Mix Sustentável

Application of the USAT tool for sustainability analysis: the case of Lagoa da Conceição, Florianópolis

Aplicação da ferramenta USAT para análise da sustentabilidade: o caso da Lagoa da Conceição, Florianópolis

Aplicación de la herramienta USAT para el análisis de la sostenibilidad: el caso de la Lagoa da Conceição, Florianópolis

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Abstract: This article presents the results of the application of the USAT (Urban Sustainability Assessment Tool), created for managing sustainability at the urban and building scale. The case study site is Lagoa da Conceição, in Florianópolis. These indicators were organized into categories to assess the urban structure and buildings according to the ESA-B Model. In all, the system has 4 panels: Shocks, Urban Structure, Conduct and Performance. In this article, data from the Urban Structure Panel will be presented, based on an analysis of the Lagoa da Conceição district; and the Conduct Panel, with an analysis of a commercial building located in the neighborhood. The research contributes to urban sustainability by offering a governance structure for the study area, with the potential to be replicated in other regions with similar challenges.

Keywords: Sustainability; Urban Structure; Building; indicators.

Resumo: Este artigo apresenta os resultados da aplicação da ferramenta USAT (Urban Sustainability Assessment Tool), criada para gestão da sustentabilidade na escala urbana e do edifício. O local de estudo de caso é a Lagoa da Conceição, em Florianópolis. Esses indicadores foram organizados em categorias para avaliar a estrutura urbana e as edificações segundo o Modelo ESA-B. Ao todo, o sistema apresenta 4 painéis: Choques, Estrutura Urbana, Conduta e Desempenho. Nesse artigo, serão apresentados os dados do Painel Estrutura Urbana, a partir da análise do distrito da Lagoa da Conceição; e do Painel Condutas, com a análise de uma edificação comercial localizada no bairro. A pesquisa contribui para a sustentabilidade urbana ao oferecer uma estrutura de governança para a área de estudo, com potencial para ser replicada em outras regiões com desafios semelhantes.

Palavras-chave: Sustentabilidade; Estrutura Urbana; Edificação; indicadores.

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Resumen: Este artículo presenta los resultados de la aplicación de la herramienta USAT (Urban Sustainability Assessment Tool), creada para la gestión de la sostenibilidad a escala urbana y edilicia. El sitio del estudio de caso es la Lagoa da Conceição, en Florianópolis. Estos indicadores fueron organizados en categorías para evaluar la estructura urbana y las edificaciones según el Modelo ESA-B. En total, el sistema presenta cuatro paneles: Choques, Estructura Urbana, Conducta y Desempeño. En este artículo se presentan los datos del Panel de Estructura Urbana, a partir del análisis del distrito de Lagoa da Conceição, y del Panel de Conducta, con el análisis de una edificación comercial ubicada en el barrio. La investigación contribuye a la sostenibilidad urbana al ofrecer una estructura de gobernanza para el área de estudio, con potencial de ser replicada en otras regiones con desafíos similares.

Palabras clave: Sostenibilidad; Estructura Urbana; Edificación; Indicadores.

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1 INTRODUCTION

The accelerated growth of cities and the environmental challenges arising from urbanization have demanded innovative approaches to promote sustainable and balanced urban development. In this context, sustainable urban planning seeks to optimize the use of natural resources, reduce environmental impacts, and enhance social well-being by articulating ecological, economic, and social dimensions. The implementation of urban sustainability assessment tools has proven essential in this process, as it enables the measurement of environmental, social, and economic variables, providing support for the formulation of public policies, management strategies, and planning actions aimed at promoting more resilient, inclusive, and environmentally responsible cities.

Within this framework, urban sustainability has become a central theme in debates on city planning and management, especially in regions characterized by sensitive ecosystems and limited infrastructure, such as the Lagoa da Conceição district in Florianópolis. Population growth and the challenges related to sustainable governance require the adoption of tools capable of efficiently integrating building planning and urban management.

In this scenario, the Urban Sustainability Assessment Tool (USAT) emerges as a strategic solution for monitoring and managing sustainability in urban neighborhoods, promoting an integrated approach between neighborhood structures and building performance. This study details the elements that compose the USAT, including its panels and indicators, as well as the organization of these components to provide a comprehensive and practical analysis of urban sustainability, capable of supporting more efficient planning decisions and public policies.

The Urban Sustainability Assessment Tool (USAT) was developed to integrate the evaluation of neighborhood and building sustainability, enabling more efficient management of urban sustainability. Inspired by the ESA-B model (Librelotto, 2005), the USAT is structured around four main panels: Shocks, Urban Structure, Behaviors, and Performance. Each panel consists of specific categories and indicators, distributed across the environmental, economic, and social/sociocultural dimensions, thereby encompassing the multiple facets of sustainability in an integrated manner.

The indicators within each panel were carefully selected to evaluate different analytical categories, including infrastructure, technological innovations, environmental impacts, and sustainable building practices. Each indicator has its own measurement strategy, often based on quantitative data from public agencies and other reliable sources. Thus, the indicators allow not only the monitoring of the current state of urban sustainability but also the identification of priority areas for intervention and improvement, providing valuable input for more strategic and evidence-based decision-making (Engel et al., 2024).

This article presents the results obtained from the Urban Structure Panel, applied to the Lagoa da Conceição district, and the Behaviors Panel, applied to a commercial building located in the same neighborhood. Although the tool was initially developed for this specific context, its characteristics allow adaptation to different urban scenarios, maintaining its applicability across various territories. In this way, the USAT provides a comprehensive analysis of sustainability, combining quantitative data from reliable sources with direct feedback from citizens, offering an integrated, practical, and balanced view of sustainable performance in the urban environment.

2 SUSTAINABILITY IN CITIES AND BUILDINGS: AN INTEGRATED APPROACH

Sustainability is grounded in the dynamic balance among three interdependent dimensions: economic, social, and environmental. According to Vezzoli and Manzini (2008), achieving sustainability is not limited to the simple adoption of isolated solutions; it requires the development of new approaches to project design that involve continuous innovation and a profound reformulation of design processes. This perspective entails rethinking the role of design professionals, integrating sustainable criteria from the earliest stages in order to generate products and systems that promote lasting positive impacts on society and the environment.

