

Green Spaces in Porto: Urban Renewal and Tourism Potential (Portugal)

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Abstract: There are several issues associated with the growing population density of metropolitan areas, especially in terms of environmental sustainability. Since many environmental problems are concentrated in urban areas, it is crucial to preserve and expand green spaces in order to bring back some ecological equilibrium. After COVID-19, people's love for urban green areas has grown again because they are so beneficial to locals, tourists, and ecosystems. This study looks at parks and gardens in Porto, Portugal, using fieldwork to pinpoint places that require improvement and emphasize important advantages and disadvantages. The results are intended to guide plans for improving lesser-known green spaces, making sure they get the same consideration as more well-known spots in the city center and along the Douro River.

Keywords: Sustainability; Parks; Public gardens; Porto; Urban tourism; Requalification.

Hidden and Covert. Colonial Ideology in the Contemporary Tourist Imaginary

Resumen: Existen varios problemas asociados con la creciente densidad de población de las áreas metropolitanas, especialmente en términos de sostenibilidad ambiental. Dado que muchos problemas ambientales se concentran en las áreas urbanas, es crucial preservar y expandir los espacios verdes para recuperar cierto equilibrio ecológico. Después de COVID-19, el amor de la gente por las áreas verdes urbanas ha vuelto a crecer porque son muy beneficiosas para los locales, los turistas y los ecosistemas. Este estudio analiza los parques y jardines de Oporto, Portugal, utilizando el trabajo de campo para identificar los lugares que requieren mejoras y enfatizar las ventajas y desventajas importantes. Los resultados pretenden orientar los planes para mejorar los espacios verdes menos conocidos, asegurándose de que reciban la misma consideración que los lugares más conocidos en el centro de la ciudad y a lo largo del río Duero.

Palabras clave: Sostenibilidad; Parques; Jardines públicos; Oporto; Turismo urbano; Recalificación.

1. Introduction

With the growing demand for leisure facilities as an escape from work activities, green spaces in cities are playing an important role in community well-being and health (Montez, 2010; Abu Kasim, Yusof, & Shafri, 2019). Indeed, the cultural and socio-environmental orientations, reflected in the artistic manifestations of gardens linked to the social elites, were at the origin of the interest, already

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in the 18th century, in the creation of extensive green areas to be enjoyed by the population. The same was true throughout the 19th century, especially in the urban extensions embodied in the creation of wide tree-lined avenues and the consolidation of significant green areas within the urban perimeter. Since then, green spaces in the city have been performing aesthetic, social and even hygienic functions. However, during the first half of the 20th century, that relationship between man and the city was compromised, with notable damage to the urban environment (Romero, 2007), a situation that would only progressively reverse from the second half of the 20th century. With growing environmental concerns, green spaces in cities began to be the object of public policies (Madureira, Nunes, Oliveira, Madureira & Cormier, 2014).

Until now, so many efforts have never been made in this direction (Vidal, Fernandes, Viterbo, Vilaça, Barros & Maia, 2021). Requalification in environmental terms and in green spaces has been seen as a priority in the main European cities. The aim is to take advantage of most of the available area and be able to widen and extend these green spaces, supporting a better harmony and balance. In the specific case of the city of Porto, there are currently around 54.8 m² of green space, per inhabitant. Nature-based projects have been developed with the aim of promoting biodiversity, respecting the natural water cycle, storing carbon, valuing soil, reducing energy consumption and making the city better for everyone (Porto., 2022b). Porto is implementing several solutions when it comes to using nature's intelligence in urban management. One of the objectives is to include green roofs in the city's strategy, that is, natural roofs, with plants, that improve the thermal insulation of buildings, retain water in periods of rain, store carbon, promote biodiversity and improve the landscape. This example, in addition to being visually pleasing, denotes sustainable innovation.

The Porto City Council intends to create a set of tourist routes, one of which is focused on the Gardens and Public Parks of Porto. Initially, it will be necessary to study the gardens and parks that can be included in the tourist route and understand which indicators would be more viable for evaluation in different locations. The study used an inventory of services and support infrastructures to conduct a descriptive analysis and firsthand observation of Porto's green areas. The four-month study's objectives were to pinpoint intervention targets and provide guidance for the creation of tourism itineraries that highlight these urban green spaces. The main objectives of this work are: a) to inventory the services and support infrastructures for the 21 green spaces in the municipality of Porto; and b) identify the main positive/negative points, among other problems of gardens in the city of Porto.

2. Sustainability and Main Challenges

In an increasingly urbanized world and with all the hustle and bustle of everyday life, people are looking for peace and quiet. For many people it is practically impossible to go on a trip every weekend or whenever they need to recharge their batteries. Living in a city area, there's nothing better than having the ease of travel to spaces in direct contact with nature. In this context, gardens and public parks play a fundamental role for all those who wish to combine business with pleasure.

Urban green spaces are essential for lowering stress and enhancing both physical and emotional well-being. They function as recreational zones, particularly in crowded cities where frequent vacations are impractical. Urban green areas have been shown to reduce stress, increase children's cognitive ability, and generally improve people's quality of life. Promoting ecological continuity and urban sustainability requires that these areas be made accessible and connected. (Madureira, 2001).

According to the Institute of Public Health of the University of Porto, children who live closer to green spaces, such as parks and public gardens, have a better cognitive performance at the age of 10. Contact with nature can play an important role in cognitive development, most likely because natural spaces are associated with lower levels of stress and pollution and greater socialization and physical activity (ISPUP - Instituto de Saúde Pública da Universidade do Porto, 2022).

According to Vital et al. (2021), proximity and the natural environment of green areas are the main reasons for the frequent use of gardens and urban public parks. Now, if these factors were very relevant before, now, with the pandemic, they have become even more so due to the panorama experienced in the last two years.

