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HOW EXCLUSIVE DO WE WANT TO BE?

Exploring the University Realm in the Contemporary Urban Territory

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ABSTRACT

Universities are currently experiencing a context of change and opportunity, resulting from several initiatives related to the ever greater interest in establishing knowledge economies. Fresh booms in the demand for higher education worldwide, associated with growing evidence of the potential benefits resulting from the economic appropriation by society of the results and methods of scientific investigation, have changed the perception of the “academic divide” and emphasised the benefits of investing in knowledge-based urban development.

This paper is based on the premise that universities play a critical role in urban dynamics because of their potential effect in enabling and promoting the development of synergies that strengthen urban vitality, as well as public and academic life. While they are integrated urban entities, they must also be able to foster interaction among (and outside) the academic community, without losing their specificity and individual character.

The ultimate goal of the paper is to allow for a description of the location properties that affect a university precinct’s ability to become fully integrated and embedded in its host city’s urban dynamics while, at the same time, preserving its uniqueness and spatial identity in such a way as to guarantee suitable places for learning and its related intellectual activities. The paper is based on a multiple case-study research, combining morphological descriptions with empirical *in-situ* observation. This spatial reasoning presupposes two main considerations: firstly the ability to identify invariants and relationships within the actual realisations and, secondly, to recognise and discover general types, i.e. The genotypes.

A 52-case sample, selected according to the urban situation and morphological features of each precinct, provided the information that was needed to identify the principles underlying the organisation of eight different university precinct genotypes. The relationships between the universities and their host cities were later clarified by means of axial and segment analysis, making it possible to emphasise configurational patterns within each type.

The paper consists of three parts: the first part presents the methodological procedures that were followed; the second part describes the eight types and their morphological features; and the third part explores the syntactic properties of each type. From the identification and

characterisation of the types, some patterns emerge, revealing common features in relation to the host city and affording a deeper understanding of the levels of morphological integration that university precincts can achieve.

KEYWORDS

University precinct, morphology, permeability, boundary, spatial reasoning, university-city synergy.

1. INTRODUCTION

Assuming that universities play a dominant role within the context of the knowledge economy, this paper examines the configurational features that can contribute positively to the integration and development of university precincts in urban & social areas. The purpose is to identify location properties that influence the precinct's ability to become integrated and embedded in its urban setting. University precincts are defined as the areas occupied by a university and where its functions and activities take place.

As Temple (2009, 2014) advocates, the physical space is one of the most powerful tools available for the university to express and convey its identity, namely its values, mission and cultural background. Not only is the university able to express its identity through the physical space (Edwards 2003, Hajrasouliha and Ewing 2016), but it can also communicate its presence, purpose and domain (Dober 1992). Furthermore, precinct configuration, including proximity and adjacency relationships, can foster exposure and interactions that permit successful collaborations and outputs (Kenney et al. 2005).

Several authors emphasise the importance of establishing relationships, connections and synergies between university precincts and their host cities (Gibbons et al. 1994, Conceição and Heitor 1999, Duderstadt 2002, Christiaanse and Hoeger 2007, den Heijer 2011, Campos Calvo-Sotelo 2015). Nevertheless, there is a shortage of literature focusing on the description of the spatial properties that enable these relationships and which may, in particular, contribute towards supporting urban activity and vitality in a balanced and sustainable manner, i.e. without forgetting that university precincts are academic facilities requiring a spatial identity that guarantees adequate places for learning and its related intellectual activities.

According to Engwicht. "cities were invented to facilitate exchange of information, friendship, material goods, culture, knowledge, insight, skills, and also the exchange of emotional, psychological, and spiritual support" (1992, p. 17). And so were university precincts. Space quality can inform and impact on human behaviour and activity, and there is a close connection between the qualities of the urban space and the quality of the activities performed there (Whyte 1980, Beck 2009). Such an inference from public space to university space is possible, and one can argue that there is a close connection between the quality of a university's physical space and the quality of university life.

