a global value to each alternative, calculated as the weighted sum of the performance scores of each alternative across the different criteria, with weights corresponding to the coefficients derived from the Swing Weighting procedure.

2. The Delphi Method

2.1. General Description

The Delphi method has been widely used for over five decades as a flexible and efficient research tool, particularly in the Social Sciences [26,27]. Its methodological adaptability and ease of implementation have contributed to its increasing application across diverse fields.

Originally inspired by the Oracle of Delphi in Ancient Greece, the method is designed to elicit informed judgments about complex or uncertain issues, particularly when empirical data are limited or unavailable.

A review of the literature is typically the first step in identifying criteria for an evaluation process [26]. However, when existing knowledge is insufficient or inconclusive, expert judgment becomes essential. In such cases, the decision-making process relies on a panel of experts whose knowledge and experience allow for the identification and validation of relevant criteria [26].

The Delphi method is a structured group technique used to address complex problems and support decision-making through the systematic collection of expert opinions [27,28]. It is particularly valuable when participants cannot meet face-to-face, enabling geographically dispersed experts to contribute remotely and asynchronously.

The method is based on an iterative and anonymous communication process, in which data are collected through successive rounds of questionnaires. After each round, controlled feedback is provided by the facilitator(s), summarizing the group's responses and allowing participants to reconsider their views in light of the collective input [29–31].

This process promotes convergence toward consensus while minimizing the influence of dominant individuals or group pressure.

The Delphi method is especially suitable in situations, as in this study, where (i) information is scarce or insufficient; (ii) the problem cannot be adequately addressed using analytical or quantitative techniques; (iii) expert judgment is required; and (iv) experts are geographically dispersed and anonymity is desirable [32].

The quality of Delphi results largely depends on the selection of the expert panel. Experts are typically defined as individuals with recognized knowledge and experience in the subject under study, supported by academic qualifications, professional practice, or peer recognition [33–35]. Their selection is commonly validated through curriculum analysis, including publications and professional roles involving decision-making responsibilities [33].

Panel size varies considerably across studies, with no universally accepted standard. While homogeneous panels often include between 10 and 15 experts, larger and more diverse panels can enhance the breadth and robustness of the results [27,36]. However, the loss of participants throughout the rounds may eventually affect response rates and the stability of results [25,26].

There is no universally established rule for panel size, and the number of members varies considerably across studies. Generally, a larger panel tends to yield more comprehensive and higher-quality information [37,38].

Some studies suggest that homogeneous panels—composed of experts with similar levels of knowledge—may consist of 10 to 15 members, which is sufficient to obtain reliable results [36]. In contrast, other studies, particularly international ones involving numerous experts, may include several hundred participants [27]. Panel sizes can also vary considerably in more specific contexts: for instance, one study involved only four decision-makers representing different associations [39], while another included 14 experts [26]. In some cases, although 45 experts were initially invited, only 31 responded in the first round, and merely 22 completed both questionnaires (69% response for the first questionnaire and 49%

for both) [40]. Similarly, out of 25 invited experts, 13 participated in the questionnaires, with 13 and 12 responding in the second and third rounds, respectively [41]. In another example, 70 invitations resulted in 37 initial participants, with between 24 and 30 completing the questionnaires across different rounds [27]. Regarding expert selection, the literature suggests that the choice of participants should consider both their availability and their suitability to address the research questions [42].

The Delphi process typically involves multiple rounds—usually between two and four—during which experts respond to questionnaires and receive anonymized feedback. This iterative process allows participants to refine their responses and promotes convergence toward consensus or stability in opinions [43,44].

Anonymity is a key feature of the method, preventing bias associated with reputation, authority, or dominant personalities, and thereby reducing undesirable psychological influences among participants [45]. The process is coordinated by one or more facilitators, who are responsible for data collection, statistical analysis, and feedback provision.

