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# Urban Regeneration Challenge: The Case of Avenidas Novas District in Lisbon

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**Abstract:** This paper aims at presenting the guidelines for an urban regeneration strategy in Lisbon, having in account the principles of urbanity, density, livability and social and territorial cohesion. The case study will be Avenidas Novas district, in Lisbon, Portugal, as it is a paradigmatic example of a central area which coexists with dynamism and decadence. The development model for Avenidas Novas was inspired on French boulevards and was planned to be the modern face of a medium to high social class population, as it was until 1940s. Today, as a consequence of further developments which corrupted the first principles and concept, its urban fabric is becoming less coherent and adequate to the needs of the population who works and lives there. From an analysis to the various components of the urban fabric, the paper will identify the major problems that are happening on the site, related to accessibility, mobility and functional diversity. Once understanding the impacts of an unsustainable territory management and urban design, the goal is to develop the principles for a creative urban regeneration strategy for Avenidas Novas district. The study will be based on the theoretical issues of the compact city and walkable distances in order to develop quantifying parameters of urban quality and to promote human scale public spaces and territorial cohesion on an urban environment.

**Key words:** Urban regeneration, compact city, spatial analysis.

## 1. Introduction

We are living an uncertainty era about the sustainability of our way of life. Its physical support is the urban network, which concentrates a major part of human-hand adaptations of natural environment. These artificial adaptations grew and became dangerous for the natural environment balance.

During centuries, cities testified human presence and its ingenious skills, as they were the remaining evidence of the human adaptation of nature to its needs without compromising the ability of future generations to meet their own needs. However, during almost the entire 20th century, there was an excessive urban growing on developed countries, along with a revolution on transportation and in health, which originated a demographic explosion.

Today, half of humanity lives in cities and it is expected to reach 60 percent in two decades [1]. Nevertheless, most cities have not changed yet their paradigm of urban development. However, with the acceleration of climatic changes and with the uncertainty about the global financial sector, the need to set an agenda for sustainable development has been reinforced. Since 1996, with the call for investigation that was promoted by the book editors of "The Compact City/A sustainable Urban Form", this discussion has been developed around the Compact City Model [2]. The theoretical basis for the principle of the Compact City defends the need of scaling urban environment to the needs of the population, focusing on a mixed-use development, mobility, "Accessibility for All" and environmental quality [3], for a more livable, productive and inclusive urbanity [4].

The revival of this historical development model had a multitude of reasons to be born and get stronger during the late 1970s and early 1980s, turning into a planning paradigm. The origin of this discussion can be traced back to Jane Jacobs (1961) and Alexander Mitscherlich (1965) [5], who first criticized

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functionalist urban development. However, the future reinforced functional development arguments and urban districts became mono-functional and based on private transport and motor vehicles. Today, the compact city model appears as an improver of inner-cities re-development and revitalization in opposition to urban sprawl and degraded urban centres. Moreover, this model has been proven to be an alternative to urban expansion in accordance to the emergent parameters for accessibility, mobility, energy resources, life quality and, in general, sustainability [6], as there has been a change on the interest for inner urban, rather than suburban, amenities, resulting from the transition to a post-industrial economy [5].

Nowadays, people relate urban environments to places for interaction, where innovation, knowledge and creativity are their main drivers [7]. This understanding of urban reality also needs a new approach to the existent urban fabrics, in order to prepare them for a low-carbon, dynamic and sustainable development.

This paper aims at diagnosing the problems of one of the main areas of Lisbon's integrated centre, in order to contribute to its regeneration, and revitalization. The main goal is to promote urban sustainability in a pre-existent urban fabric and optimizing its centrality qualities. The current study focused on the principles of density, livability and social and territorial cohesion. It intends to contribute to develop a strategic basis for the increase of density in cities, thus reducing urban sprawl. The methodology will proceed with an analysis of land uses, as well as environmental, urban design, space and human issues, which will contribute to the description of the urban space elements and allow the characterization of its network.