Despite the difficulty of limiting the impact of spatial variables while analysing universities, it is possible to identify some key aspects that can serve to enhance perception of a university's physical integration within its host city. Location is a crucial feature in increasing a university's visibility and the movement taking place to and through the precinct. Furthermore, since this is one of the hardest and most costly features to change, the amount and type of boundaries and the presence of barriers can deeply affect the way in which city and university relate. The existence of links connecting the interior of the precinct to its surrounding neighbourhood can also be a key factor in establishing stronger connections.

In face of the importance of the physical space of the university, particularly considering it is the first available link connecting the university to its hosting city, this paper aims at identifying patterns of precinct location within hosting cities, on an attempt to identify positive scenarios for university physical integration. It relies on the premise that there are eight university precinct genotypes, according to their morphological features, and that these present different urban behaviours.

2. METHODOLOGICAL PROCEDURES

This paper is based on a multiple case-study research (Cannas da Silva 2017), undertaken with the purpose of providing an understanding about the configurational properties of a broad set of university precincts in an attempt to identify general conditions.

This required a methodological strategy that was sufficiently rigid to allow for a comparison of different cases and to search for possible generalisations, while, at the same time, being sufficiently flexible to accommodate all the specific details that, although varying from case to case, make it possible to understand the spatial identity of a university precinct. The specificity of each case makes it possible to construct the distinctiveness of the object of study, in an integral manner.

In order to pursue this main goal, it was necessary to identify the genotype of the university precincts. Genotype is taken to mean the “abstract rules underlying spatial forms,” (Hillier and Hanson 1984, p. 12) i.e. an identifiable pattern, “one which could be detected in the configuration itself rather than in the way in which it was interpreted by minds” (Hanson 1998, p. 32). This pattern can be modified to a “greater or lesser extent in different physical circumstances, but always within limits which can themselves be specified” (Hillier and Hanson 1984, p. 38). These modifications correspond to different phenotypical situations.

Firstly, a set of 52 exemplificative cases was defined, grounded in the literature and experiential knowledge about the topic. The cases were selected according to the urban situation and morphological features of the precinct, considering the relationship between the university and the host city.

Secondly, twelve spatial variables were chosen in order to better describe the relationship between each university precinct and its surrounding urban environment - location; accessibility; boundaries; limits; density; compactness; distribution; landmarks; green elements; circulation; paths; size. Comparisons were made focusing on the relationship of the university precinct's fabric with the adjacent urban fabric, requiring an understanding of both the “university precinct boundary” and its relative “permeability”, as well as the precinct's spatial complexity.

An evaluation scale was drawn up for each variable, in order to permit a direct comparison between cases and to make it possible to extrapolate from the set of cases analysed, establishing “types” against which each case could be compared.

Thirdly, one example from each type was chosen as representative and analysed according to its urban insertion, using space syntax methodological procedures and tools (Hillier and Hanson 1984, Al-Sayed et al. 2014). At this stage, university precincts were analysed on a larger scale, considering the whole urban environment, in order to identify their underlying patterns and structures. In order to compare the urban qualities of each type, axial maps were analysed, focusing on two main variables: integration and choice. Integration makes it possible to measure the ease of access from any other point in the system, showing the potential of the university surroundings to be a destination, or, rather, showing whether the university premises are located in a place with the potential to serve as a destination in terms of roaming movements. Choice was used to assess the potential of the precinct to be located in a place that enables “passing-by” movement, and to enable serendipitous relationships between academics and outside users.