The green areas of a city are assumed as an essential support to the quality of life of citizens (Martins, Carvalho & Almeida, 2021; Martins, Carvalho & Almeida, 2023, 2022; Martins & Pinheiro, 2022) also considered a second-order factor, insofar as they promote biodiversity, recreation and leisure, in addition to sustaining and organizing the urban fabric. They are promoters of an ecological and cultural

continuity, essential for environmental sustainability, which integrates resources as diverse as water lines, parks, gardens, partition hedges, trees on streets and in areas free of buildings that contribute to the construction of the “urban forest” (Porto., 2022a).

When one thinks of green spaces, natural parks and gardens outside the urban core come to mind. In reality, we are closer to these places than we imagine. The strategic concerns in terms of planning green areas in cities currently include ensuring the connection between new spaces and the recovery of existing ones through green corridors; increase not only the global green area available to the citizen, but also reduce the distance between these and the green spaces through the creation of proximity gardens, located next to people’s work places and residences, in order to avoid the use of transport to reach green areas; conserve the arboreal heritage and guide new plantings and replacements, in the short, medium and long term, with a strategic afforestation plan that allows improving the functions and services of ecosystems generated by trees; provide the city with a green structure that can actively contribute to adapting the city and its infrastructure to climate change, such as extremes of cold and heat, a decrease in average precipitation and the concentration in torrential episodes, the increase in storms, floods urban areas and landslides; safeguard and promote the potential of the humid system, as a key element of sustainability and cohesion of the landscape.

2.1. Sustainable practices used in cities

In the 19th and 20th centuries there were already conservation movements to protect and preserve natural areas, but outside the cities, as cities were increasingly occupied by buildings, factories, for example.

Now, Beatley (2016) states that 15% of all land on the planet is under some type of protected status. Some cities are already choosing to add public parks (as is the case of some within the municipality of Porto), within the city to provide some relief from urban tensions and improve public health. Some urban designers promote the development of “garden cities” that support and reinforce the central importance of these areas. (Beatley, 2016) states that the inhabitants of the cities of Melbourne and Singapore see themselves as living in a city within a forest, which means that there is a tendency to eradicate green areas. However, plans are in place to change this scenario. The objective is to introduce new projects/designs for these spaces, keeping the old elements, incorporating entirely new ones. Integrating nature into walls and building facades, such as the giant trees in Singapore. It is considered a futuristic city because it manages to take advantage of natural resources, while grouping them in new inventions. An example of this are the giant, self-sustaining trees that have photovoltaic cells in their crowns, which capture energy during the day to light up at night. These function as gigantic water collectors, used to water the plants in the gardens. The eastern part of the city of Porto wants to implement a similar project.

While conservation efforts in the past were concentrated on rural regions, contemporary urban planning is progressively incorporating green spaces into cityscapes. Porto seeks to imitate successful examples of green infrastructure deployment from cities like Washington, D.C., Mexico City, and Paris. These projects involve installing a lot of green roofing, developing urban agriculture, and building green corridors that are safe for bicyclists and pedestrians. Some of the examples of cities that have embraced green infrastructure are Washington D.C which, instead of building traditional drainage systems during the storm water period, invested \$90 million in green infrastructure on a large scale to reduce the amount of rain that had to be later handled through tunnels. Paris planted 20,000 trees and created 10.7 million square meters of green roofs and walls and 81 hectares of urban agriculture. Mexico City followed Paris’ lead a bit and installed more than 226,000 square meters of green roofs on government buildings, schools and hospitals and even offered private residential buildings a 10% reduction to put up their own green roofs. The green roof is seen as a component of sustainable design. Ultimately, Berlin has developed nearly 500km of green walkways for pedestrians and cyclists, keeping 44% of the city’s area in forests, preserves, lakes and other green and blue areas.

2.2. Porto: One Territory, Many Offers

Porto, a major Portuguese city, has seen a notable increase in tourism. The city’s many attractions, among which are its green areas, amplify its allure as a premier city break location. Comparable to other European cities, Porto has a high per capita amount of green space, suggesting that these spaces could be used to boost tourism and enhance the quality of life for locals. Located on the North Coast of Portugal, it embraces a geographical area currently composed of 17 contiguous municipalities. The

Metropolitan Area of Porto has a vast collection of references to offer, with its architecture, handicrafts, landscape, its traditions and ways of being with an authenticity that undoubtedly does not end in this region, being a business card from Portugal. In 1996, in view of all its richness, the historic centre of the city of Porto was considered a World Heritage Site. In terms of tourism, the city of Porto sought to position itself in the field of branding of tourist destinations through the creation of the brand “Porto.”, in 2014, to differentiate itself as a tourist destination.

In terms of attractiveness, there was a remarkable upward trend in the number of guests between 2017 and 2019. This increase was shaken in 2020, due to the drop in tourism due to the pandemic (table 1). 2019 was the best year ever for tourism in the city as well as in the regional context of Porto and North, with around 2.2 million tourists in the city and more than 5.8 million in the region of Porto and North, as a result growth of 12.5% and 11.1%, respectively, in relation to the previous year. The tourist offers of the city, in 2019, amounts to 373 establishments and 23,270 beds (Instituto Nacional de Estatística I.P., 2022). Despite the very significant drop and the consequences that this scenario entailed, 2021 was a year of clear recovery.