The research will use the syntactic analysis methodology, and techniques of observation, interpretation and evaluation, in order to gather the necessary data about the case study and thus contribute to the development of a sustainable and integrated strategy for urban regeneration.

## 2. Urban Dynamics in Avenidas Novas District, Lisbon

The Avenidas Novas plan was developed and implemented in a changing time, with the liberal revolution, which led to a deep turning over the city perception and, consequently, its shape. In the mid-nineteenth century, Lisbon grew North, through two main axes: (a) The axis defined by Av. da Liberdade to Campo Grande; (b) The axis defined by the today's called Av. Almirante Reis. These projects would contribute to a change from the Romantic mentality period, which followed the pre-existent urban fabric from 18th century, to the Modern period which defended a renewal of urban patterns. During this period, there were developed several studies for the "city's improvement", until July 1879, when the project for the future Avenida da Liberdade was approved. The favourable political framework and the stability of Ressano Garcia leadership on the Public Works Department of the municipality allowed the development of new projects for the expansion of the city limits to North until their presentation at the Universal Exhibition in Paris, 1900, and its approval in 1904 [8]. These projects include the Parque da Liberdade area and the district of Picoas until Campo Grande, which form the present study area.

The project had as main goals: (a) Accessibility and space perception improvement–through the implementation of an orthogonal and strictly hierarchical public space network; (b) Infrastructures improvement, namely sanitation, water, gas, power supply, telephone, rails for animal traction and electric vehicles and sidewalks–through the articulation of several design standards for streets and blocks and the spatial distribution of public plots with non-specific land uses, which could be used for public gardens or buildings (to be designed for civic facilities, commercial, industrial or public housing); (c) Design and implementation of a "green network"–which would include urban parks, public and private gardens and trees alignments parallel or central to the road network [8].

This plan was the modern face of a medium to high social class population until 1940s, when deep economical and social changes begun to happen. Today, its urban fabric is gradually less coherent and adequate to the needs of the population who works and lives there. An inadequate urban fabric can lead to an unsustainable use of the public space, and increase Lisbon's centre problem.

To better understand the phenomenon, we will look up for each relevant urban issue and systematize the major reasons for the decline of this area, in order to promote its urban regeneration. For the analysis of the urban dynamics of the case study, we applied the techniques based on "Syntactic Analysis". This theory aims at capturing the physical and spatial characteristics of the urban structure, to a better understanding of its formal logic [9]. The theoretical basis implicit in this approach argues that, for a successful urban planning and public space design, it is important to take into account not only the local characteristics of the area, but also its relations with the whole urban system.

The "Syntactic Analysis" is developed at the global dimension (rn) and at the local dimension (r3). The study of the global, extended, area (global integration – r = n) allows the assessment of the performance of the whole urban system. With this analysis, it is possible to calculate total accessibility and centrality [10]. The local area study (local integration–r = 5) allows the assessment of the local accessibility from the inside in order to calculate the level of intelligibility of each sector area, which is crucial to improve mobility and public space safety.

*2.1 Accessibility*

For the accessibility assessment, we followed the syntactic analysis methodology, which recognized the area of Avenidas Novas as part of the "functional centre" of Lisbon, while being an urban structure formed by the axial lines which were represented in the three darkest grey colours in the used scale [11].

The analysis of centrality and accessibility levels is directly related to the attractiveness for the location of economic activities. The configuration of the centre is therefore the result of the competitiveness for land uses location in the urban grid. Hillier et al. [12] states that one of the primary properties of the urban grid is to be the main generator of movement patterns. Consequently, the sustainable use of an urban centre is strongly dependent on the balance between spatial configuration (accessibility and mobility) and land uses. We analyzed the resulting axial map for the case study, which allows to get the syntactic indicators (Global Integration, Local Integration, Connectivity and Control) and lead to the global accessibility assessment, by the Global Integration level (r = n) (see Fig. 1).

