

# Exploring Urban Heritage: Leveraging Space Syntax for the Digitization and Preservation of Climat de France in Algiers

\* <sup>1</sup> Ph.D. Candidate. **Khadidja Khelil Cherfi**, <sup>2</sup> Dr. **Rym Merzelkad**, <sup>3</sup> Dr. **Hamza Benacer**.

<sup>1 & 2</sup> *institute of Architecture and urban planing, Faculty Of architecture, Blida 1 University, Algeria.*

<sup>3</sup> *Institute of Urban Technique management, University of Larbi Ben M'hidi Oum El Bouaghi, Algeria*

E-mail <sup>1</sup>: [Khelilkhadidja97@gmail.com](mailto:Khelilkhadidja97@gmail.com), E-mail <sup>2</sup>: [merzelkadrym@gmail.com](mailto:merzelkadrym@gmail.com), E-mail <sup>3</sup>: [benacer.hamza@univ-oeb.dz](mailto:benacer.hamza@univ-oeb.dz)

## Abstract

Research on modern heritage is attracting interest nowadays. For this research, we focused on the large housing estate of Climat de France, designed by Fernand Pouillon. We aim with this participation to provide alternatives like digital instruments to enhance these dwellings, articulating our research on the following problematic: How can the contribution of space syntax be useful for carrying out a diagnosis and digitization of the Climat de France? The research will be based on an integrated urban approach that combines spatial and geographical analysis. We will focus on understanding the different elements of space (roads, public spaces, the built environment, and physical attitudes) and describing the relationships between them in terms of connectivity, accessibility, nodality, and density, these parameters will therefore require the use of software such as depthmapx. In conclusion, the study of the Climat de France using syntaxe could be an effective lever for safeguarding and valorization of this modern heritage.

**Keywords:** moderne heritage, digitization, safeguarding, valorization, space syntaxe, diagnosis.

## 1. Introduction

Climat de France is one of the most emblematic housing estates of modern architecture in Algeria and in the world, a testament to the ideas of Fernand Pouillon, Algeria's modern architectural genius, who at the time was able to transform an unbuildable site into an architectural masterpiece. (In the midst of all that was being done in the field, Pouillon's three housing estates were exceptional successes, and they were able to have an influence given Pouillon's provocative personality and complacent ideology that characterize him) (Deluz, 1979).

Like his first two estates, Climat de France in Algiers represented a unique creation with the same principles based on historical and geographical contextualization, with a focus on urban ambience and monumentality.

Despite its importance, this large complex is currently facing a number of challenges in terms of conservation and promotion, not to mention its urban, architectural, and, above all, social degradation (Aziz Amen, 2017; Aziz Amen & Nia, 2018). It has become isolated from the rest of the city, harboring various forms of social ills, such as drugs, violence, etc.

Thus, in the current context of the preservation of 20th-century heritage, which has become a necessity, especially with the advent of the theoretical framework by GETTY and ICOMOS (ISC20C), current research wants to explore a new holistic approach that integrates spatial syntax as a diagnostic and digitization tool.

In 1970, the British architect and researcher succeeded in revolutionizing the world with a new theory and method of analysis that studied the interaction between physical and spatial configuration and human behavior. Together with Julienne Hanson, they succeeded in bringing out a new axis that combines architecture and urban planning and later other sciences such as sociology and geography.

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These parameters are essential for understanding how the physical form of the city influences human behavior and social dynamics (Hillier & Hanson., 1984). By integrating these measures into a systematic analysis,

researchers can better understand the processes of urban planning, land use, and community development. Space syntax opens up a new dimension that adds value to the enhancement of urban heritage.

It offers a critique of built environment typologies defined in terms of stylistic periodization by advancing an understanding of the role of spatial configuration in the production and reproduction of space-time events. In the context of urban heritage studies, this means looking beyond the value of buildings as individual objects to buildings as elements in emergent arrangements of social space. (Palaiologou & al., 2019)

At present, researchers are increasingly turning to this innovative approach to urban heritage enhancement, as it offers the possibility of analyzing the spatial configuration of historic quarters, thereby providing support for informed decision-making on the conservation and management of historic sites. (Conzen., 2001)

This research is built around the following question: how can the contribution of space syntax be an effective lever for diagnosing, digitizing, and revitalizing the climate of France?