Table 1: Guests in tourism accommodation establishments (per year)

Year	Porto and North Region	Porto Metropolitan Area	Porto City
2021	3 348 702	1 846 265	913 883
2020	2 469 917	1 315 858	619 644
2019	5 873 026	3 671 926	2 245 291
2018	5 285 297	3 304 848	1 996 461
2017	4 892 605	3 117 423	1 876 720

Source: Data from the Anuários Estatísticos da Região Norte (National Institute of Statistics, 2023)

As far as the offer is concerned, the city of Porto is full of activities to do. The Department of Tourism and Municipal Commerce of Porto provides free flyers and other guides with possible routes to take, among other activities. One of the products that Porto offers is Cultural and Landscape Touring. Although Cultural and Landscape Touring has a meaning more focused on tourist attractions, there is an increasing demand for more complete travel experiences, where people seek to complement and enrich their tourist experience by carrying out occasional tours or circuits, combining scenic and cultural attractions to discover and enjoy the territory where they are located.

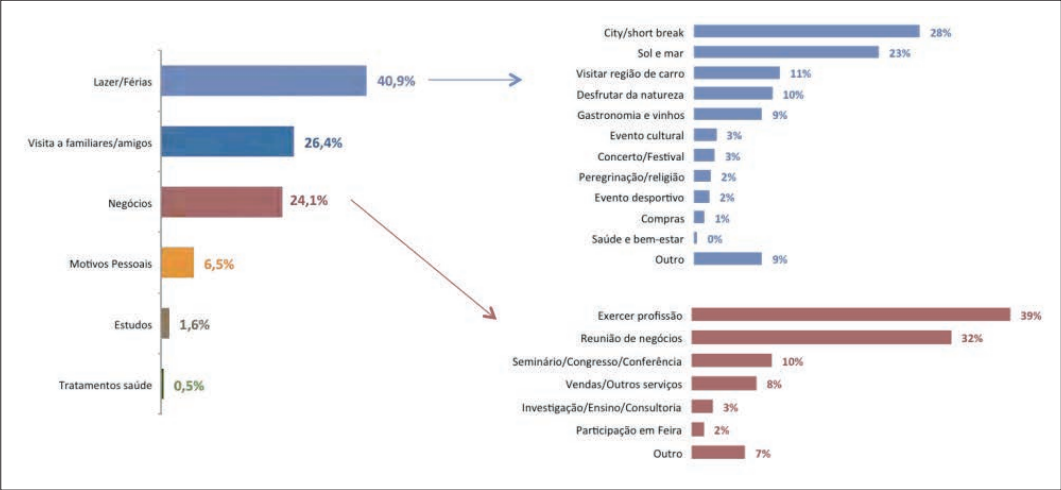
One of the strengths of Portugal is its “diversity and high value of historical, cultural and natural heritage” (Turism of Portugal, 2017, p. 35). It is important to emphasize the issue of the “natural” because, as a rule, urban centers are not included in this type of tourism. The truth is that it is possible to include the Route of Gardens and Public Parks in the Porto region as a Landscape Touring. Two of the weaknesses that are pointed out are “Seasonality” and the “Deficit of information about supply”, in the SWOT analysis (Turism of Portugal, 2017, p. 35).

The city of Porto was chosen as “the best European destination for a city break, an achievement that highlights the city’s attractions and acquires special significance in the complicated context that the tourism industry is going through all over the world” (Porto., 2020, own translation). It is in this context that the 22 thematic promotional videos are launched, “which address diverse aspects such as the cultural, social, architectural, heritage and gastronomic richness of Invicta” (Porto., 2022b). The main motivation of the City Breaks sector is based on getting to know a city and its monumental, architectural, cultural, commercial, gastronomic attractions, etc. Fans of this modality look for key factors such as an attractive and well-maintained urban environment; the degree of cleanliness and hygiene; the security; the wide coverage of tourist information in strategic locations in the city; and the varied offer of thematic itineraries within the city and surrounding areas.

As a rule, city break trips do not include routes through public gardens and parks. However, that is what is intended: to make these places as dynamic as possible so that they can be part of this type of market and, subsequently, to stimulate the region. All the key factors mentioned must be taken into account, so that the offer can be streamlined, and the general conditions of the parks and gardens improved, so that it is pleasant. It is essential to look at these public spaces as potential attractive resources. The

objective is to continue to elevate the city of Porto as one of the best City Break destinations in Europe and the world, but with other aspects, one of which is the landscape aspect, where the Route of Parks and Public Gardens of the Porto city.

Figure 1: Segment and Main Reason for Visit



Source: (TrabelBI, 2018)

According to figure 1, the majority of respondents who travel to Porto and/or the North are for leisure/holidays and the motivation that stands out the most is short breaks (which is in line with what was mentioned above), followed by sun and sea (23%). Far away, we found other reasons such as visiting the region by car (11%) or enjoying nature (10%). The tourist looking for tranquillity, rest, authenticity and carrying out multiple activities in the destination can do so in the city of Porto. As relevant market niches, it is possible to mention walking, cycling or even birdwatching in some cases. All these tasks are possible to carry out within the city.

2.2.1. The rehabilitation of green areas in the city of Porto

The Porto City Council has made major investments in the restoration and growth of the city's green spaces, adding amenities for outdoor exercise and improving accessibility. In light of the post-pandemic environment, these initiatives seek to encourage active aging and healthy lifestyles. In order to ensure inclusion, accessibility enhancements have also been made to public transportation and are extended to green areas. Recently, it invested 640,000 euros in fitness equipment, 100,000 in the refurbishment and placement of 15 basketball hoops in sports spaces. These outdoor "mini gyms" are important from a health and leisure point of view and everything they can do in the post-pandemic, that is, take advantage of and improve public spaces in cities, is a largely justified investment (ISPUP - Instituto de Saúde Pública da Universidade do Porto, 2022). Despite all the obstacles that people have overcome during the pandemic, at the same time they have realized that staying outdoors is good in every way. If the City Council of Porto invested in the expansion and rehabilitation of the city's green areas, creating more green spaces for public enjoyment, now this idea has gained a certain reinforcement and meaning. The objective of this investment is to contribute to the promotion of healthy lifestyles, to motivate regular physical activity, to enhance active aging and to mitigate the effects of social exclusion phenomena. It is possible to find more than one hundred fitness equipment and maintenance circuits for free use by the population, installed in different places in the city.