Segment maps were used as the basis for comparison. Normalised angular choice (NACH) and normalised angular integration (NAIN) complement the axial analyses of integration and choice (Hillier et al. 2012). Only the segment where the main entrance to the precinct is located was considered. In open precincts, with no clear main entrance, a street was identified as the location that was most visible for the university users and the one that was most used. Host cities and university precincts are analysed by being compared, in terms of their foreground and background structures. This analysis makes it possible to understand whether a university is positioned within the foreground or the background network of its host city, thus informing about its character and potential for attracting movement. When the precinct is located in the foreground network, it is likely to be frequently crossed in random movements, to be visible

within the urban system, to behave as a landmark and a reference point within the city. In contrast, when the precinct is located within the background network, it tends to be more frequently appropriated by the neighbourhood and more likely to be used as a part of it, but it can be disregarded as an important element for the city as a whole. Hence, it is less likely to be used as a path in the course of random movements, but rather to be visited only if it is a specific destination. In all cases, university premises do not have the structure to be part of the foreground network as a whole. Instead, their precincts are an integral part of the background network. It is the proximity to the foreground, or the fact that some of the segments included in the university precinct are part of the foreground network, that changes its likelihood to be used as a path by outsiders.

3. TYPES OF UNIVERSITY PRECINCTS

Eight university precinct types were identified as unique and distinct from each other, representing different modes of university spatial integration within the host city

Autonomous precincts establish minimum ties, or even none, with the closest city, as illustrated by the Simon Fraser University precinct in Burnaby, Canada. These precincts, evoking the traditional University “Utopia of Insularity”, need to host all activities consistent with the permanent presence of people, so that all users (students, teachers, researchers, and administrative and ancillary staff) do not need to commute or to leave the precinct on a daily basis. Leisure facilities and activities are also provided.

Attached precincts, exemplified by the Aalto University Precinct in Espoo, Finland, maintain their self-sufficiency and independence from the city, seeking some degree of seclusion by being located in the outskirts. They establish a relationship of proximity that allows for the establishment of some connections.

Inner precincts are fully integrated into the urban fabric, but still include all the functions necessary for the permanent residence of people, such as the MIT precinct in Cambridge, Massachusetts. In this type, the university precinct is located within an urban area, establishing connecting nodes with the adjacent areas and distinguishing itself morphologically from the urban fabric. .

Developer precincts, such as the Yale University precinct in New Haven, Connecticut, are responsible for a large part of the city’s development and assume very prominent positions in the urban fabric that surrounds them and develops mostly concentrically therefrom. They tend to host a high percentage of the global population of the settlement, offering all the required living functions.

Self-enclosed precincts, exemplified by the IST precinct, in Lisbon, are located within the city’s urban fabric, but with a strong inner-focused structure, behaving as islands within the urban area. They are characterised by their detachment from their urban surroundings, in spite of their central location.

Open precincts, such as the UCL precinct in London, do not present clear boundaries separating them from their surroundings, but establish a relationship of morphological continuity in terms of their scale, their main sightlines and their pathways, construction density or volumetric relations and proportions. Architectural elements are often used to establish a difference from the surrounding environment.

Scattered precincts spread throughout the cities, consisting of a series of separate and independent buildings, even when they are located in geographical proximity. They are exemplified by the case of UniBG, in Bergamo, Italy.

Ubiquitous precincts are completely intertwined with the city, becoming entities that are indistinguishable from the rest of the urban fabric, such as the precinct of the Université Catholique de Louvain, in Louvain-la-Neuve, Belgium.