The aims of this essay are: to examine the contribution of syntax to the enhancement of the city on a municipal scale; to diagnose and understand the physical form of the urban environment and social behavior through syntactic and socio-cultural analysis; and to think about sustainable actions that will enhance the city.

We have focused on the description through a mixed method, which will allow us to, in the end, make a correlation between the syntax of the urban environment and social well-being to understand the contribution of the syntactic characteristics to social behavior.

This research is structured around four chapters. The first takes charge of understanding the foundations of the syntax in the revitalisation of the urban heritage of the 20th century; the second explains the methodological path, which is based on the application of the syntax in the Depthmapx and the relation of this reading with the social context; and the third and fourth present the results of this reading and their interpretation.

With this research, we want to complete the attempts at understanding and valorizing the quotations that were already made, but based on traditional bases of analysis, few syntactic studies have been made on this set to direct the decision-making.

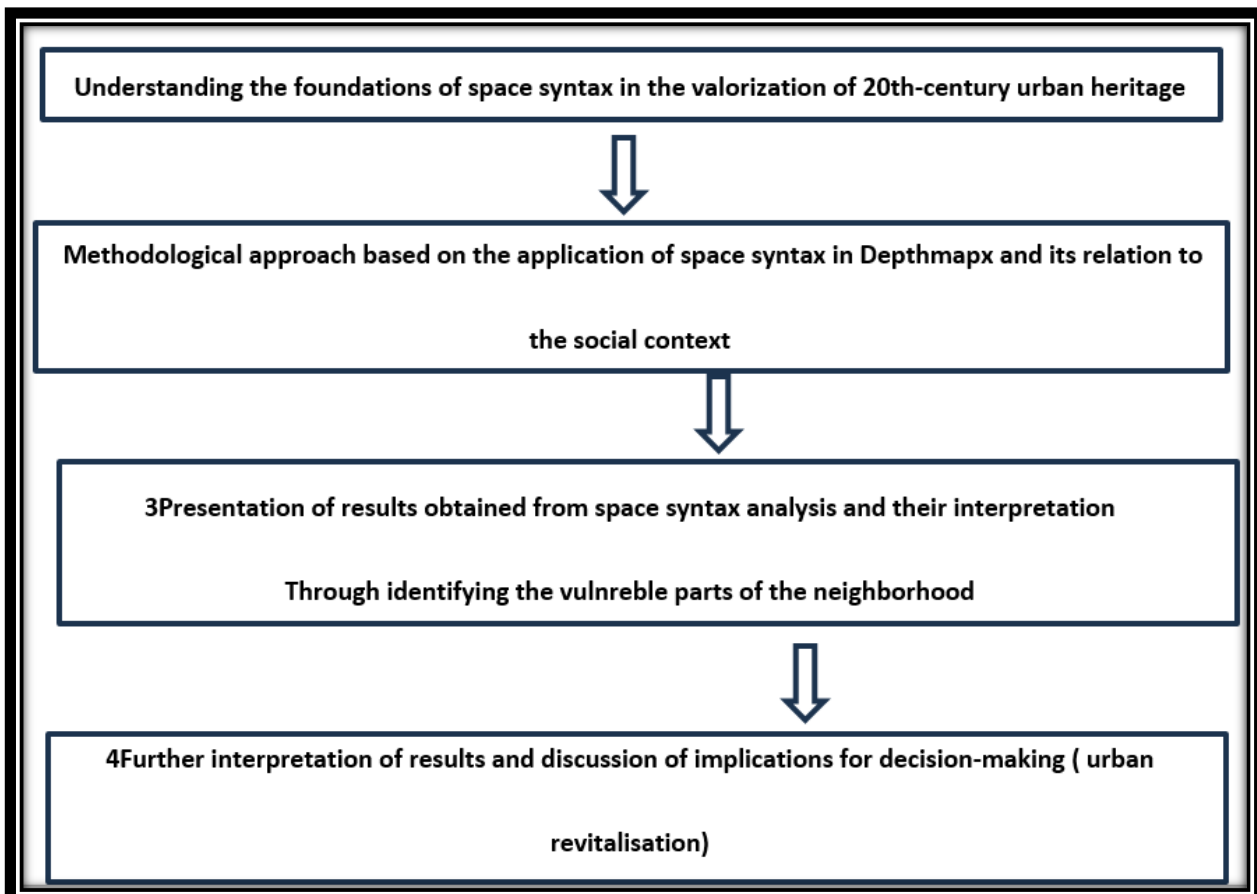


Figure 1. Structure of the Study (Developed by Author).

### 3. Material and Methods

The Material and Methods section of a scientific article is where the authors describe the experimental design, procedures, and methodology used in their research. This section should provide enough detail so that other researchers can replicate the study if they wish. Here are some key considerations for writing the Material and Methods section:

The research is descriptive, based on a mixed method (quantitative and qualitative), with deductive reasoning that began by questioning the contribution of syntax to the revitalization of modern estates, based on studying the relationship between spatial syntax and social behavior in three groups: the upper part of the estate (the small courtyard), the lower part of the estate (the large courtyard (the two hundred columns), and the intermediate part.

The research aims to explore the social behavior of residents or permanent visitors.

The relationship between indicators of spatial centrality (connectivity, accessibility, and nodality) and the nature of socio-cultural behavior based on correlation

Data Collection Methods

Literature Review and Archive Consultation:

It is by identifying the true essence of the spatial syntax and the large-scale housing of Climat de France that we will be able to better apprehend the act of enhancing the city. We are interested in a number of elements linked to the latter, divided into two parts:

The history of space syntax, its evolution through the different periods, and its key concepts.

At a second level, we need to understand the climate of France as well as the subject of the project, with a view to highlighting its history, its development, its urban and architectural description, as well as its neighborhood in relation to the commune.

Contextualization and syntactic study: using Depthmapx and ArcGIS of the town, starting with a DXF format support, will help us to make an initial contextualization and identification of the urban environment.

Semi-structured interviews:

Semi-structured interviews were carried out with residents and permanent visitors to the area to gather information on their social perception of the three parts of the estate and to collect quantitative data on the socio-demographic characteristics of the residents and their satisfaction with their social well-being.

Photographic reports:

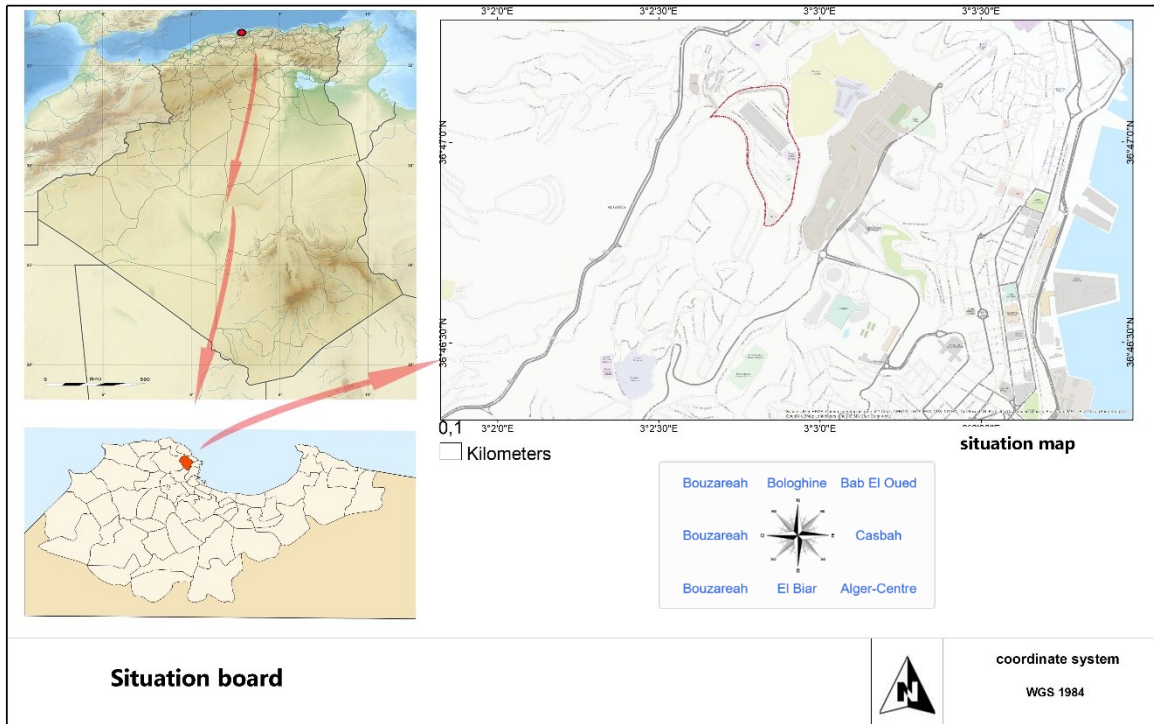
Photographic reports were produced to visually document the current state and the social behavior of the three parts of the housing estate.