We can verify that all the case study area is inside the integrated centre of Lisbon (see Fig. 1), which means that it is extremely accessible from outside the urban network. This factor gives it a great visibility and importance in the whole urban system.

The local scale analysis represents the local importance of each axis viewed from those who are inside the urban grid. We can verify that the Avenidas Novas district is structured by some of the most integrated N-S oriented spaces (Avenida Fontes Pereira de Melo (1) and Avenida da Republica (2), which are the main distributor axes and also the privileged location for special uses and services, and Avenida 5 de Outubro (3)) and W-E oriented (Avenida dos Estados Unidos da America (6), Avenida Joao XXI (7), Avenida de Berna (8), Avenida Miguel Bombarda (9) and Avenida Praia da Vitoria (10)) (see Fig. 2).

An analysis of this axial map leads to the following conclusions: (a) Lisbon's urban structure still reflects its radiocentric logic, where the most accessible axes to the centre develops N-S oriented (because of the North orientation of the city's first expansion) and, secondarily, by the W-E oriented axis. So, as Avenidas Novas district was the first area of the city that reflected this radiocentric growing model for the

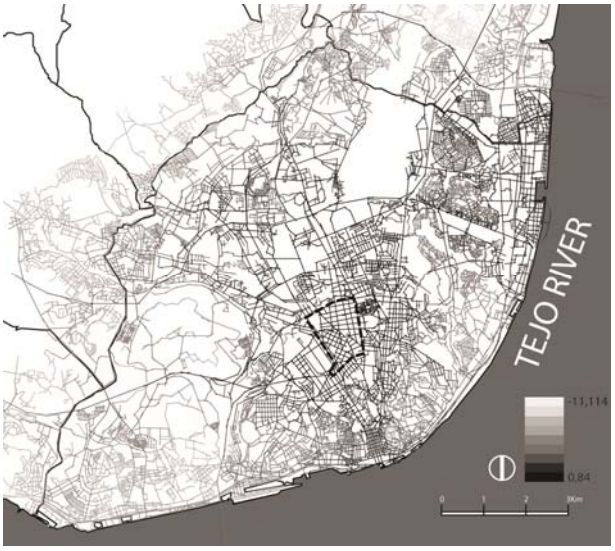


**Fig. 1 Lisbon global integration (r = n) axial map [9].**

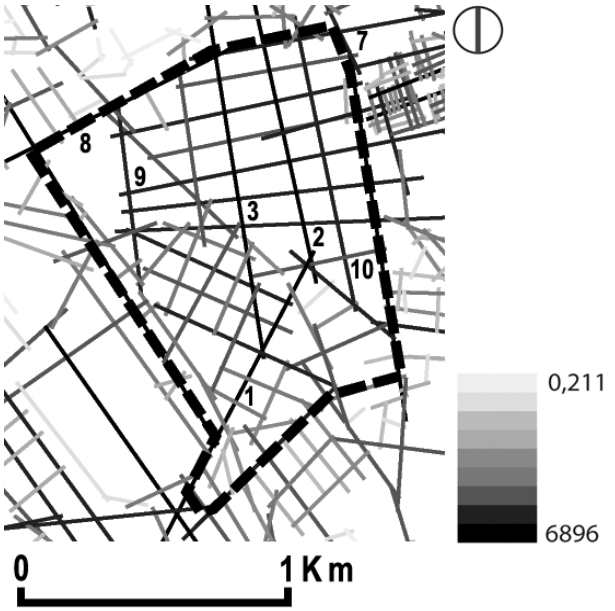


**Fig. 2 Avenidas Novas local integration (r = 5) axial map [14].**

contemporary urban grid, we can conclude that this area still plays its role of flows distributor in the city and centralizing of urban activities; (b) The relation between its orthogonal street pattern and its centrality level gives this area a great potential of important land uses location, like central administrative services or big companies headquarters. These land uses are, on the other hand, attractive for the location of sophisticated shops and other related to offices and services; (c) Today, the Avenidas Novas district still keeps its central character, along with the Avenida Almirante Reis district and the historic centre, which presents a denser and more irregular and fragmented urban grid. Originally, general housing, shops, services and Public Administration uses were mostly located in the historic centre, while higher social classes housing was mostly located in Avenidas Novas district [9]. However, during the 20th century, the gravity centre of the city went from the 18th century plan to North, in part due to the better accessibility level of Avenidas Novas, comparing to the traditional urban fabric. Consequently, Lisbon's downtown gradually lost its importance for shops and services and Avenida da Liberdade, which played the role of articulating the traditional and the modern city, also lost its high global integration level.

However, as Avenidas Novas district was to be a mainly residential area, its land uses transformation led to a gradual decrease in buildings and public space quality, due to its continuously inadequate use. Nowadays, the evolution of the urban centre recently turned the attentions to the eastern area of the city, where a major urban regeneration took place – Parque das Nacoes.

*2.2 Mobility*

For the evaluation of mobility in the studied area, we approached the following isssues: (a) Spatial intelligibility; (b) Conectivity; (c) Transport system; (d) Walkability. Mobility is directly related to the capacity of an area of being easily perceived (intelligibility). The consciousness of space, or orientation, is one of the major factors to facilitate dislocation. However, spatial intelligibility is also important to promote public spaces safety because it improves the perception of the alternative pathways in a limited area.