Sustainability is achieved through the equilibrium between the economic, social, and environmental dimensions, and it is essential to recognize the interdependence among these three pillars for the formulation of effective strategies. In this context, it becomes necessary to consider the interests of all stakeholders involved in the process — including investors, local communities, and workers — so that each group can benefit in terms of quality of life, equity, and social justice. This approach requires systemic planning, in which economic decisions cannot be dissociated from their social and environmental implications, thereby promoting more inclusive and equitable development (Elkington, 1998).

Moreover, sustainability demands the adoption of practices that minimize negative impacts on the environment while preserving natural resources essential to the continuity of life and the maintenance of ecosystems. This entails reducing emissions and waste, as well as implementing innovative design, production, and management solutions that integrate efficiency, environmental responsibility, and socio-economic resilience. In this way, sustainable actions transcend isolated measures, representing a structured commitment to environmental conservation, social well-being, and long-term economic viability (Elkington, 1998).

From the social perspective, sustainability goes beyond the mere satisfaction of basic needs, encompassing the responsibility of organizations toward society and the public at large. This dimension involves an ethical commitment on the part of institutions to act proactively, generating positive impacts in the contexts in which they operate and contributing to social development, equity, and community cohesion.

The pursuit of sustainability, which connects environmental preservation and social responsibility, cannot neglect the economic dimension, since the balance among these three pillars is essential for the long-term viability of organizations and projects. This process often involves complex and sometimes contradictory challenges, requiring institutions to undergo significant transformations in their values, ethical and cultural principles, as well as a re-evaluation of their management and operational models.

In the field of architecture, sustainability initially focused on environmental issues, particularly energy efficiency. Zambrano (2021) outlines a historical trajectory beginning with solar architecture in the 1970s and evolving into sustainable architecture in the 1990s. In this latter phase, sustainability has often been interpreted as a set of technical solutions applicable to construction, including green roofs, rainwater harvesting, photovoltaic energy generation, and air quality improvement, reflecting a pragmatic approach that seeks to reconcile environmental performance with architectural innovation.

Buildings demand large amounts of natural resources for both their construction and maintenance, generating significant environmental impacts. In this scenario, it becomes essential to adopt strategies that reduce resource consumption and minimize negative effects on the environment. In this regard, Goulart (2008) emphasizes that a sustainable project must reconcile ecological, social, and economic criteria, taking into account multiple variables, among which the rational use of energy constitutes a central premise.

At the urban scale, sustainability transcends the individual scale of buildings, encompassing territorial planning, mobility, green infrastructure, cultural heritage preservation, and the promotion of quality of life (Leite Awad, 2012). Sustainable cities require the harmonization of economic growth, social equity, and environmental protection through the articulation of effective public policies, citizen participation, and the incorporation of innovative technological solutions. In this sense, the integration between sustainable construction practices and urban development strategies emerges as a central axis to address contemporary challenges, including climate change, accelerated urbanization, and the increasing pressure on natural resources (UN-Habitat, 2020).

2.1 Sustainability Assessment Tools

To ensure that the principles of sustainability are effectively applied in cities and buildings, it is necessary to use assessment models. These models make it possible to measure, monitor, and improve sustainable practices in various contexts.

As a first example of a sustainability assessment model, there is the ESA Model (Librelotto, 2005). This model was initially proposed as a tool for assessing sustainability in construction companies and was later adapted to evaluate building sustainability across three dimensions—economic, social, and environmental—considering the urban context (Librelotto et al., 2017). The adapted version, known as ESA-B (Building), analyzes a set of indicators for each dimension in order to determine the sustainability of a building in terms of its behaviors (strategies applied in the building) and the performance achieved, associated with the existing neighborhood structure.

Regarding the urban structure, the ESA-B Model, as an open model, in a subsequent application proposed the use of indicators from the Urban Quality of Life Index (IQVU) (Nahas, 2016) as measures of urban structure. This method has already been applied in the city of Belo Horizonte and has been periodically updated. In addition, the MASP-HiS Model (Carvalho Sposito, 2012) was used for evaluating building strategies and behaviors. Although the original weights and formulas from the IQVU were not applied, its quantitative parameters served as references for the assessment, while the behaviors, since this is not a case study, were evaluated more generically when considering cities.

Sustainability assessment tools for buildings are known as Sustainable Building Assessment Tools

(SBATs), developed to objectively measure the most immediate and quantifiable environmental impacts of constructions. Among the most common criteria are energy consumption, water efficiency, pollutant emissions, and the presence of toxic substances in building materials. These criteria allow projects and buildings to be compared in a standardized way, guiding decision-making toward more sustainable practices. Moreover, such tools encourage the adoption of innovative design solutions, materials, and technologies, promoting the reduction of negative impacts throughout the building's life cycle.

Complementarily, Urban Sustainability Assessment Tools (USATs) expand the perspective to the urban level, assessing aspects related to mobility, safety, access to leisure spaces, and the overall environmental quality of cities. Although they offer a broader approach, these tools tend to provide less detailed analyses at the building scale, focusing instead on the interconnection between infrastructure, urban services, and population well-being. Thus, SBATs and USATs are complementary, being essential to integrate architectural and urban sustainability while guiding policies and practices that simultaneously promote environmental efficiency, quality of life, and balanced urban development.

Recognizing the need to preserve the environment and ensure a sustainable future, several countries and regional governments have established goals and regulations aligned with the United Nations Sustainable Development Goals (SDGs) (2015). These guidelines have been progressively adapted to the fields of architecture and engineering, encouraging the adoption of more responsible, efficient, and environmentally conscious construction practices. As a result, buildings that meet sustainability standards have gained higher market value, reflecting both the growing demand for environmentally responsible construction and the professional recognition of architects and engineers who incorporate these principles into their projects. This reinforces the importance of sustainability as both a competitive and ethical differentiator in the construction sector.