Once the information has been systematically collected, a correlation will be made between the material configuration selected during the syntactic studies and the social behavior captured by the interviews and photographic reports.

#### **4. Results**

Location Construction context

The large complex of Climat de France is located in Bab el Oued, Algiers, in the pediment slope of Oued Koriche. In which the municipality holds the same name It was constructed between 1954 and 1957, where The public HLM office began the famous Agence du Plan project to rehouse the most deprived Muslim population of Oued Korich.



Architectural and urban generalities: The modernist style of Climat de France is characterised by clean lines, geometric forms that are distinguished by monumentality and the use of traditional materials such as stone and concrete.

The design principles are based primarily on two aspects, the search for inscription in a historical context, of which the majority of his works for Climat de France construction finds the backbone of the design of the two hundred columns in the fundamental principles of Maydan-i Shah and Masjid-i Shah of Isfahan, a Iran.



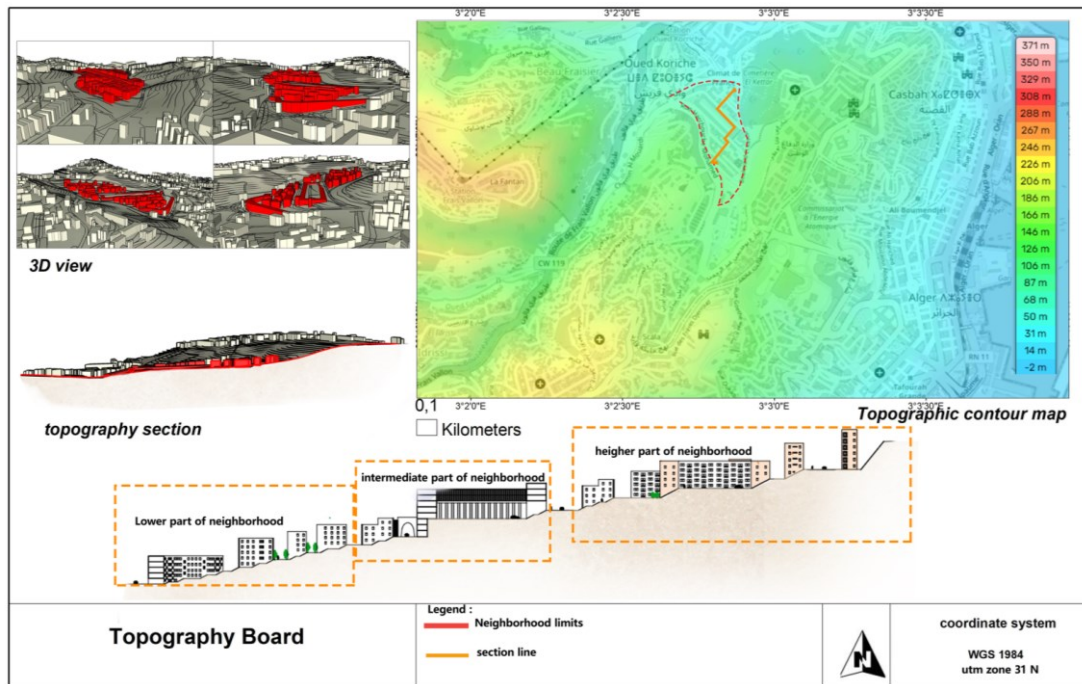
**Figure 1** : Maydan-i Shah and Masjid-i Shah in Isfahan,