On the other side, the connectivity level can also be a considerable factor on mobility assessment because the more links to the urban network at a smaller distance, the more alternative pathways, which allow a

greater variety of public spaces and activities. For the improvement of connections, it is required an increase on the variety of nodes in close mixing, at different scales [13]. These two factors for mobility assessment can be analysed through the presented local integration axial map (see Fig. 2).

From the local integration (r3) assessment, the local importance of Avenidas Novas district in the whole city context is clear. The reason for the high local importance level for this area is strengthened by the elevated concentration of local and central importance axes, a high urban fabric consolidation level and by the previously planned hierarchical public spaces network [9].

The local effect, calculated by the correlation of local integration (r3) and total integration (rn), is excellent. However, the intelligibility of the studied area, which is given by the correlation between the connectivity values and the total integration (rn) values, is meaningful, but not so positive [14]. The major reason for this happening is that there are several changes on the orientation of the urban grid in the case study area, which decreased its intelligibility values [14]. The spatial analysis to each sub-area shows that the urban grid is more intelligible if more regular.

To the evaluation of the transport system and times of dislocation, it is important to consider that 85.80% of the residents spend less than 30 minutes on house to work/school dislocations [15], which strengthens the accessibility and centrality level of the area. From the global number of residents, 40.10% use private transport on their house to work/school dislocations, while 30.50% go walking and 28.40% use collective transport [15]. This number is a relatively positive factor, having in account that the majority of the other districts of Lisbon have lower walking and collective transport percentages. Still, almost half of the working/studying population chooses private transport for their daily dislocations, which is an evidence of unsustainable planning and design of the public space.

In order to evaluate pedestrian environments and walkability level, we used the following headings: (a) Connectivity–variety of links in a route; (b) Convenience–pathways that facilitate the desired journey, avoiding deviation or other difficulties; (c) Coherence–continuity of routes or main pathways; (d) Conviviality–public spaces comfort; (e) Conspicuity–transparency of building facades and public space ability to promote personal security and road safety.

2.2.1 Connectivity

Comparing the local integration (r = 5) and the day average pedestrian movement rates axial maps, it is immediately visible that, in spite the strong correlation between spaces connectivity and pedestrian flows, there are some differences, due to the other analyzed (see Fig. 3).

The spaces with a better local integration which reinforce their centrality with pedestrian flows rates are: (a) Av. da Republica (1); (b) Av. Joao XXI (2); (c) Av. Duque de Avila (3). The major loss of centrality was noted in what concerns Av. Fontes Pereira de Melo flows, but the majority of the differences were to reinforce centrality in secondary axis, as: (a) Av. Duque de Loule (4); (b) R. Camilo Castelo Branco (5); (c) R. Andrade Corvo (6); (d) R. Tomas Ribeiro (7) (see Fig. 3).