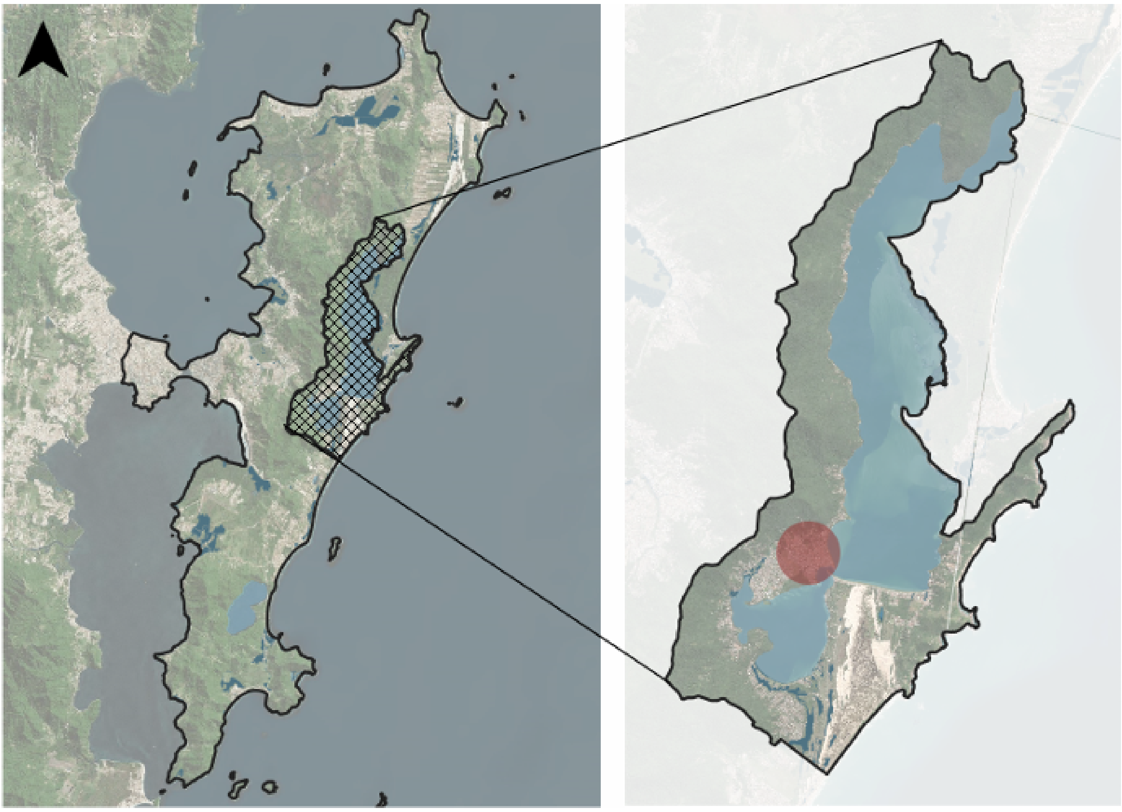
However, this approach, focused on improving internal building systems and assessing their immediate surroundings, often underestimates the potential of constructions to foster significant improvements in the surrounding urban space. At the same time, the increasing use of finite natural resources highlights the need to redefine priorities in the design process, questioning traditional concepts and encouraging the adoption of technological and constructive solutions aligned with local characteristics, promoting greater efficiency, adaptability, and integration with environmental and social contexts.

3 RESEARCH METHODOLOGY

This article presents data related to the application of the USAT tool, based on a case study of the Lagoa da Conceição district in Florianópolis (Urban Structure Panel) and a commercial building located in the same neighborhood (Behaviors Panel). The study followed the following stages: (1) definition of the areas of analysis; (2) data collection on urban structure; (3) interview with the person responsible for the commercial building; and (4) analysis of the results.

In the first stage, concerning the definition of the study areas, the selected neighborhood was Lagoa da Conceição, which is the focus of the project. To select the commercial building, several establishments were contacted to request authorization for conducting interviews and applying questionnaires. In this way, the identity of the participating establishment was preserved, as requested. Figure 1 shows the Lagoa da Conceição district in Florianópolis, with the area marked in red indicating the approximate location of the analyzed building, situated in the central region of the neighborhood.

Figure 1 – Location of the Lagoa da Conceição District in Florianópolis and the Area of the Building under Study



Source: prepared by the authors, based on Google Satellite, 2025.

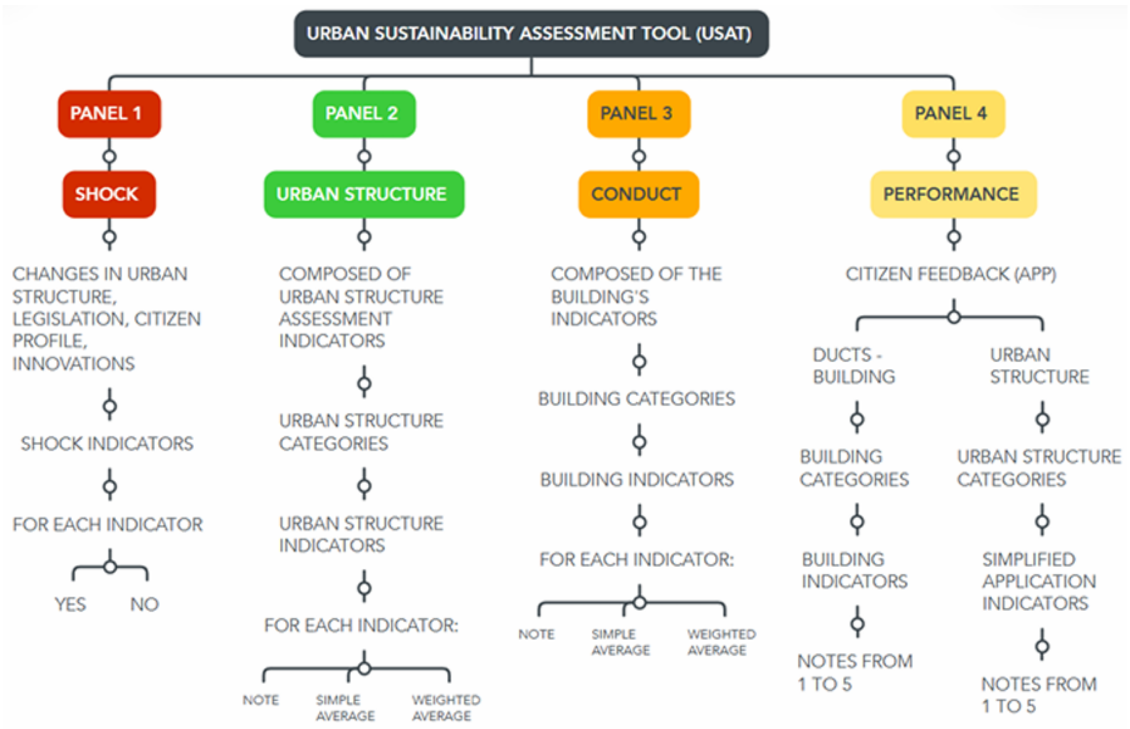
The second stage, concerning the collection of urban structure data, encompassed the analysis of the urban structure indicators, totaling 202 indicators. For this purpose, information was gathered from open databases and official websites of public agencies. A considerable challenge lies in the fact that most of the available data refer to the municipality as a whole, without stratification by neighborhood. Therefore, many indicators were evaluated using general data, which represents a limitation regarding the availability of specific information for the area of analysis.