The process is guided by one or more facilitators, who collect responses, perform the corresponding statistical analyses, and provide feedback to the experts while preserving participants' anonymity. The comments and opinions expressed during each round expose participants to new perspectives, allowing them to reconsider and potentially revise their responses in subsequent rounds based on the feedback received [46].

Despite its advantages, the Delphi method is time-consuming, with the duration of the process potentially extending over several months due to the iterative nature of the rounds [42]. Additionally, declining participation rates across rounds represent a significant challenge. To mitigate this issue, strategies such as selecting motivated experts, maintaining regular communication, sending reminders, and ensuring the process aligns with participants' availability are commonly recommended [27,37].

2.2. Application of the Delphi Method

In this study, a heterogeneous panel of experts was selected to reflect the multidimensional nature of the urban landscape, which requires a diversity of perspectives and expertise across multiple domains. At the same time, the panel size was deliberately kept limited to facilitate indirect interaction among participants through controlled feedback, allowing for reflection and potential revision of opinions in order to achieve consensus.

The application of the Delphi method to identify and select criteria for assessing urban landscape quality followed a structured sequence: (i) problem definition (identification of evaluation criteria); (ii) expert selection (including academics and public administration decision-makers); and (iii) four iterative Delphi rounds, followed by analysis of the results.

A total of 57 experts were invited to participate, including academics from several Portuguese universities and decision-makers from public administration. This disciplinary diversity ensured coverage of key urban landscape components, such as the built environment, transport systems, vegetation, biodiversity, population, and visual perception.

The Delphi process was conducted online and supported by a facilitator/coordinator (the author), responsible for managing data collection, analysis, and feedback.

Of the 57 experts invited, 45 accepted the invitation, while 12 did not respond. Ultimately, 24 experts participated in the questionnaires, with the number of respondents varying between 20 and 22 across the four rounds, despite reminders being sent every two weeks to encourage participation.

The 24 participants represented a wide range of disciplines to be included in the panel of experts, such as (10) Architecture, (1) Environmental Engineering, (4) Geography, (2) Psychology, (4) Landscape Architecture, (1) Business Management with a specialization in transport, and (2) Civil Engineering (Figure 1).

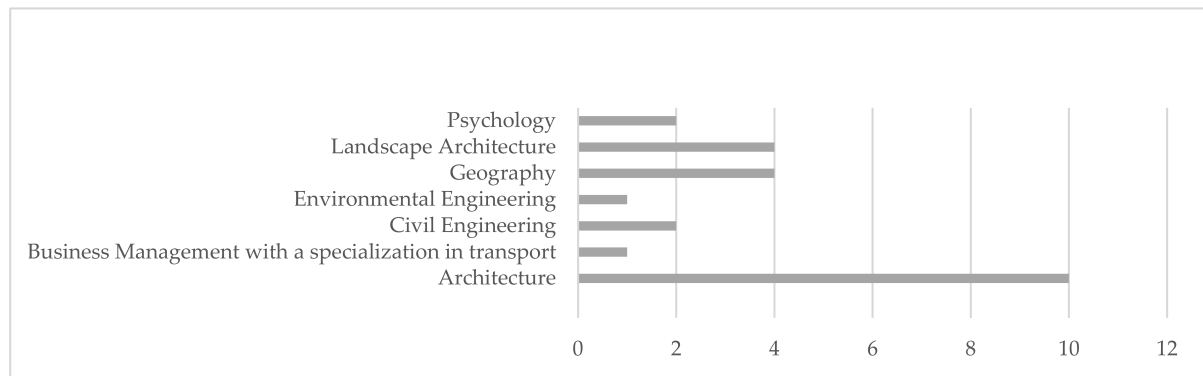


Figure 1. Number of specialists in each area of expertise.

In the first round, an e-Delphi approach was adopted, in which questionnaires and responses were exchanged via email [30]. This round employed an open-ended question to explore expert perspectives and identify relevant criteria for evaluating the urban landscape [38,42].