These differences appear to be related to qualitative factors as the public space comfort, personal security or to road safety.

2.2.2 Convenience

The convenience is the ability of an axis to facilitate the desired journey of a pedestrian, avoiding deviation or other mobility difficulties. It is related to the most demanded destinations, as civic and cultural facilities or shopping centres, which have a high density of jobs location and are demanded places to daily journeys. To assess this ability, we analyzed the day average movement rates and its relation to shopping centres.

From the pedestrian flows, it is visible a strong relationship between them and the importance of some private developments (see Fig. 3) to urban dynamism.

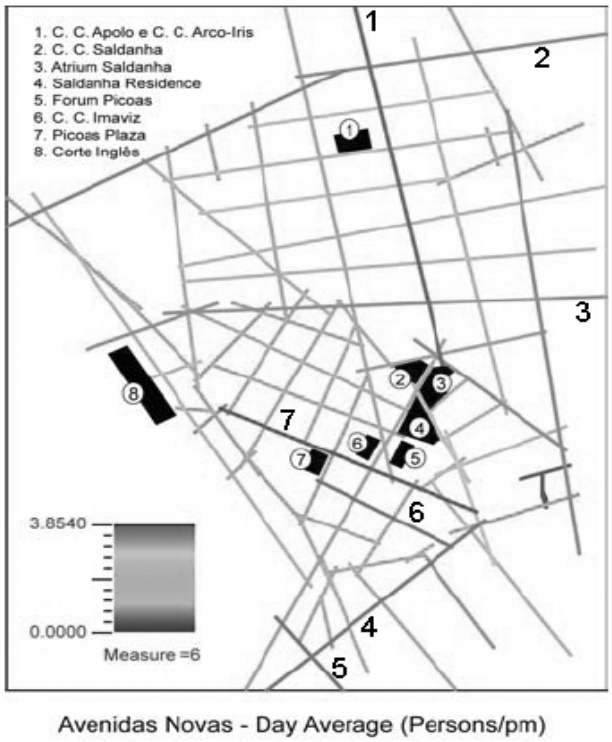


**Fig. 3 Day average movement rates with shopping and axis references [14].**

2.2.3 Coherence

Coherence is the ability of an axis to provide a coherent, linear and continuous journey to the demanded destinations. This happens mostly in central spaces, which have a high level of integration (rn) and, additionally, a high intelligibility and convenience level, which actually happens in the same public spaces of high pedestrian movement rates.

2.2.4 Conviviality and Conspicuity

Conviviality analysis of public spaces is related to the way people use them and how the existence of several urban elements stimulate urban life. However, public life study implicates a high variety of information. This paper will analyze only few of these variables, namely the elements that have a direct impact on public space flow, as: (a) Sidewalks wide; (b) Sidewalks markers; (c) Parking areas; (d) Benches; (e) Tree alignments or other shade structures; (f) Parks and water plans; (g) Other aesthetic elements [9].

The differences observed between local integration levels and pedestrian flows can be justified by conviviality and conspicuity levels. These two factors reflect qualitative elements which are going to be analyzed in further studies, as the public space comfort and safety. There is an evidence that pedestrians choose pathways that seem more clear (intelligibility), linear (convenience and coherence), but also safer (conspicuity) and better designed (conviviality) (see Fig. 4), even if they have to give up some convenience or coherence of the pathway.

*2.3 Land Use Diversity*

For the land uses diversity study in Avenidas Novas district, we analyzed the following issues: (a) Residential dynamics; (b) Jobs dynamics; (c) Urban uses distribution. The available data for this study refers to a larger area. However, this statistical unit is relatively homogeneous, so that the results are applicable to the current case study.