In the third stage, for the analysis of the Conducts Panel, an interview was conducted with the person responsible for the commercial building, through which the necessary data were collected to assess the indicators. Additional information was later provided to complement the evaluation. Finally, stage four presents the overall analysis of the results obtained from the application of the tool, discussing its potentialities and limitations.

4 THE USAT TOOL

The USAT tool is structured into four main panels: Shocks, Urban Structure, Practices, and Performance. Each panel is subdivided into specific categories, composed of indicators relevant to the assessment of urban sustainability. The complete list of indicators, as well as a detailed description of the model's operation, can be found in Engel et al. (2024) and Librelotto et al. (2024). Figure 2 provides a concise overview of the tool's panels and the functioning of each assessment.

Figure 2 – Panels that compose the USAT System



Source: adapted from Librelotto et al., 2024.

The Shocks panel focuses on assessing the neighborhood's resilience to unexpected changes, such as legislative shifts or technological innovations. These changes may include the adoption of new technologies, social transformations, government actions, and regulatory modifications, as well as alterations in the ecosystem. When such shocks or changes occur, they should be directed toward the indicators that are affected. Therefore, the person responsible for data management (e.g., managers, researchers, or public entities) must identify which data need to be reviewed. Figure 3 presents some example categories for the implementation of the Shocks panel.

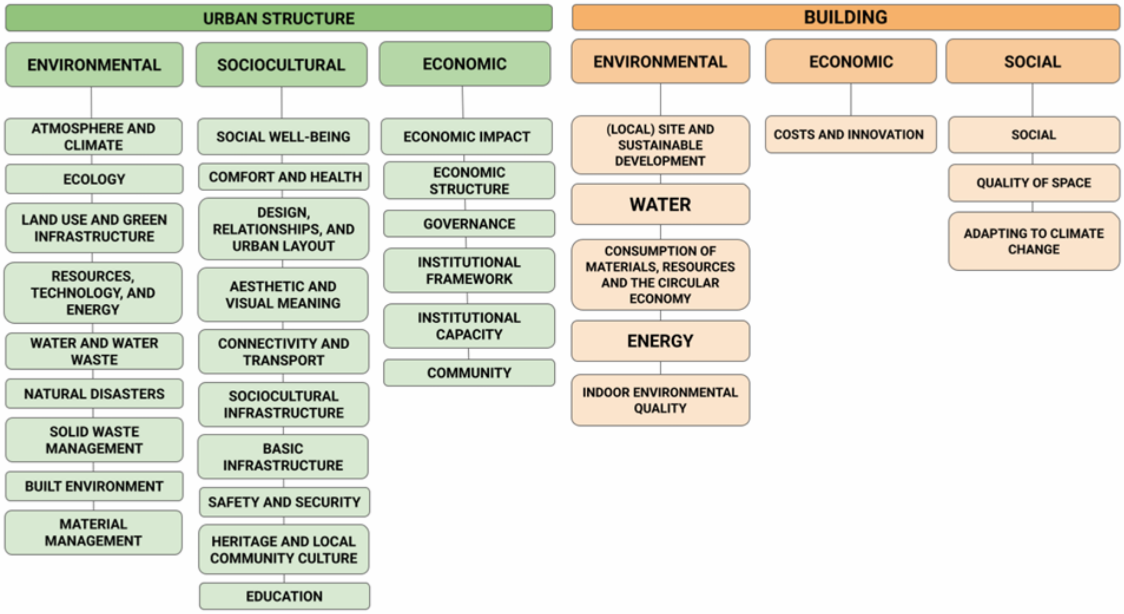
Figure 3 – Overview of the Categories in the Shocks Panel.

Source: prepared by the authors.

The Urban Structure Panel aims to analyze the physical and functional organization of the neighborhood through a set of 202 indicators distributed across 25 categories, designed to provide a multidimensional view of sustainability and the quality of the urban environment in Lagoa da Conceição. These indicators encompass aspects ranging from road safety and risk management in public facilities to the efficiency of waste collection and transportation services, including elements related to cultural heritage preservation and urban space configuration. In its conception, the indicators were designed to be continuously updated by different governmental agencies, enabling an integrated and dynamic measurement of multiple urban challenges.

The Conduct Panel, in turn, focuses on assessing sustainable practices in buildings, considering parameters such as energy and water consumption, as well as waste management. This panel establishes a direct relationship with data from the urban structure, since the building is analyzed in interaction with its immediate surroundings. To achieve effective sustainability, it is essential to understand cities and buildings as interdependent systems, in constant dialogue between architectural and urban scales.