Experts received an email containing a list of criteria accompanied by descriptive notes. They were asked to assess the completeness of the list, comment on the clarity of the definitions, and propose additional criteria where appropriate. Furthermore, they were invited to provide descriptions for any new criteria suggested, thereby expanding the range of potential evaluation criteria based on their individual knowledge and experience. Experts were instructed as follows:

“For this first round, please review the attached Excel file containing a list of 13 criteria for evaluating the urban landscape, each accompanied by a brief description. You are invited to assess the completeness of this list. If you consider that additional criteria should be included, please add them under the section ‘Other’, providing both the name and a brief description. You may also include comments on the existing criteria.”

Accordingly, an Excel file was distributed containing 13 initial criteria: Accessibility, Element Attributes, Coherence, Diversity, Harmony, Identity, Readability, Mobility, Natural Elements, Maintenance, Safety, Sustainability, and Views. These criteria were primarily derived from previous research [47] and supported by attributes commonly identified in the literature, such as the presence of public leisure spaces, vegetation, cultural and historical identity, and the maintenance of buildings and public spaces [18,20].

Expert contributions in this first round led to the inclusion of three additional criteria: Planimetric and Volumetric Density, Human Dimension, and Mystery. This outcome highlights the importance of incorporating an open-ended exploratory phase at the beginning of the Delphi process.

Subsequent rounds were structured based on the information gathered in the first round, transforming qualitative input into quantitative evaluation [44].

In the second round, the Welphi (RC1) platform (app.welphi.com) was used to administer a structured questionnaire, to implement the e-Delphi process. Responses were analysed using descriptive statistics, specifically through frequency distributions across the response scale categories.

A total of 16 criteria, each with a corresponding description, were presented to the experts. For each criterion, participants were asked: “Is this a quality criterion for the urban landscape?”

Responses were collected using a three-point Likert scale (“agree”, “disagree”, “neither agree nor disagree”), with an additional field provided for comments.

Consensus thresholds were predefined at 85% for Round 2 and 80% for Round 3, values consistent with those commonly reported in the literature.

The Delphi method is designed to facilitate consensus-building through iterative feedback. However, achieving full consensus is not always necessary; stability in responses across rounds may also justify terminating the process. Typically, consensus is reached within three to four rounds, although this depends on the complexity of the issue and the time available [30,44].

A key limitation of the method is the decline in participation across rounds, which may compromise the iterative process [43]. For this reason, the number of rounds is often limited. Each round builds on the results of the previous one, with anonymized feedback enabling participants to reconsider their responses and progressively converge toward a collective judgment [43].

The Delphi process concludes when either consensus or stability of responses is achieved [36]. Consensus is reached when a group opinion is expressed collectively, typically as a majority percentage of responses in a given direction, or when responses remain stable across successive rounds, regardless of percentage [30,36]. Although no fixed rule exists for determining consensus, it is advisable to define a target consensus rate in advance [38,43]. Previous studies have reported consensus rates ranging from 51% to 90%, with an average of approximately 75% [29,42,48–50].

In the second round of this study, only 20 of the 45 experts who initially agreed to participate responded, despite reminders sent every two weeks. This corresponds to response rates of 51.1% in the first round and 44.4% in the second round. A consensus threshold of 85% was adopted for Round 2. Accordingly, the criteria “Functional Diversity” (86%) and “Natural Elements” (90%) were automatically accepted and included in the model. The remaining criteria, which did not reach the threshold, were carried forward to Round 3 for further evaluation. Criteria with very low consensus (43–76%) were rejected.

In Round 3, the same question was posed (“Is this criterion a quality criterion for the urban landscape?”) for the 14 criteria still under consideration. A consensus threshold of 80% was applied, resulting in seven criteria tied at 81%: Element Attributes, Human Dimension, Harmony, Identity, Legibility, Security, and Views. The remaining criteria—Accessibility (71%), Formal Coherence (52%), Planimetric and Volumetric Density (71%), Mystery (43%), Mobility (76%), and Sustainability (76%)—were rejected.