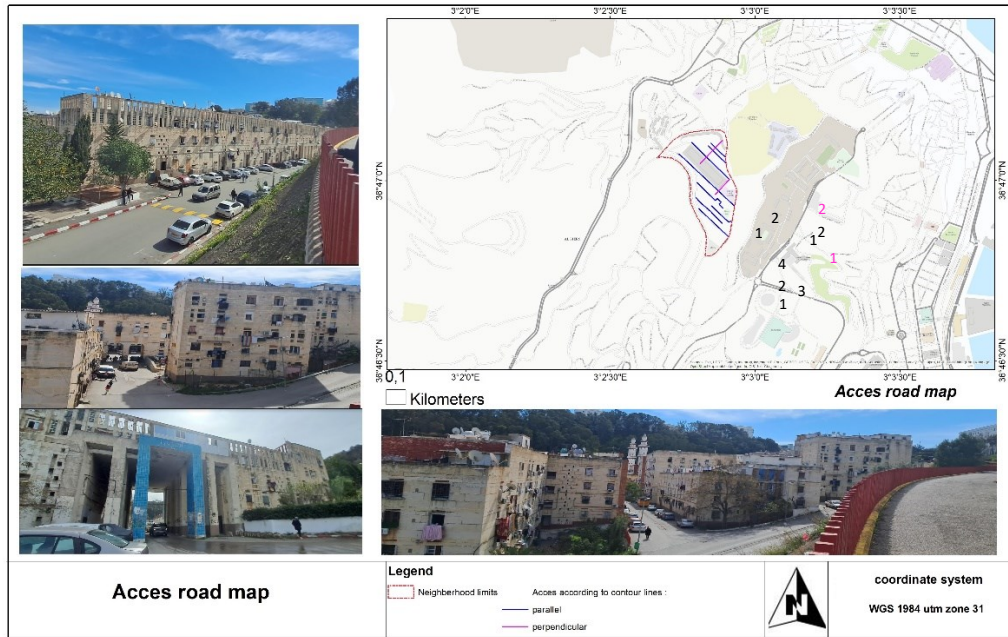
**Figure 2** Expo : Algier, Climat de France de Stéphane Couturier

To conduct the syntactic study, we focused on segment analysis as an effective tool. We classified the lanes into parallel and perpendicular lanes to the contour lines, then numbered them to make them easier to read.





The large complex in a pediment slope is composed of three parts  
 Lowest part  
 Intermediate part or the two hundred columns  
 Higher part