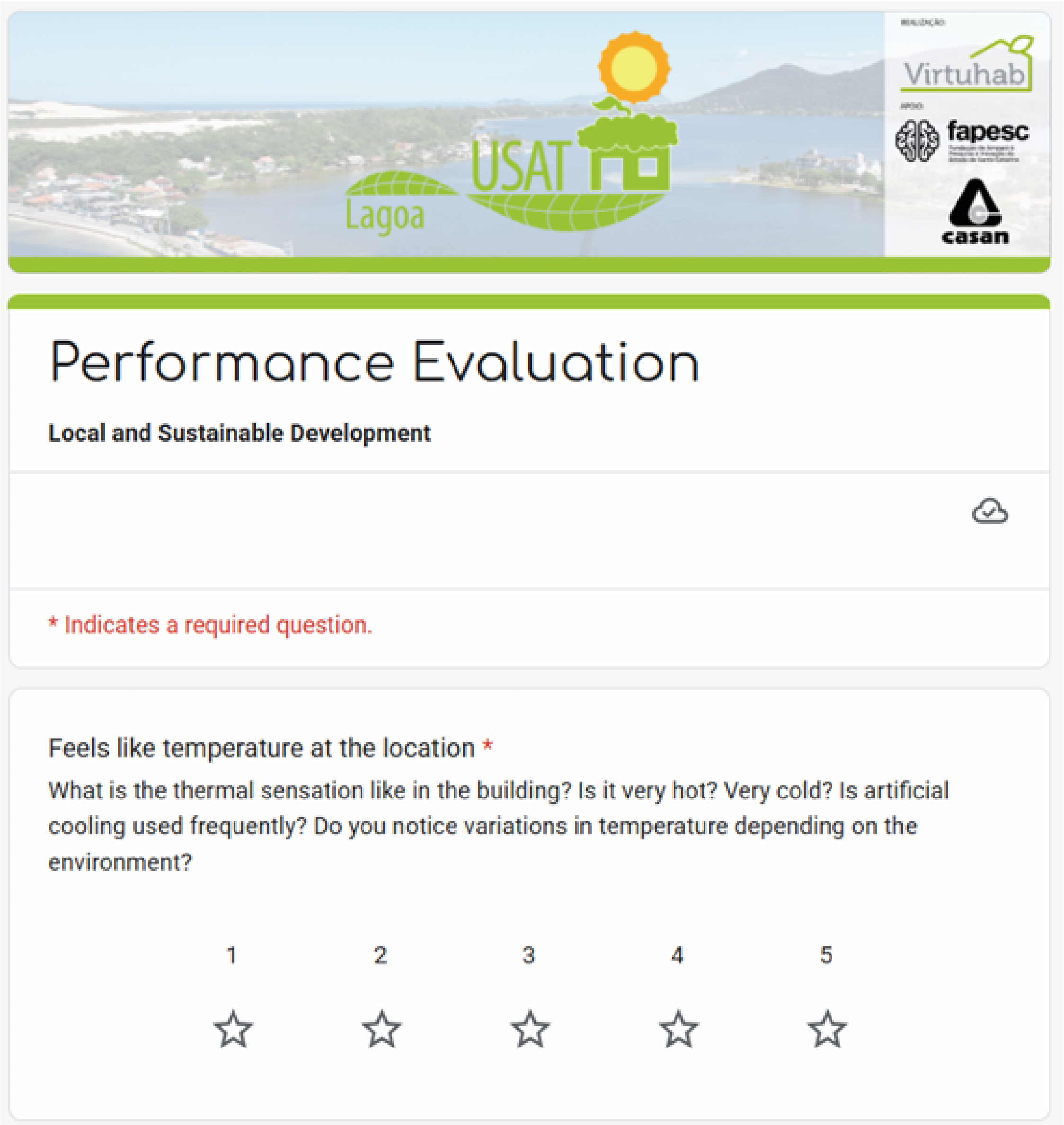
Figure 4 – Categories of the Urban Structure and Conduct Panels.



Source: Librelotto et al, 2024.

Finally, the Performance Panel addresses the dimension of citizen participation by adapting the indicators from the Urban Structure and Conduct Panels so that residents can evaluate them using a simplified 1-to-5 scale, without requiring technical calculations or complex interpretations. The developed prototype operates in a web environment, using a form-based system that translates technical indicators into accessible language, facilitating public understanding and engagement. The process of creating the USAT brand's visual identity and developing the application was presented in previous publications (Da Rosa et al., 2024). Figure 5 illustrates some examples of the application's interfaces.

Figure 5 – Categories of the Urban Structure and Conduct Panels.



Source: Librelotto et al, 2024.

The central proposal of the model lies in the integration of all data obtained from the different panels, allowing citizen evaluations to be directly compared within the platform to the results derived from technical analyses. This integration enables a comprehensive understanding of the territory by connecting the metrics used by public managers and decision makers with the population's perception of their neighborhoods and buildings.

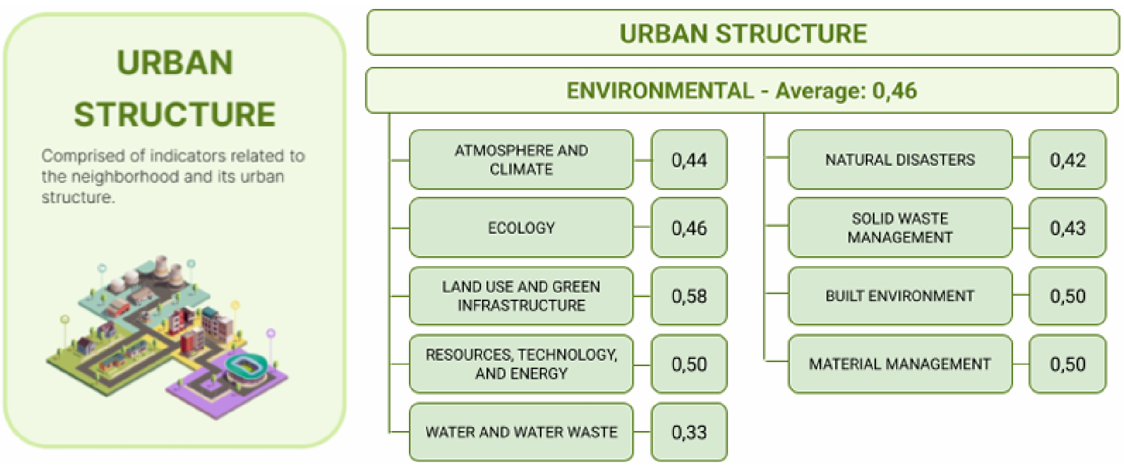
5 RESULTS OF THE USAT TOOL

5.1 Application in Lagoa da Conceição

Based on the operation of the tool, the panels that could be tested were the Urban Structure Panel, applied to the district of Lagoa da Conceição, and the Conduct Panel, focused on the analysis of the commercial building. The Shocks Panel has as its main function the issuance of alerts regarding possible changes that may affect the assessments, notifying decision makers. The Performance Panel, in turn, is linked to the stage of citizen participation, which will be implemented after the completion and deployment of the web platform.