At the end of Round 3, the Maintenance criterion reached a very high consensus rate of 90%, exceeding the acceptance threshold of 80%, and was thus selected alongside the two criteria already approved in the previous round: Functional Diversity and Natural Elements. Had the previous round’s consensus threshold of 85% been applied, only Maintenance would have advanced to Round 4, leaving just three criteria for inclusion in the model. By adopting an 80% threshold, it was possible to include seven additional criteria tied at a consensus rate of 81%. Comments from the experts during Round 3 were incorporated into the final descriptions of these criteria, enriching their conceptual definitions.

Given the tie between seven criteria, an additional round was required. The process did not follow the same platform (Welphi), nor was the same question from the previous rounds posed, as it was foreseeable that, given an 80% consensus rate, the tie would persist and consultation with the experts would not yield a successful outcome. Accordingly, this round was conducted using the electronic platform SurveyMonkey, which allowed the initial question to be reformulated—a feature unavailable in the platforms used for Rounds 2 and 3. The panel was asked to select only two or three criteria to add to the three already selected:

“In the previous Delphi rounds, consensus was achieved for the criteria Functional Diversity, Natural Elements, and Maintenance. If you could add only two more

criteria from the following list—Views, Security, Legibility, Identity, Harmony, Human Dimension, and Element Attributes—which two would you choose?”

There is no fixed rule regarding the total number of criteria to include in a parametric model. However, operationalizing the model with five or six criteria is generally feasible, since increasing the number of criteria not only complicates the model’s use but also the quantification of weighting coefficients [24]. Considering that conciseness is an important property of a decision-making criteria set, it is advisable to limit the number of criteria to a manageable and meaningful subset.

The SurveyMonkey round, although it reduced the consensus rate to a lower level, enabled the tie to be resolved and resulted in the inclusion of two additional criteria: Human Dimension (54.55%) and Identity (40.91%) (Table 1). Throughout all rounds of the Delphi process, expert observations were incorporated into the descriptions of each criterion, thereby enhancing and refining the conceptual framework used in the assessment model.

Table 1. Consensus rate for each round.

Rounds	Consensus Rate
Round 1	-
Round 2	85%
Round 3	80%
Round 4	40.91%

3. Results and Discussion

The total duration of the Delphi method application (Figure 2), encompassing four rounds, was approximately one year and one month (from 1 June 2018 to 1 July 2019). This period is substantially longer than the three to four months reported by some authors but remains within the 16-month timeframe referenced in other studies [42,44]. The timeline included the summer, Christmas, and New Year holiday periods, the use of various software tools (Excel, app.welphi, and SurveyMonkey (2020/2021)), and the time required for analyzing and processing the responses.