Avenidas Novas district was planned to be a medium to high social class residential area. It is a mainly high density area and is in 3rd place on the ranking of the districts with more dwellings (2001) [15]. However, during the last decades, it has been losing its residents to give place to offices and services. In fact, this is a mixed use area which presents a high proportion jobs/residents (351.50 for a Lisbon average level of 100) [16] and has been reinforcing this relation during the last decade (1991-2001), presenting a 0.20 growing index for jobs in the area [16]. The growing activities were mainly restaurants and services which required high qualification jobs.

However, it has been noticed a growing of vacant dwellings, which can be a sign for Avenidas Novas having loosen its attractiveness level. In fact, there are 11.40% of vacant dwellings in the area, which represent almost 30% of the total vacant dwellings in the city, and its number has been growing during the last decade (29.20%) [15].

Analysing its residential vitality in relation to all areas of Lisbon (see Fig. 5), it is clear that it is still an important residential area, and its relative vitality is due both to the building and human component. However, if we look closer to the case study area, the

**Fig. 4 Avenidas Novas public spaces.**

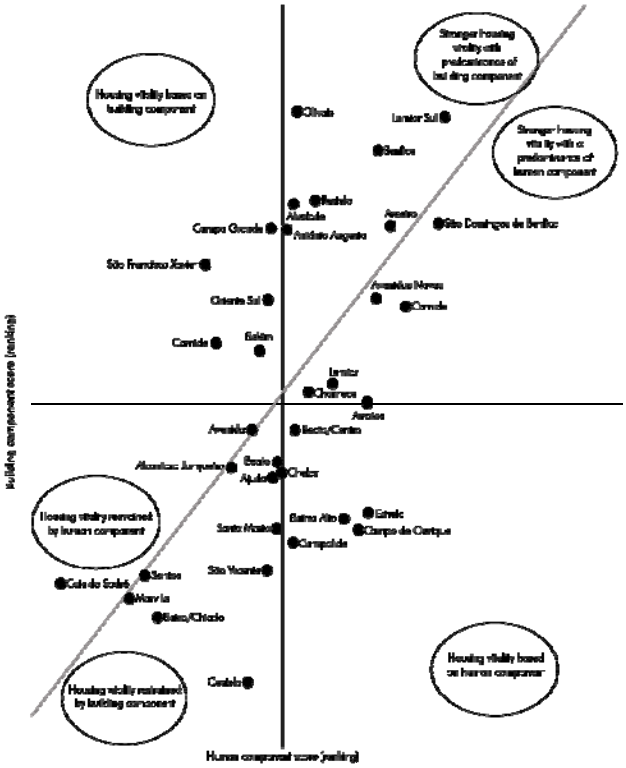


**Fig. 5 Residential vitality in all areas of Lisbon. [19]**

conclusion is that the main cause for the eminent degradation of this area is the human component, namely the density factor and the rejuvenation factor. However, in comparison to the other statistical units of Lisbon, the buildings factor is worse, mainly due to high rental prices and buildings conservation and infrastructuration (see Fig. 6) [15].

Nevertheless, this district is still on the 5th position of the residential vitality ranking (see Fig. 7) [17]. For the land uses distribution, Avenidas Novas district is characterized by the mixed use, in spite of an increasing concentration of services around the main axis (Avenida Fontes Pereira de Melo and Avenida da Republica), which has been led to a tendency for specialization around these areas.

The increasing demand for offices led to a replacement of housing for offices buildings, changing significantly the urban shape and image of the area [18], without adapting the public space to such transformation. On the other hand, housing buildings were used for offices, which led to an increasing inadequacy of the building stock and accelerated its degradation process.

However, this is one of the most dynamic districts, in terms of housing, jobs and shops. In fact, Avenidas Novas district is on 5th position in the ranking of Lisbon areas with more residential vitality [15] and in 1st place on the areas with more jobs [16].

The analysis of urban competitiveness [19] relates employment/income (X axis) with population/ consumption (Y axis) and reinforces the potential of Avenidas Novas to attract economic activities mainly related with the employment/income component, in spite of its positive overall position.