For the results analysis stage, the values obtained for the categories and indicators of the Environmental Axis are presented, encompassing both the urban structure and the building practices. The averages of the indicators in each category were calculated to allow comparison between the two levels of assessment, highlighting the relationships between the environmental performance of the neighborhood and that of the buildings. Figure 6 below illustrates the results obtained for the Urban Structure Panel.

Figure 6 – Summary of the Environmental Axis Assessment of the Urban Structure.



Source: prepared by the authors.

In the Environmental Axis, aspects ranging from atmosphere and climate to materials management are considered. During the application of the indicators, difficulties were encountered in obtaining specific data for the Lagoa da Conceição district, which limited the accuracy of certain analyses. In the Atmosphere and Climate category, for instance, data are required on heat island effects, adaptation to climate change, control of ozone layer depletion, and air quality. However, the available information from meteorological stations and environmental monitoring platforms does not correspond to measurements taken within the district itself, thereby reducing local representativeness. Consequently, the assessment was conducted using the existing data, while ensuring methodological consistency and comparability of results.

Regarding the urban structure, the category that presented the best performance was Land Use and Green Infrastructure. This category encompasses thirteen indicators addressing issues such as land use optimization, diversity of uses, permeability, presence of green areas, and control of occupation in risk zones. Lagoa da Conceição is an environmentally sensitive area characterized by extensive native vegetation and nearly complete occupation of urbanizable zones. This context reveals significant challenges related both to environmental preservation and to the need to reconcile diverse existing uses while ensuring the sustainability of the territory. Table 1 below presents an example of an indicator within this category.

Table 1 – Example of an Urban Structure Indicator

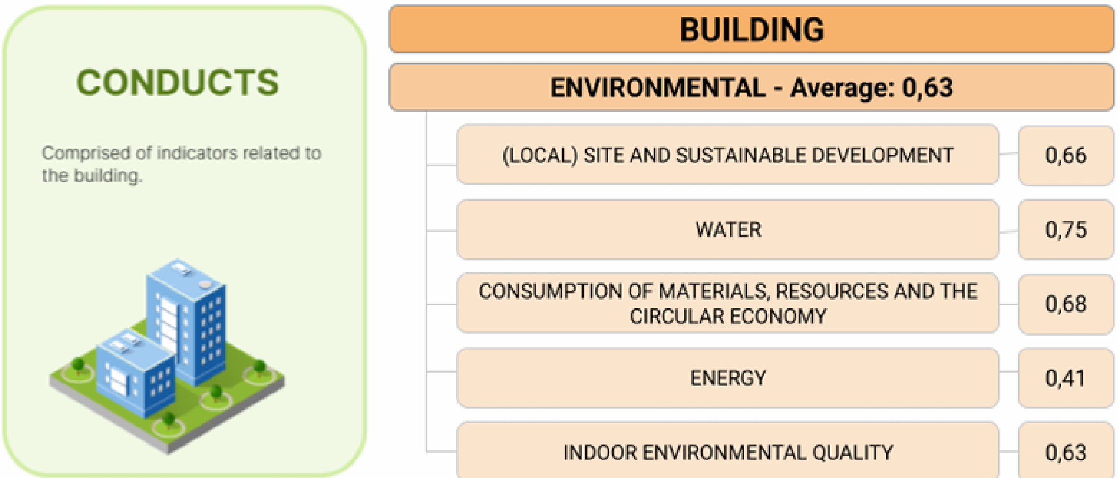
(12) Land Use Optimization	
Description	Evaluates practices aimed at using land efficiently and responsibly. This includes the reuse of abandoned urban areas, minimizing earth movement, preserving the natural terrain, and avoiding steep slopes.
Objective	To reconcile human development with environmental preservation, promoting sustainable growth and harmonious coexistence with the natural environment.
Calculation	**Checklist:** • Is there active implementation of land use plans? (Percentage of public and private construction projects that comply with the Land Use Master Plan) • Is there an effective rate of land reuse, with no abandoned urban areas? • Is the natural terrain preserved, without the creation of steep slopes? **Scale:** Yes (1), Partial (0.5), No (0), or Not Applicable (N.A.)
Variables	Land Reuse Rate, Earth Movement, Terrain Alteration Index, Creation of Steep Slopes.
Criteria	Verifies whether solutions have been proposed to optimize land use, including land reuse, minimization of earth movement, and prevention of terrain alteration or steep slopes.
Periodicity	Annual

Source: prepared by the authors.

For the evaluation of this indicator, data provided in the Annual Progress Report of Florianópolis Indicators (FloripAmanhã, 2022) were considered. The indicator aims to measure practices that promote efficient land use. In the first criterion, it was verified that most projects comply with the regulations established by the Master Plan. Regarding the second criterion, related to land reuse rates, it was observed that in Lagoa da Conceição there are no abandoned areas, since the available land in the neighborhood is already fully occupied. As for the third criterion, concerning the natural terrain, the region presents extremely steep topography, which makes several areas unsuitable for urbanization and requires significant earth movement when construction takes place.

For the evaluation of the Conduct Panel, the data analyzed refer to the building selected for the case study. The identity of the building was preserved as requested, and confidential information—such as water and electricity bills and city-approved plans—was not provided. Therefore, the analysis considered the responses obtained during the interview with the commercial manager, as well as the perceptions and observations recorded by the researchers during the site visit. Figure 7 presents a summary of the scores assigned to the Environmental Axis of the Conduct Panel.

Figure 7 – Summary of the Building Assessment by Categories.



Source: prepared by the authors.