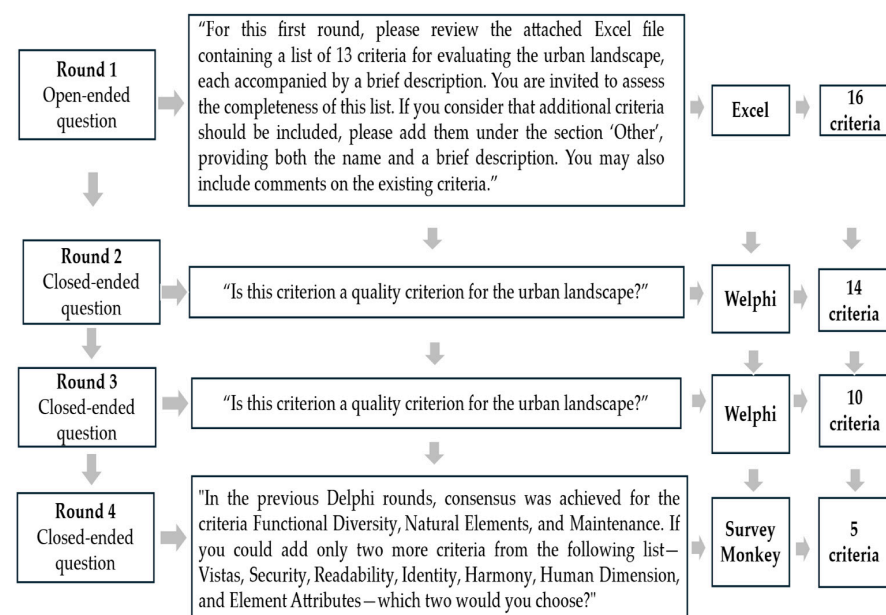


Figure 2. Application of the Delphi method in four rounds.

As expected, the first round, which employed an open-ended question, generated the most comments. Rounds two and three received fewer comments, mostly related to criteria where the experts responded “disagree” or “neither agree nor disagree,” using these insights to guide their subsequent decisions. Conversely, criteria that achieved the highest consensus received the fewest comments. Some experts engaged in discussion during the inquiry stage, commenting on others’ responses without altering their own initial opinions.

All expert observations across the Delphi rounds were carefully considered and incorporated into the descriptions of each criterion (Table 2). This iterative process contributed to refining and enriching the conceptual definitions of the criteria, enhancing the overall quality of the urban landscape assessment model.

Table 2. Criteria for evaluating the quality of the urban landscape identified by the Delphi method.

Assessment Criteria
Human dimension
Functional Diversity
Natural elements
Identity
Maintenance

The definitions of these assessment criteria concepts are as follows:

1. Human Dimension

This criterion relates to the human presence in the urban landscape and to factors that have to do with demographic equilibrium and diversity of ethnic groups and/or social classes. It involves aspects that reveal social cohesion and respect for basic housing rights, namely the absence of beggars and/or homeless people. The Human Dimension criterion is also manifested by the existence of leisure spaces that further socialisation, interaction, and social inclusion, the capacity to include both residents and non-residents and the existence of spaces with no use restrictions of use, in the residential zones, for certain segments of the population, thus providing an inspiring and creative urban landscape.

2. Functional Diversity

This criterion relates to the variety of urban elements such as: the built elements (e.g., ordinary buildings, notable buildings; monuments); public space elements: urban furniture (e.g., fountains, benches); public art (e.g., statues); vegetation; urban layout elements: outdoor spaces (pedestrian routes; road traffic routes; stairs/steps, arcades, railways); contemplation spaces (e.g., squares, plazas, avenues, gardens, parks).

It also has to do with the variety of functions, such as housing, commerce, services, schools; health facilities; leisure/sports facilities, and the variety of commercial and service units, such as bookshops, pharmacies, banks, cafes, bars, restaurants, kiosks, cinemas, theatres, electronics stores, clothing/footwear/bags, jewellery, decoration, florists, cars/car parts vendors, mobile phone retailers, hairdressing/beauty salons and stationery/tobacco shops.

3. Natural Elements

The “Natural Elements” criterion assesses the presence of the “green” system and the “blue” system in the urban landscape. The “green”, or “vegetation in the public space”, refers to the inclusion, and/or proximity, of herbaceous, shrub and arboreal elements, and landscaped green spaces, flower beds, in roads and squares. “Blue” refers to the inclusion or proximity of natural elements such as water, water courses and ponds, rivers, fountains,

water sources, lakes or proximity to the sea. This criterion also has to do with other natural elements, such as mountains, which, if close to the city, can be part of the urban landscape.