Therefore, the city of Porto sought from an early age to take advantage of its resources and improve the services and support infrastructures for the benefit of its inhabitants (Andersen, 2001). According to table 2, the green space per inhabitant of the city of Porto exceeds the desirable value for the urban green structure.

Table 2: Population and Green Area per capita in Five European Cities

City	Inhabitants	Source	Green Area (m2/inh.)
Amsterdam	873 989	Suglia et al. (2016)	51,7
Athens	664 046	A view on cities (2020)	25,6
Porto	214 587	Pordata (2018)	54,8
Prague	1 305 737	World Population Review (2020)	74,6
Turin	875 698	Statistiche demografiche (2018)	43,1

Source: (Guedes Vidal et al., 2021, p. 142) with adaptations by the authors.

This value is very significant, taking into account other European cities (table 2). This could be a good starting point and an asset to resolve some of the threats at European level with regard to city breaks. The present study reveals and intends to characterize the natural resources that the city of Porto has compared to other European cities, which are also considered a city break. In addition to being an added value in terms of the environment and sustainability, which is, nowadays, a problem on a world scale, the Porto City Council should take advantage of this reality in its favor, since with the improvement of green spaces and of all the resources it gives them, it creates more favorable conditions for people who use the spaces and attracts more tourists, especially if there are innovative elements in these areas.

And because sustainability is not only linked to the environment, but also to the population, it is important to mention that Porto was nominated for the “Accessible City of 2022” Prize and, despite not having won, it deserved a special mention by the European Commission, for having improved accessibility of railway stations – “Porto has made notable improvements to its rail system and metro system, so that people with disabilities can use them. For example, it has increasingly accessible vehicles and metro stations, as well as sound warnings and adapted equipment throughout its network. I hope that many other cities will follow this example” (Comissão Europeia, 2021). It is important that this accessibility is adopted by the gardens/parks, that is, in their improvement, so that these people do not feel left out, but that they live and experience every moment, as if they had no limitations.

In order to attract more residents and tourists to green spaces, for public enjoyment, it is not enough to create projects and study the areas, it is important to understand what is being done abroad and how we can replicate it in the city, maintaining authenticity and its “personality”.

3. Methodology

Given that the municipality of Porto intends to implement a set of tourist routes, one of which is focused on the Gardens and Public Parks of Porto, the need was felt to analyse and haracterize these same spaces.

The study used an inventory of services and support infrastructures to conduct a descriptive analysis and firsthand observation of Porto’s green areas. The four-month study’s objectives were to pinpoint intervention targets and provide guidance for the creation of tourism itineraries that highlight these urban green spaces. The method used to carry out the work was the direct observation technique, within the scope of field work. It is therefore an exploratory and descriptive investigation. Observation consists of visualizing and systematically recording behaviour patterns of people or other objects in order to obtain information about the object of research. The observer does not question people or communicate with the people being observed, he only registers, generally, according to an observation grid, the behaviours performed (Hill & Hill, 2012).

In surveys where the object of study is not people, but other targets (for example, the layout of a store), the observer registers observations according to a previously planned matrix. In this case, an observation was made and, later, a description of what was seen. This type of research can be structured or unstructured, that is, in the first case it is specified what should be observed and how the observations should be recorded; in the second case, the observer registers the aspects that seem important for the problem under analysis. This second method requires a great deal of experience on the part of the observer and is applicable in subjects where there is no prior knowledge on the subject, usually to prepare a later structured research work. Both structures were used (Tuckman, 2000).

Likewise, content made available by the Department of Tourism and Commerce of Porto and other content on various websites were used.

As a fieldwork tool, some indicators from other studies were used, namely (Guedes Vidal *et al.*, 2021). The indicators were very useful as they served as a means to evaluate the selected locations and, as a complement, to understand whether the analysed areas would be in line with the preferences of the users of Porto's green spaces. Criticisms and suggestions were pointed out to improve the analysis. After this survey, we tried to create tables with all the information duly organized, for a better understanding of what was evaluated.

Before going to the field, a table was prepared (table 3) with the inventory of services and support infrastructures of all Gardens and Public Parks in Porto, on which it would be pertinent to monitor. Some aspects were based on a survey of uses and perceptions of gardens and urban public parks in the city of Porto (Guedes Vidal *et al.*, 2021), analysing results from three dimensions, namely: uses and usage profiles, space evaluations green areas they most frequent, preferences in choosing a green space and perceptions about the potential of these spaces in regenerating the urban environment and the ecosystem services they can provide. This study lasted about four months, between February and May 2022.

With regard to the survey by (Guedes Vidal *et al.*, 2021) it was found that users of green spaces in Porto indicate that at the top of their preferences are the indicators of cleanliness and maintenance, tranquillity, feeling of security, the existence of shady places and the absence of offensive odours and disturbing noise. Other studies also refer to cleaning as the element most valued by users of green spaces (Arnberger & Eder, 2015). If we associate these facts with what was analysed on the ground, there are some points that need to be improved, namely cleaning. Cleaning will be a crucial factor to be resolved in the Municipality of Porto, as well as the maintenance of spaces in general.