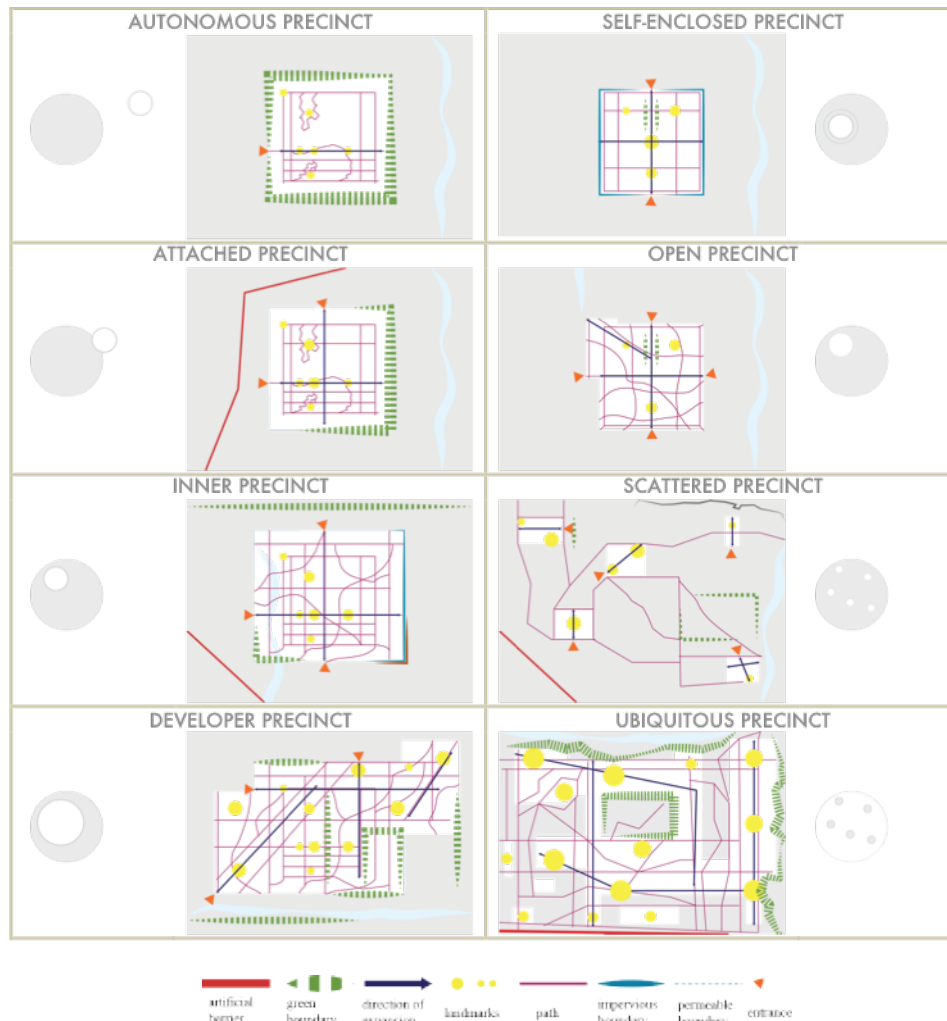


Figure 1 - University precinct types

4. SYNTACTIC PROPERTIES OF EACH TYPE

Some other patterns are revealed by the syntactic analysis. The percentage of axial lines that the precinct occupies varies substantially, from 0.2% of the total of the city, in the cases of London and Lisbon, to 11% of the urban region, in the case of Louvain-la-Neuve. This value alone is not an accountable measure of the university's impact on the area, yet it nevertheless clearly affects the university's visibility and its influence, because of the fraction that it occupies and dominates within the urban territory.

The case of Burnaby – an **autonomous precinct** – shows very low values of integration within the city, but high choice values. This means that the precinct is probably not used by the outside community as part of their environment, but is instead an area that they pass through on their travels across the Burnaby mountain.