4. Identity

The Identity criterion assesses the factors that make the difference between one urban landscape and another and give it character, originality, recognition and increase its standing in terms of the collective memory. The urban identity dimensions are based not only on typical morphological characteristics, but also on meanings. Accordingly, this criterion focuses both on the natural physical aspects, such as the morphology of the terrain and soil characteristics, type of vegetation, and proximity to rivers, lakes, sea, and on the built elements—materials, styles, and architectural characteristics. Identity is also evidenced by built elements that stand out from the rest, i.e., iconic buildings, cultural buildings, buildings of historical and heritage value, or by buildings for private and/or public entities, such as universities, museums, football stadiums and concert halls. This criterion also refers to the resilience of the respective building, conveyed by sedimentation over time and the reflection of various periods, i.e., the ability of the urban landscape to reflect its own history over time and to convey adaptation to changes in time. Other revealing elements of Identity have to do with preservation of the collective memory, reflected, for example, in statues, commemorative plaques and neighbourhood figures from the past, the identification of famous residents and their respective dwellings and even the occurrence of regular events, such as folk festivals and/or markets.

5. Maintenance

The Maintenance criterion relates to the conservation and cleanliness of public space, the preservation of buildings and the visual pollution. In terms of the public space, it has to do with the way in which sidewalks, pavements, street furniture, signalling and safety equipment, and natural elements are maintained, cared for and kept clean. Visual pollution relates to the placement of advertising atop poles and bus stops and to the existence of electronic “screens”, and/or large “billboards”.

With regard to buildings, this criterion has to do with the preservation of the respective buildings, maintenance of front facades and/or gables, (or back facades when these are visible from the public space), posting posters on the building facades, the existence of graffiti that is not considered art and even with “extra” elements on building facades, such as cables, satellite dishes, air conditioning equipment, advertising support structures and/or marquees; i.e., all changes that affect the original image of a building.

4. Conclusions

This study identifies criteria for evaluating the quality of the urban landscape, aligning with the objectives of the European Landscape Convention regarding urban landscape assessment. These criteria are applicable across any urban context or territorial unit and can serve as a practical tool for local authorities in urban planning, management, and policy development.

By defining the five essential assessment criteria, municipalities can better ensure a high-quality urban landscape for residents and visitors. Incorporating these criteria into urban planning and design helps guide informed choices, while in urban management, it enables targeted actions and investment. At the strategic level, it supports comprehensive evaluation of urban policies.

The five criteria identified—Natural Elements, Maintenance, Functional Diversity, Human Dimension, and Identity—have been operationalized in a parametric evaluation model, to be detailed in a subsequent study [24]. This framework is flexible enough to be applied to other non-European and culturally diverse urban contexts.

It should be noted that results may vary with a different panel of experts; however, these criteria largely align with commonly recognized urban landscape attributes in the literature, as highlighted by both experts and the general public. This approach provides a practical contribution to the development of urban landscape policies at both central and municipal levels.

Additionally, this study demonstrates the application of the Delphi method in the urban planning context, extending its use beyond previously reported domains. The method's remote, non-simultaneous format enabled the collection of responses from 24 experts over approximately one year. The online approach facilitated participation from geographically dispersed experts and reduced environmental and economic costs associated with travel.

Among the identified criteria, Natural Elements emerged as a critical component of urban landscape quality. This criterion emphasizes the incorporation of vegetation—trees, shrubs, flowers, and gardens—preferably native species that are adapted to the local climate, requiring less maintenance and water while providing ecological benefits such as shading. It also includes water features such as rivers, lakes, seas, or fountains. The prominence of this criterion reflects a strong concern for ecological sustainability and the preservation of urban ecosystems.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are openly available in [Alexandra Campos] at [<https://scholar.tecnico.ulisboa.pt/api/records/br39Ry294NAI49t7jdqgjXZZWTHLhB8G3snr/file/a6e22e4de5f4391df8958fb0ed841560b92afb422f0f498ac3381ce83e69688d.pdf>] (accessed on 15 April 2026).

Conflicts of Interest: The authors declare no conflict of interest.

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