Thus, an attempt was made to make an inventory of the services and support infrastructures for the 21 green spaces in the municipality. The spaces were divided into areas. The geographic configuration is based on the official Visit Porto tourist map, which encompasses four zones: a) Foz; b) Marginal and Boavista; c) Historic Center; and d) Oriental. We tried to treat the zones/spaces globally, but also individually, as each one has its particularities and the environment of each garden/park conveys a different "personality".

By grouping the gardens and parks that are part of the Route, the division of areas is organized as follows: i) Foz Area: Porto City Park; Passeio Alegre Garden and Atlantic Front; ii) Boavista and River Area: Boavista Roundabout Garden; Pasteleira Park and Calém Garden; iii) Historic Center Area: Virtudes Park; Cordoaria Garden; Carregal Garden; Sophia Garden; Palácio de Cristal Garden; São Lázaro Garden; República Square Garden; Oliveiras Garden; São Roque Park; Doutor Francisco Sá Carneiro Garden; Marquês Garden; Covelo Park; Águas Park and Arca d'água Garden; iv) Eastern Zone: Corujeira Garden; Bonjónia Farm and Oriental Park.

The purpose of the map shown (figure 2) is to decentralize tourists from the core of the historic center, attracting them to other areas of the city. The configuration of this map could be favourable from an economic and tourist point of view, as it generates more jobs in these areas, with strong resources and tourist attractions.

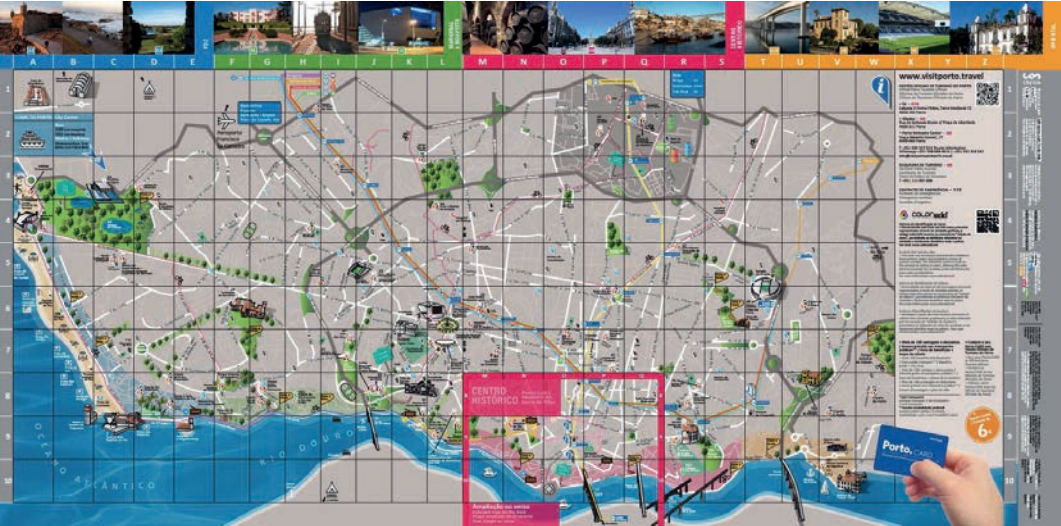
Table 3: Inventory of Services and Support Infrastructures

Identification of the Tourist Point/Place: _____			
Services and Support Infrastructures	Yes	No	Obs.
Library			
Phone booth			
WiFi			
Sanitary			
Coffee			
Restaurant			
Bar			
Kiosk			
Terrace			
Picnic Area			
Parking lot			
Nearby parking			
Playground			
Dog park			
Sports field			
Shared bike lane			
Bicycle parking			
Scooter Parking			
Pedestrian path with signs			
Belvedere			
Existence of fruit tree			
Botanical diversity			
Lake			
River			
Drinking fountain			
Sculpture			
Bandstand			
Environmental Education Center			
Games área			
Minigolf			
Skate Park			
Birdwatching			
Maintenance circuit			
Bridge			
Undifferentiated garbage			
Ecopoints			
Monument			

Monument classified as Public Interest			
Family friendly			
Athletics friendly			
Informational board			
Communication/Subtitles in English Language			
Benches			
Tables with benches			
Places with shade			
Accessible to people with reduced mobility			
Pets allowed			
Box with bags to collect animal waste			
Color identification system for color blind people (Coloradd)			

Source: Own elaboration, based on (Guedes Vidal et al., 2021)

Figure 1: Official Tourist Map of Porto



Source: (ISSUU, 2021)

It is presented in four different languages (Portuguese, English, Spanish and French). Its structure is complete and brings together all the necessary elements when visiting the region. Consequently, it allows the reader to check all the paths, streets, pedestrian walkways, metro lines, buses, etc., that the region owns. It also allows calculating the time taken from one point to another and identifying where the points of interest are located.

In addition, it will be essential to mention the efforts that are being made to improve accessibility for all those who suffer from the condition of colour blindness. The Coloradd proposal – “Colour Identification System, is based on the concept of “colour addition”, allowing the colour-blind person to relate the symbols and easily identify the entire palette”. This innovative tool is not only present, mostly, in the area of education, but also in other areas, for example: Hospital signage; Identification of hospital drugs; Flags on the beaches; Football stadiums (the dragon stadium being the first); Traffic lights (Lisbon as a pioneer city); Libraries to identify subject areas; Clothing; building paints; Ceramics; Parking lots; Didactic material (games, UNO type); among others. The metro in the city of Porto is the first in the world to be inclusive of colour-blind people. The lines are properly identified, so that there

are no constraints during the visit to the region. A practical example of the use of this tool will be the Parque Oriental of the city of Porto, whose official map has the indication of the possible routes, with the respective colours and, of course, with the symbols for the colour-blind.