On the other hand, this is an area which, in spite its public space problems, presents a high level of pedestrian flow.

This can be explained by the increased number of jobs, associated to civic and cultural facilities, street shops and shopping centres network along some of the axis which present a larger pedestrian flow movement rate (see Fig. 8).

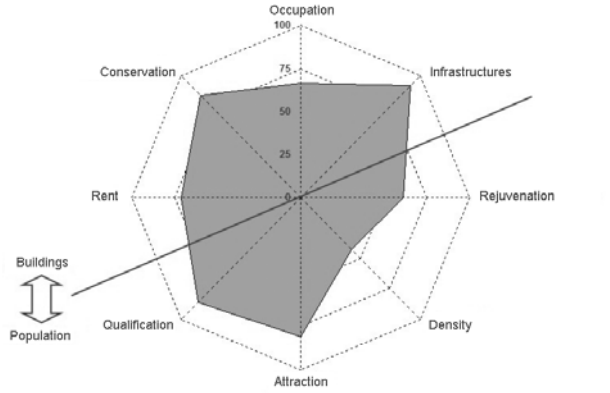


**Fig. 6 Residential vitality index–Avenidas Novas district [15].**

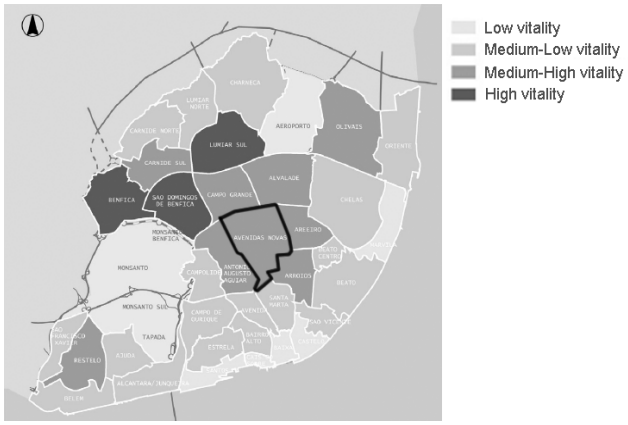


**Fig. 7 Lisbon's residential vitality index–Avenidas Novas district [17].**

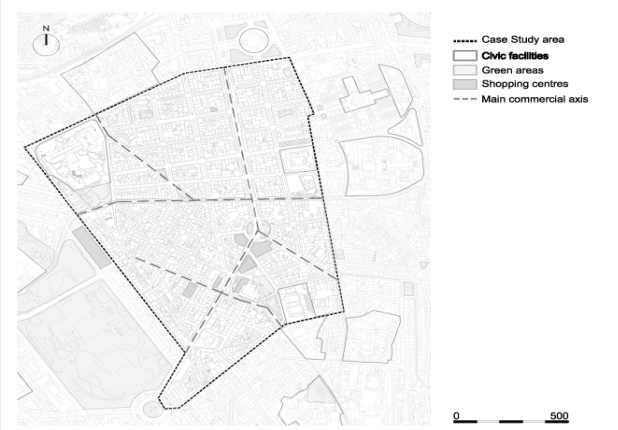


**Fig. 8 Avenidas Novas facilities, commercial and green areas.**

## 3. The Challenge–Principles for an Urban Regeneration

For the 21st century premises, urban planning must take place within a sustainability framework, which represents the new urban challenge. There are three strategic scales for the development of a sustainable urban regeneration of Avenidas Novas district case study: (a) Regional/municipal scale (strategic scale); (b) public space design; (c) architecture.

Several approaches to the strategic scale planning were identified in UN-HABITAT [4] Global Report on Human Settlements. The case study relevant ones are: (a) Strategic spatial planning–focusing on important aspects of an area; (b) Use of spatial planning to integrate public-sector functions–giving sector strategies a territorial dimension; (c) Participative processes and partnerships at the neighbourhood level; (d) New forms of master planning–focused on social justice and aiming to counter the effects of land speculation; (e) Planning aimed at producing new spatial forms – aiming at responding to urban sprawl and climate changes challenges.