In the Environmental Axis of the building assessment, categories such as Site and Sustainable Development, Water, Resources, Energy, and Indoor Environmental Quality were considered. The category that achieved the highest score was related to Water, which included indicators addressing consumption efficiency, reuse of greywater and rainwater, irrigation systems, and consumption monitoring. During the interview, the building manager emphasized that the establishment adopts efficient water management practices, demonstrating concern and investment in this aspect.

The category that required the most attention was Energy, encompassing indicators related to sensor systems, thermal comfort strategies, renewable energy use and generation, green envelope, life cycle analysis, and ventilation, among others. Although some practices, such as strategies for reducing energy consumption, have been implemented, other aspects, particularly greater emphasis on thermal comfort and life cycle analysis, still require attention to enhance the building's energy sustainability.

In the Site and Sustainable Development category, the building showed satisfactory performance, considering indicators such as location in areas planned for development, absence of risks and extensive earth movement, and preservation of natural vegetation. For illustration, Table 2 presents indicator 4 of this category.

Table 2 – Example of a Conduct Indicator

(4) Implementation on Non-Contaminated Land or Rehabilitation of Areas (Decontamination or Encapsulation of Contaminated Soils)	
Description	It addresses the practice of constructing buildings on non-contaminated land and/or rehabilitating contaminated areas through soil decontamination or encapsulation. Soil contamination is a significant environmental concern in urban areas, as it can pose risks to public health and contribute to environmental degradation. The occupant of the affected lot is directly exposed to these impacts and may engage in activities at the source that have a considerable influence on both the building and the surrounding urban environment.
Objective	Promote sustainable and responsible urban development by encouraging the construction of buildings on non-contaminated soils and the proper rehabilitation of contaminated areas to protect public health and the environment.
Calculation	**Checklist:** • Is there a soil characterization study to identify contamination? • The construction is carried out on non-contaminated soil. • Is there a project for soil rehabilitation if contamination is detected? **Scale:** Yes (1), Partial (0.5), No (0), or Not Applicable (N.A.)
Variables	Identification of contaminated soils, construction on non-contaminated soils, rehabilitated areas, rehabilitation efficiency, monitoring and maintenance.
Criteria	Identification of Contaminated Soils: Conduct soil studies and analyses to identify contaminated areas. Construction on Non-Contaminated Soils: Assess the number of buildings constructed on non-contaminated soils in relation to the total number of buildings in the urban area. Rehabilitated Areas: Record the number and total area of sites rehabilitated through soil decontamination or encapsulation. Rehabilitation Efficiency: Evaluate the effectiveness of the adopted rehabilitation measures, verifying whether contamination levels comply with established environmental and public health standards. Monitoring and Maintenance: Establish a monitoring and maintenance system for rehabilitated areas to ensure long-term sustainability and safety.
Periodicity	Annual

Source: prepared by the authors.

In the case analyzed, the studied building meets the indicator only partially, as no soil characterization was carried out to verify possible contamination. However, the person responsible for the establishment reported that there are no signs of contamination, justifying the assignment of a partial score equivalent to 0.5. This example highlights the difficulty of obtaining data, since not all evaluated criteria are required by legislation, which can compromise full compliance with the indicators.

Based on the studies conducted, it is observed that the tool presents significant potential, mainly due to its accessibility and its ability to integrate different dimensions of sustainability. However, limited access to data still represents a major challenge. As the next steps of the research, it is planned to expand data availability and implement the tool in an operational way, allowing managers and citizens to directly enter information. This integration will foster closer interaction between the population and decision-makers, strengthening participatory management of urban sustainability.

5.2 Platform Implementation

After defining the evaluation metrics and collecting the data, the method was transformed into a digital platform accessible to professionals, managers, and the general public. During this process, efforts focused on presenting the information clearly and intuitively, while also enabling managers to continuously fill in and update the indicators. The website thus provides both a public version for consultation and visualization of results and a restricted area for data administration and entry. Currently, the platform is available at https://usat.com.br/. Figure 8 shows the platform's welcome screen.