In general, and when visiting the spaces, there was a need for care for them. Although requalification works in the green spaces are in progress, certain aspects that were observed along the route cannot fail to be mentioned.

After collecting all the information about the services and support infrastructures, the gardens and parks, the data were then organized in a more succinct way.

In addition to what was observed during visits to parks and gardens, it is essential to think further, that is, to provide practical and accessible solutions to the municipality so that the infrastructure of services and support to the populations are the target of improvements. Having said that, negative points were identified, in the sense of improving the areas and making the space more pleasant and attractive for those who visit it. Likewise, positive aspects were highlighted, as it is important to give emphasis and relevance to all the projects that have already been carried out in the municipality and that make these spaces tourist spots that are often popularized by the population, but which in fact are the key complement to urban life. Each garden/park has its particularities and this information is relevant and must be treated in a particular way.

4. Discussion of Results

Table 4 shows the amount of equipment in each zone and all of them (21 spaces). It is observed that only four indicators obtained 100% of the score: “Nearby parking”; “Undifferentiated garbage”; “Botanical Diversity” and “Shaded Places”. The fact that it is a city justifies why there is at least parking close to the gardens/parks.

Table 4: Inventory of Services and Support Infrastructures (global)

	Foz	Boavista & River	Historic Center	Eastern	Total		%
Library	0	0	2	0	2	9,52	
Phone booth	1	0	3	1	5	23,80	
WiFi	1	2	6	1	10	47,61	
Sanitary	3	2	9	0	13	61,90	
Coffee	3	1	3	0	7	33,33	
Restaurant	2	0	1	0	3	14,28	
Bar	2	1	2	0	5	23,80	
Kiosk	1	0	2	0	3	14,28	
Terrace	3	1	3	0	7	33,33	
Picnic Area	1	1	7	0	9	42,85	
Parking lot	2	0	5	2	9	42,85	
Nearby parking	3	3	12	3	21	100	
Playground	1	2	5	1	9	42,85	
Dog park	0	0	1	0	1	4,76	
Sports field	2	1	0	1	4	19,04	
Shared bike lane	2	2	0	1	5	23,80	
Bicycle parking	3	0	4	0	7	33,33	
Scooter Parking	1	2	4	0	7	33,33	
Pedestrian path with signs	1	0	2	1	4	19,04	

Belvedere	2	0	4	0	6	28,57
Existence of fruit tree	1	0	0	1	2	9,52
Botanical diversity	3	3	12	3	21	100
Lake	1	1	7	0	9	42,85
River	1	1	0	1	3	14,28
Drinking fountain	2	2	6	1	11	52,38
Sculpture	2	3	10	1	16	76,19
Bandstand	1	0	4	0	5	23,80
Environmental Education Center	1	1	3	0	5	23,80
Games área	2	1	1	0	4	19,04
Minigolf	1	0	0	0	1	4,76
Skate Park	0	0	0	0	0	0,00
Birdwatching	2	2	2	1	7	33,33
Maintenance circuit	1	2	4	1	8	38,09
Bridge	0	2	2	1	5	23,80
Undifferentiated garbage	3	3	12	3	21	100
Ecopoints	2	0	5	1	8	38,09
Monument	1	2	4	1	8	38,09
Monument classified as Public Interest	1	1	3	1	6	28,57
Family friendly	3	3	11	3	20	95,23
Athletics friendly	2	2	2	1	7	33,33
Informational board	2	2	6	1	11	52,38
Communication/Subtitles in English Language	2	1	6	1	10	47,61
Benches	3	3	11	1	18	85,71
Tables with benches	0	0	4	0	4	19,04
Places with shade	3	3	12	3	21	100
Accessible to people with reduced mobility	3	3	10	3	19	90,47
Pets allowed	3	3	10	3	19	90,47
Box with bags to collect animal waste	2	2	3	2	9	42,85
Color identification system for color blind people (Coloradd)	0	0	0	1	1	4,76

Source: Ownn elaboration

There is not a total of 100% in terms of ecopoints, which could indicate a lack of care on the part of the city council. However, a study revealed that people from Porto are increasingly aware of this issue. As mentioned in the chapter on environmental strategy – the recycling rate increased by 1% last year compared to the previous year. The objective is to continue to improve this parameter, albeit gradually.

Then there are the following elements: “Suitable for families” (95.23%); “Accessible to people with reduced mobility” (90.47%); “Pets allowed” (90.47%) and “Benches” (85.71%). Only Virtudes park is not suitable for families since it does not meet safety conditions. The terraces present a high level of danger, especially for children, as already explained.

Virtually all gardens and parks are accessible to people with reduced mobility. The areas of Foz, Boavista and Riverside and Eastern are in accordance with the parameters. Only the Historic Center

area is missing with 2 gardens. The Cordoaria garden is a bit relative as it may be suitable in some areas. In general, the pavement is not the most regular and needs maintenance in that sense. Interestingly, the other place that is not suitable for people with limitations is Virtudes park, which does not have the necessary conditions for a pleasant visit by these people. It would be necessary to place ramps, in addition to the existing stairs, and arrange the floor in such a way as to facilitate movements in wheelchairs.

Still above 50%, it is possible to verify four more indicators with the following scores: "Sculpture" (76.19%); "Sanitary" (61.90%); "Drinking fountain" (52.38%) and "Informational boards" (52.38%). The sculptures are an integral part of the city of Porto and represent various elements, relevant figures, objects, etc. That said, there are a total of 16 gardens and parks with sculptures.

Despite the "Sanitary" indicator being slightly above average, there is an area that is particularly "forgotten", the Eastern Zone. Corujeira garden already has a plan in place. Soon, with all the works that will be carried out, in addition to the cafe and terrace that will become part of this place, there will also be a Sanitary for its users.