Any successful spatial intervention strategy has to begin with an accurate and integrated diagnosis of the problem. The next steps are to combine it with the legal and political framework.

An approach on overcoming governance fragmentation in public policy formulation and decision-making is the next step for a sustainable urban regeneration plan. It works building horizontal and vertical relationships and combining regulatory power with investment and public sector decision-making. Political and legal measures are also needed, in order to ensure an effective participation, socially inclusive and contributing for a sustainable urban planning.

Developing an urban regeneration strategy should include a number of urban design policies and strategies, in order to improve urban and environmental performance, such as: (a) increase urban density within a mixed-use strategy development; (b) providing renewable energy and developing carbon-neutral strategies; (c) developing eco-efficiency and sustainable transport strategies. To successfully implement these policies, it is also needed monitoring and evaluation as permanent features.

Finally, developing control systems with sustainable planning standards and building regulations will help on the implementation of urban regeneration strategies. For the public space scale, it is necessary to take into account the design principles for public life and urban uses revitalization, namely in what concerns street furniture, flooring, street design for collective transport, bike lanes and pedestrians (special concerns with disabled people), public lighting, green areas, public and commercial signs, etc. [20].

## 4. Conclusions

From the urban dynamics study of Avenidas Novas district, we can conclude that the causes for the recent loss of attractiveness are related to two components: (a) urban fabric component; (b) human component.

In what concerns the urban fabric component, it is clear that this area maintains its centrality, as well as local importance. However, when it concerns pedestrian mobility, it loses its overall importance, due to some lacks on urban design, mainly in Av. Fontes Pereira de Melo.

On the other hand, the building stock has proven to be inadequate to the current urban uses and to the growing demand of offices and smaller family houses.

In spite of the importance of the presented urban fabric fragilities, the human component is also a crucial factor to take into account in Avenidas Novas, since it regulates the liveability of the streets at all hours of the day. If the human component is well balanced and the area presents a younger and dynamic residential population, it will positively influence the attractiveness of other related urban uses, increasing demand for dwellings in the area and general urban dynamism.

In order to replace urban dynamism in Avenidas Novas, it is important to develop first a complete and rigorous study of the problems and potentials of the intervention area. The strategic decisions at all scales must be related to an integrated study that focuses on all urban components, namely physical, social and economic ones.

At the regional/municipal scale: (a) it should be built horizontal and vertical relationships and combining regulatory power with investment and public sector decision-making; (b) relevant studies should be developed for the construction of the urban regeneration strategy, giving sector strategies a territorial dimension, focusing on increasing social justice and aiming at responding to the new urban challenges. For this scale, the case study analysis revealed that the area needs improvements on sustainable transport and housing strategies.

For the public space scale, this study revealed that the area needs improvements on its design, namely increasing conspicuity and conviviality. The main principles for public space safety and comfort are about pedestrian areas inclusive design (sidewalks dimensions, street furniture, flooring, trees and shading structures, public lighting and signs), parking areas and street design for collective transport, bike lanes and pedestrians.

Finally, for the architecture issues, the study revealed that it is needed a housing strategy development, through buildings adaptation to the demanded uses, having in account their conservation, infrastructures level, and dwelling typologies, as well as a review of rental policies. These changes can increase density in housing and jobs, which, in accordance to the compact city principles, leads to an increase on livability and social and territorial cohesion.

For the further implementation of the urban regeneration strategy, it is needed an increase of the participation and an effective monitoring and planning evaluation.

Avenidas Novas district is one of the main areas of Lisbon’s integrated centre, which means that its regeneration will have a multiplier effect for the urban dynamics of the whole city. A sustainable intervention in the core of Lisbon can help on giving back the city to the people, recovering some of the dynamism that development policies were decreasing during the second half of the twentieth century.

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