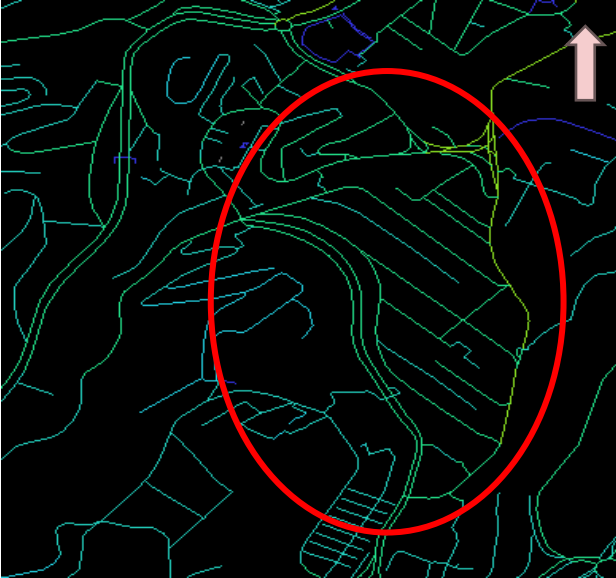
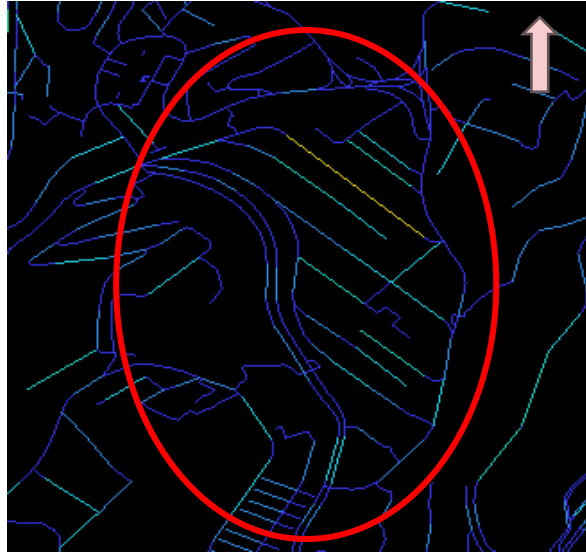
In the second phase, we decided to focus the syntax analysis on segment analysis because, unlike the axial study, segment analysis is the best approach for studying a specific part of a specific part of a network. Initially, we limited ourselves to a perimeter of 0.8 km<sup>2</sup>, and then we chose to focus the results on the parallel and perpendicular accesses classified in the 3 compartments of the district (lower part, upper part, intermediate part), mentioned above in terms of connectivity, total integrations, integration by segment length, and depths.

(Smith et al., 2018)

Each parameter is shown in the following table, along with an explanation and a reading of the color variation. Note that the warmest colors from dark red onwards represent the highest rates in the interface structure, and the coolest colors represent the least significant rates.

Reading the colors in space syntax can be compared to discovering an invisible urban landscape, revealing the dynamics and interactions between the different strata of the city. (Hillier., 1996)

Connectivity Rate:	Total Integration Rate:
<p>The level of connectivity in the estate is very low, especially in the highest part and at the end of the two hundred columns, while the best-connected lane and that of the perpendicular access have average connectivity with the parallel access, which intersects with it.</p>	<p>The total integration rate of the housing estate is moderately high, except for the main access to the two hundred columns and the second and last accesses to the upper part, while the least integrated part is the end of the first access to the upper part.</p>

Integration Rate per Segment Length:	Depth Rate per Segment Length:
<p>The rate of integration per length of segment of the estate is moderately low for all the entrances to the estate, even low for the main entrance to the two hundred columns and the second and last entrances to the upper part, while the least integrated part is the end of the first entrance to the upper part. On the other hand, the eastern ring road is the best connected road in the whole estate.</p>	<p>The rate of depth per length of segment of the estate is low for all the entrances to the estate and even moderately low for the main entrance to the two hundred columns and the entrances to the upper and lower parts, which vary between low and moderately low, while the first axis parallel to the two hundred columns has a moderately high depth.</p>
	

According to the interviews, the lower part of the 200 columns is socially hazardous as it harbors drug-selling activities and social dynamics that lead to social closure. This observation underscores the urgent need for targeted interventions to address these issues and improve the overall safety and well-being of the community. This perspective is also confirmed by the photographic documentation.

Initially, the neighborhoods had a very low connectivity rate, which differed from one compartment to another, indicating a problem of interconnection between the three parts.

Then the low connectivity rates indicate a problem of accessibility to the city area, especially in the lower part (the two hundred columns), which has less connectivity than the others. This makes it very difficult to access this part, which explains the social problems (social closure, drug dealing, and violence) and the difficulty of accessing the whole area.

This configuration makes it very difficult to get to the city on foot or by car, creating a problem of disruption to the urban fabric and making it difficult to access basic services and facilities.