About the Oriental park, it is undoubtedly the one that deserves special attention and reinforcement in the sense of implementing sanitaries, among other basic services and complementary services.

As far as the drinking fountains and the Foz area are concerned, there is only one place missing and it won't be a problem, as the Passeio Alegre garden is very close to Foz do Douro, where there is no shortage of water fountains for people to refresh themselves easily. The Boavista and Riverside area, only Boavista Roundabout garden lacks drinking fountains, but people can easily find cafes around, which should help in this regard. Following the same line of thought and when approaching the Historic Center area, 6 of the gardens and parks do not have a drinking fountain, which proves to be a problem in more "closed" areas, such as Águas park or Virtudes park. – both are further away from cafes or other places where they can hydrate. In the Eastern area, Bonjónia Farm is the most "isolated" and, despite not receiving many visitors, birthday parties are held regularly there, so it would be interesting to have drinking fountains for the children who go there and even for the rest of the population. visitors to the farm.

The lack of informative signs reflects a bit of carelessness towards the population that intends to obtain the maximum knowledge whenever they visit a new place. During the visits, the interest on the part of the tourists in understanding what each place represented/represents was noticeable, in the sense that many went to the signs placed there to obtain more information. The Passeio Alegre garden does not have information signs, however it has some history that dates back to 1832, so it would be interesting to put a sign with that information.

In the Boavista and Riverside area, the Monument to the Heroes of the Peninsular War is very remarkable and relevant, so a simple information plaque in Portuguese and English, explaining its symbolism, would be essential. Furthermore, and in the month of June, this place is occupied by preparations for the most important party in the region, which invites many visitors to the space. One more reason to invest in this element. This fact applies to the remaining gardens/parks in the various regions.

Accounting for values slightly below 50%, it is possible to mention "WI-FI" (47.61%); "Communication/Subtitles in English Language" (47.61%). About the value 42.85%, the following elements are listed: "Picnic area", "Parking lot", "Playground", "Lake" and "Box with bags to collect animal waste".

Nowadays the internet is part of our lives. It is a practically indispensable tool, especially when it comes to travel. Out of a total of 21 gardens/parks, only 10 have a WI-FI network. In a scenario where the tourist does not have a physical map and is in a place where there are no people to guide him in terms of directions, the use of the internet could be the key to solving the problem. There is an application called Explore Porto. that allows its user to check the real-time schedules of public transport and how to move from one tourist point to another. This requires the use of the internet, which is an adversity to be resolved as soon as possible.

Many of the gardens and parks already have subtitles in English, both for knowledge purposes and rules for using the spaces. The truth is, less than half hold this information. Improvements in this sense would be useful for tourists and even for Porto residents. Communicating different topics in other languages makes the tourist feel integrated in the city and that he is making the most of his trip.

Given that all analysed sites have many shady places, it would be very nice to have more picnic areas, as all sites have conditions for this. With regard to Foz area, it appears that only the City park has conditions for picnics. The installation of tables with benches from Passeio Alegre Garden to Castelo do Queijo would provide more pleasant moments, both with family and friends, as this is an area with a lot of tourists and even residents.

The Eastern area is the one that is most affected by the lack of tables with benches. The Oriental park has immense potential to provide other types of conditions to the people who visit it. This would imply a greater flow of people in this park with so much potential, but at the same time very forgotten. Bonjóia farm is another example of the lack of use: own equipment, intended for picnics in a green area like this, would be quite pleasant.

About parking it shouldn't be a problem as there is always parking nearby. Regarding the playgrounds and, like the maintenance circuits, they play a key role in influencing the practice of physical exercise, not to mention the usefulness they also play in the aesthetics of these green areas. The Eastern area has gained strength in terms of improving some equipment for children.

Aesthetically the lakes, like the flowers, etc. they create a harmonious environment and are an excellent addition to gardens. The presence of a water point in the garden changes the way wildlife interacts with the space, contributing significantly to increasing biodiversity. The pond brings new sounds, smells, and movement to the garden. Many forms of life depend on water for one of their stages of development, such as amphibians and some insects (Revista Jardins, 2022). That said, the installation of lakes could benefit the entire surroundings of the sites. The boxes for collecting animal waste should not be a major problem since most of their owners carry bags and respect the stipulated rules.

Maintenance circuits are installed in 8 spaces (38.09%) of the analysed locations. Despite being a number below the average, the city council is currently betting on this parameter. With the same value, the issue of ecopoints – they only exist in 8 out of 21 gardens/parks. The area with the most ecopoints is Foz, compared to the other areas. The Historic Center only has 5 recycling containers, which is not even half of its totality (5 out of 12).

The existence of monuments has the same value as the two indicators mentioned above (38.09%). With values around 33.33%, a total of 6 indicators are accounted for, namely: "Coffee"; "Terrace"; "Bicycle Parking"; "Scooter Parking"; "Birdwatching" and "Athletics Friendly". Among the 6 indicators mentioned above, the one that requires the most care is undoubtedly bicycle parking. The Foz area in this parameter is complete, so it does not need improvements in this regard. About Boavista and Riverside area and Oriental area, they do not have parking for bicycles. Calém garden is a little compromised in this regard. When visiting the garden, it was observed that there are many visitors who chain their bicycles to the lampposts, due to the lack of supports to park them, in an area that is frequented by many tourists who opt for more sustainable transport.

The "Belvedere" and "Monuments classified as Public Interest" are around 28.57%, which is equivalent to 6 for each indicator. Due to the geographic positioning of some places, they are not conducive to the existence of belvederes, however, for those looking for viewpoints, you can always use the brochure that has already been referenced.