Figure 8 – Platform Home Screen

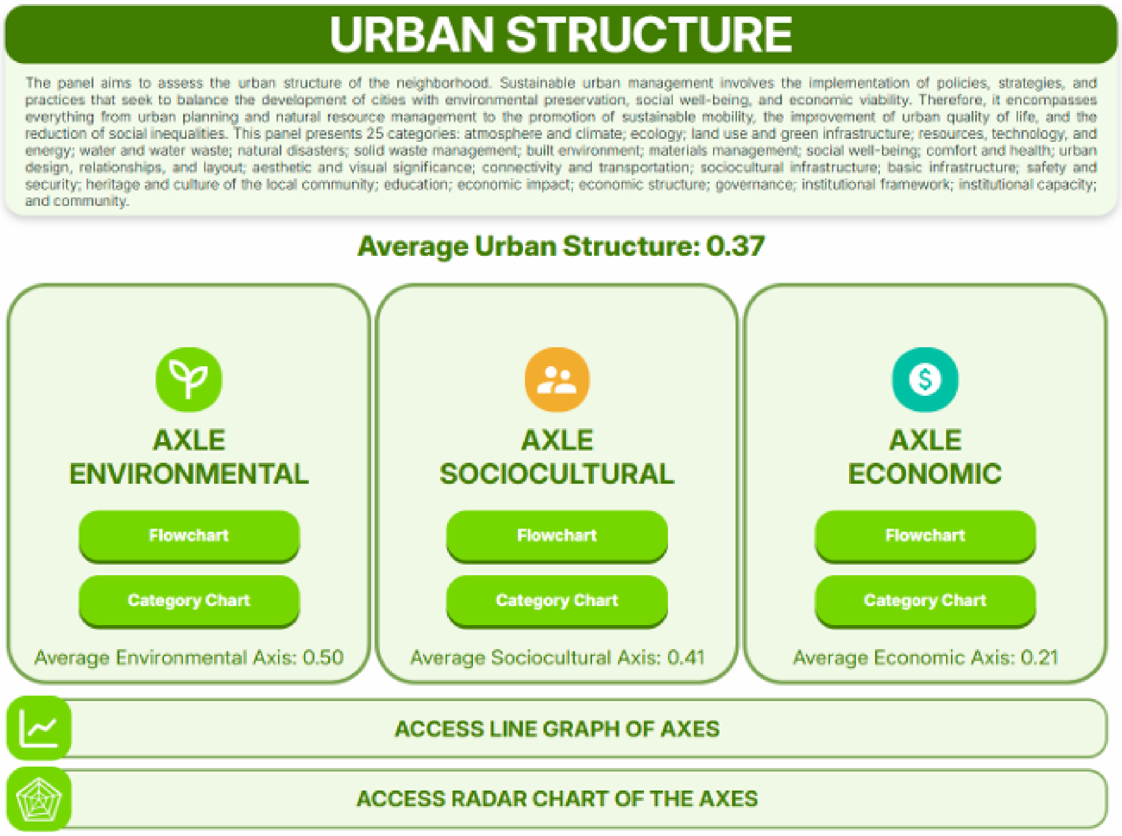
Source: https://usat.com.br/

The platform provides detailed information about the project, including an interactive map of the districts of Florianópolis. This structure allows other districts to be incorporated into the system in future expansions, increasing the reach and applicability of the tool in different urban contexts.

In addition, the website provides access to all evaluation panels of the system (Shocks, Urban Structure, Conduct, and Performance), offering a comprehensive view of the model and its practical application. This organization allows managers, administrators, and researchers to monitor results in a structured way, consult specific indicators, and use the platform as a support tool for decision-making and sustainable planning.

Figure 9 presents the Urban Structure panel, where it is possible to access indicator results by district, view illustrative charts, and interpret data intuitively. This facilitates comparative analysis between different areas and enables the identification of patterns, intervention opportunities, and strategies for improving urban sustainability.

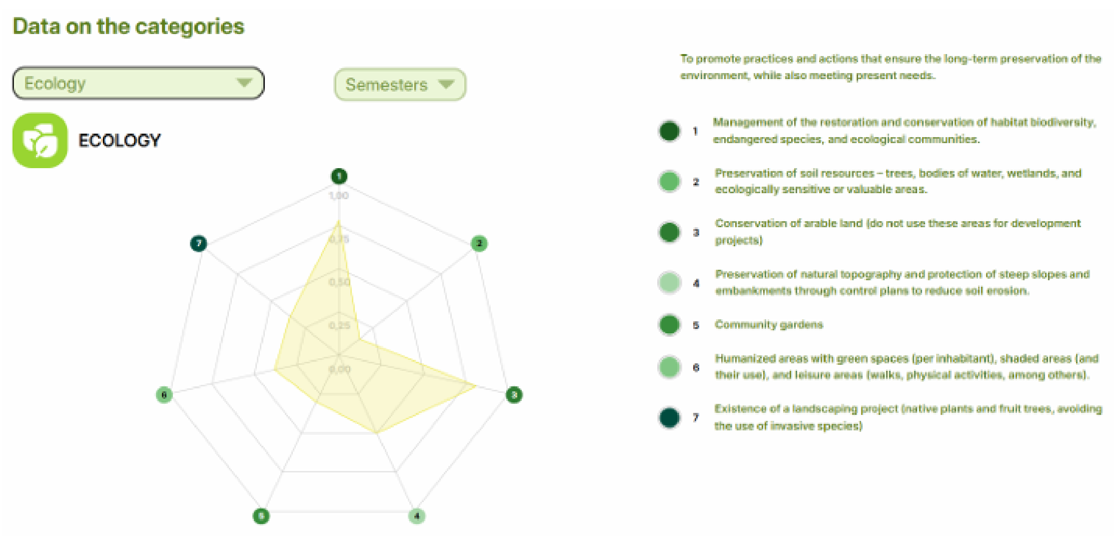
Figure 9 – Urban Structure Panel.



Source: https://usat.com.br/

In each axis, it is possible to view evaluation charts for the categories. Users can both compare indicators and observe the temporal evolution of the assessments. All data include information on which entity recorded the evaluation and the date of the update. Figure 10 provides an example of a chart for the Urban Structure category as displayed on the website.

Figure 10 – Ecology Category Data of the Environmental Axis in the Urban Structure Panel.



Source: https://usat.com.br/

The presentation of the USAT platform highlights its strategic role in consolidating urban and building data, allowing detailed analysis of sustainability at different scales and providing support for both managers and the general public. By offering information in a clear and organized way, including specific panels (Shocks, Urban Structure, Conduct, and Performance) and interactive district maps, the tool facilitates the interpretation of indicators and promotes social engagement in urban management. In this way, USAT operationalizes the developed method while reinforcing its potential as an instrument for planning, monitoring, and decision-making, providing a solid foundation for the formulation of more effective public policies that can be replicated in other urban contexts, as exemplified by the study of the Lagoa da Conceição.

6 FINAL CONSIDERATIONS

The USAT tool aims to create a continuous database for monitoring urban and building indicators, contributing to the development of sustainability-oriented public policies and encouraging active citizen participation in urban management. In this way, the method enables a detailed diagnosis of sustainability at both the neighborhood and building scales, providing relevant information for the development of more resilient and sustainable cities. By integrating technology, scientific methodology, and social engagement, the USAT tool demonstrates significant potential to enhance urban planning, monitoring, and management, promoting more balanced and sustainable urban development.

The results obtained highlight the relevance of using integrated tools for sustainability assessment, providing a consistent basis to support decision-making in urban policy and the improvement of environmental management strategies. Furthermore, the research contributes to the debate on urban governance by proposing an assessment framework that can be replicated in other regions facing similar challenges and characteristics.

Based on the data collected, it is expected that the study will assist in the formulation of more effective guidelines for the sustainable development of Lagoa da Conceição, as well as other urban contexts seeking to strengthen their planning and environmental management strategies.

It is important to note that the evaluation results were manually collected by research fellows and subsequently reviewed by the researchers between May 2024 and February 2025. As a future development of this research, the implementation of a digital platform is planned, which will allow the automated input of data. With this tool, both data collection and processing are expected to become automated, eliminating currently time-consuming steps and, consequently, accelerating analysis and decision-making by the responsible authorities.

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