On the other hand, the moderate connectivity of the perpendicular accesses offers the possibility of better accessibility and fluidity, which is probably the strongest point of the fabric and could be a support for future architectural and urban projects.

As far as total integration is concerned, moderately high with weak points at the level of accesses indicates a real problem of isolation and decentralisation of the estate to the city if the perimeter roads are centralised and the interior of the estate is of low connectivity, Certainly the external roads are more dynamic than the interior of the complex itself and therefore the solution could be the reconciliation of the articulation points between the perimeter road and the accesses to the district, by means of urban interventions at the level of the road system (mechanical and pedestrian), the improvement of public space etc...

The rate of integration by length of segment is low for the whole neighbourhood and even lower for the accesses parallel to the contour line, especially that of the two hundred column.

This confirms the decentralised nature of the city as a whole, with some of the most vulnerable points in terms of access. The whole area presents the case of an area with a high degree of urban closure, which is detrimental to the socio-cultural and economic dynamic, implying a mediocre quality of life.

The solution lies in intervening at the level of these accesses to revitalise the ensemble, especially at the level of the links between the parallel and perpendicular accesses, in accordance with the solutions proposed during the analysis of the rates of total integration.

The depth varies between low and very low for the whole district, except for the first access in the lower part. This configuration favours easy and direct circulation in the whole area, without navigation errors, which will facilitate the planning of public transport lines, but on the other hand this layout leads to a difference in the location of

services and equipment, resulting in increased monotony and a blockage of road activity because it directs traffic towards the deepest lanes.

Unlike the first access to the lower part, which will be busier, but this will make navigation more complex.

Result	Cause-and-Effect Relationship
<b>Initial low connectivity of neighborhoods</b>	Indicates an interconnection issue among the three parts of the city.
<b>Low connectivity rates of accesses</b>	Reflects accessibility problems to the urban area, especially in the lower part (two hundred columns), leading to social issues.
<b>Moderate connectivity of perpendicular accesses</b>	Offers increased accessibility and fluidity, a strong point for future urban projects.
<b>Moderately high total integration with weak points at accesses</b>	Indicates isolation and decentralization of the urban ensemble, necessitating reconciliation between perimeter roads and district accesses.
<b>Low integration rate per segment length</b>	Suggests a decentralized city with vulnerable access points, requiring interventions to revitalize the ensemble and improve connections between axes.
<b>Variable depth with higher depth in lower part accesses</b>	More complex circulation in areas with higher depth, but simpler navigation in areas with lower depth.

### 5. Conclusion:

In conclusion, our research highlights the importance of considering modern heritage in the context of urban planning and heritage preservation. Using a holistic approach based on spatial analysis, we have been able to identify challenges and opportunities for improving the quality of life in the city of Climat de France. It is essential to integrate these findings into urban planning and development processes, ensuring that interventions are sensitive to the needs and aspirations of residents, and guaranteeing the long-term sustainability of the estate and its heritage.

For the results of this study to have a significant impact, it is essential that they are integrated into a participatory and inclusive process involving residents, local decision-makers, urban planners and architects. By encouraging dialogue and collaboration between these stakeholders, it is possible to design urban interventions that truly meet the needs and aspirations of the residents of the Climat de France housing estate.

Furthermore, it is imperative to recognise that the preservation of modern heritage is not limited to the conservation of physical buildings, but also encompasses the preservation of the memories, cultural identities and social practices that are embedded in these places. In this respect, the revitalisation of the city of Climat de France must be seen as a holistic process that enhances its heritage while encouraging its adaptation to contemporary needs.

Finally, this study highlights the potential of spatial analysis tools such as Syntax to inform decision-making processes in urban planning and heritage preservation. By continuing to harness these tools in innovative and collaborative ways, we can help shape more inclusive, sustainable and resilient cities for future generations.

In short, the Climat de France housing estate is a precious testimony to the urban history of Algiers and the legacy of Fernand Pouillon. By investing in its revitalisation and preservation, we are investing in a future where modern heritage is fully integrated into the urban fabric, helping to build stronger, more prosperous communities.

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