It is possible to measure the value of 23.80% for each of the following indicators: "Phone Booth"; "Bar"; "Shared bike lane"; "Bandstand"; "Environmental Education Center" and "Bridge". Since virtually everyone has a cell phone, the lack of phone booths won't be a problem. The lack of bars in some places will also not prove to be an adversity, given that, nearby, there is plenty of food on offer. About shared bike lanes, the fact that they do not exist in some areas is justifiable, since they do not meet the conditions for this (because they are not wide and they endanger the individuals who use them). However, it is necessary to implement and improve the conditions of this indicator. Many areas of the municipality have the ideal conditions to provide moments of leisure and safety in this sense.

Regarding the Environmental Education Centres, these prove to be fundamental in terms of visits by local people, for the purpose of study visits, etc. In terms of tourism, it may not be so interesting. As far as the bridges are concerned, most can be seen as ornamental elements, however, there are others that serve as a connection from one area of the garden to another, such as, for example, in the Pasteleira urban park: two of the existing bridges facilitate the pass over the road.

Around 19.04%, the following elements are mentioned: "Sports field"; "Pedestrian path with signs"; "Games area" and "Tables with benches". With regard to sports fields, there are quite large areas that deserve to be used, as is the case of Oriental park. It is the only place that would justify the existence of sports fields/games area, among other attractions, given its size and surrounding area. Once again, this park has enough resources to become an attractive tourist destination. The indicator "Tables with benches" is related to picnic areas. Although there are benches in practically all places, it is essential to add tables. It makes all the difference when people come to an area to have a picnic, play board games for an afternoon or just hang out. It is an element that stands out positively. Pedestrian routes with signs in the public gardens/parks of the Municipality of Porto exist in a few places, since most gardens

are inserted in the urban environment. Geographically, it doesn't. The only locations they have are Western and Eastern.

Both indicators "Restaurant" and "Kiosk" account for 14.28% each. Practically the entire area surrounding most of the selected locations has restaurants and kiosks around them, so the lack of restaurants and kiosks in the locations does not need to be treated as a priority. Below 10%, two components are listed: "Library" and "Existence of fruit tree".

Last but not least: "Dog park"; "Minigolf" and "Color Identification System for colour-blind people (coloradd)" which accounts for a total of 4.76% each. The only place with a dog park is Covelo park. It is an extensive and well-organized space in terms of security – as it does not allow the animal to escape. In addition, it has a drinking fountain for them. All these features stand out positively.

Comparing these data to what was verified during visits to gardens and parks, it is possible to see that other indicators that were collected are not in line with user preferences. For example, in the case of the Oriental park, there is no night lighting at the main entrance. It could be extremely dangerous as it is a bit bumpy and could bring negative experiences like someone getting hurt or worse. It is an area where there is no type of surveillance and, although it is not frequently visited, as is the case with the city park, it deserves special attention in this regard. The indicator "existence of shady places", which has 92.4% of preference from users of green spaces, is in line with what was analysed. All locations have places with plenty of shadows. The "absence of offensive odours and disturbing noises (90.9%)" proved to be a concern on the part of these users. Naturally, when it comes to a city, it is inevitable to eliminate these two factors. However, what is intended with the requalification of gardens and parks is to change this reality. For example, an existing case, the City park, with its 83ha, makes people feel in another place, completely distant from everything that surrounds them. That's what we want – to make people disconnect a little from the daily pollution and make the most of the time they spend in these green areas.

5. Conclusions

The primary aim of this work proved to be fulfilled, since it was possible to present the main green areas in Porto, accessible to all and to realize that some aspects need to be studied and, consequently, worked on. The places that were analysed are often trivialized but the truth is that they have a strong potential that deserves a lot of attention. It was verified that this problem could pass through the project of creating scripts. The main objective with all these investments is the decentralization of visitors from the most frequently visited areas and, consequently, the creation of jobs and the promotion of local commerce. This could be a starting point for an improvement in the structure of green areas, as well as the conditions they offer to residents and, of course, to tourists. The more complete, attractive and varied the place is, the more people will visit it and the more tourism will grow in that area.

The emergence of the pandemic came to alert populations to the fact that we cannot take everything around us for granted and that we must preserve the best of what we have, the green lungs of cities, such a precious asset, but currently so underappreciated.

In terms of limitations of the study, the requalification of the parks is ongoing, so the analysis of some points in different locations may have been compromised.

With regard to suggestions for future investigations, it is suggested to deepen the gardens/parks presented here, that is, to make a more comprehensive assessment, with regard to other parameters. With the emergence of new and innovative elements at the sites, it would be interesting to carry out a new (more complete) analysis, using the same indicators, but only when the works were completed.

It is recommended that a survey be carried out among residents of the city of Porto and domestic and non-domestic tourists who visit the region, in order to understand their relationship with the parks and public gardens of the city. Conducting a questionnaire, following the idea of the study mentioned here, but this time with tourists, to compare the preferences and priorities of each group and, in this sense, find a balance, so that visiting the gardens becomes pleasant for everyone. Exploring and investigating the remaining gardens and public parks that are not part of the present city council route would be interesting, in order to understand whether it differs much from the areas analysed here or whether it is based on the same support infrastructures.

The idea with this work was to promote spaces that are available to everyone, that is, free of charge, as they are public, but in the future and following this theme, invest in a broader and more extensive analysis of a comparison between public gardens/parks and private could be an added value, in order to

point out the main problems that are felt. Porto's green spaces can be enhanced and promoted to draw more tourists, improve the urban environment, and benefit locals in many ways. The results emphasize how important it is to keep funding upkeep, accessibility, and strategic development of these regions in order to promote sustainable urban living and tourism.

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