AUTONOMOUS PRECINCT SYNTACTIC ANALYSIS

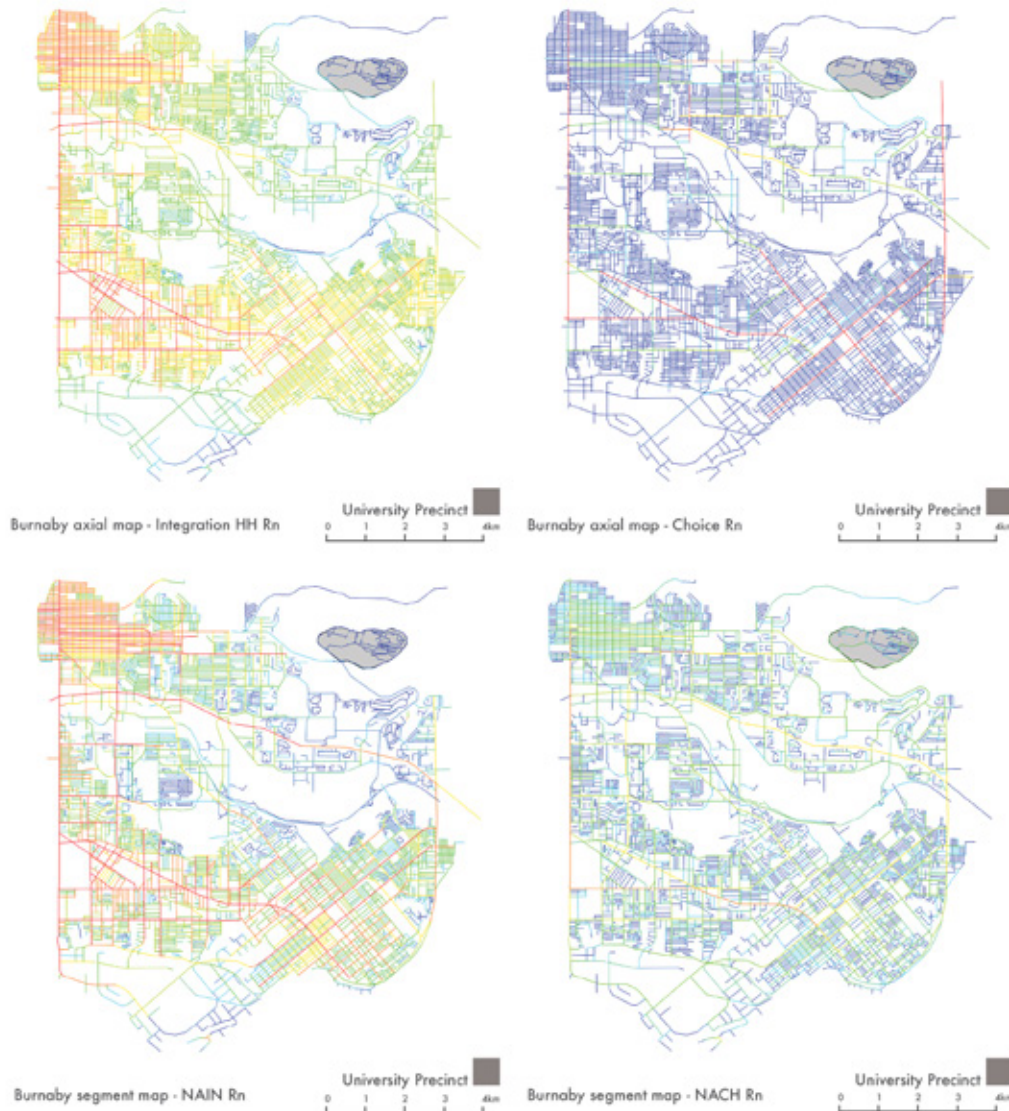


Figure 2 - Autonomous precinct syntactic analysis. Axial map source: Cannas da Silva (2017)

Espoo – representing the **attached precinct** – shows a mean integration value above the average for the city as a whole, and a low mean choice value within the precinct, despite the very high value of choice of its main access. These values are probably influenced by the fragmentation of the city's urban fabric, since it would be expected that the mean integration value of the precinct would be lower than that of the city. The choice values, however, are easier to explain. Within the precinct, most of the streets do not belong to the shortest path between origins and destinations for the whole system. Nevertheless, the main access route corresponds to one of the few axes connecting Espoo to Helsinki, in the East, especially in the southern area of both cities.

ATTACHED PRECINCT SYNTACTIC ANALYSIS

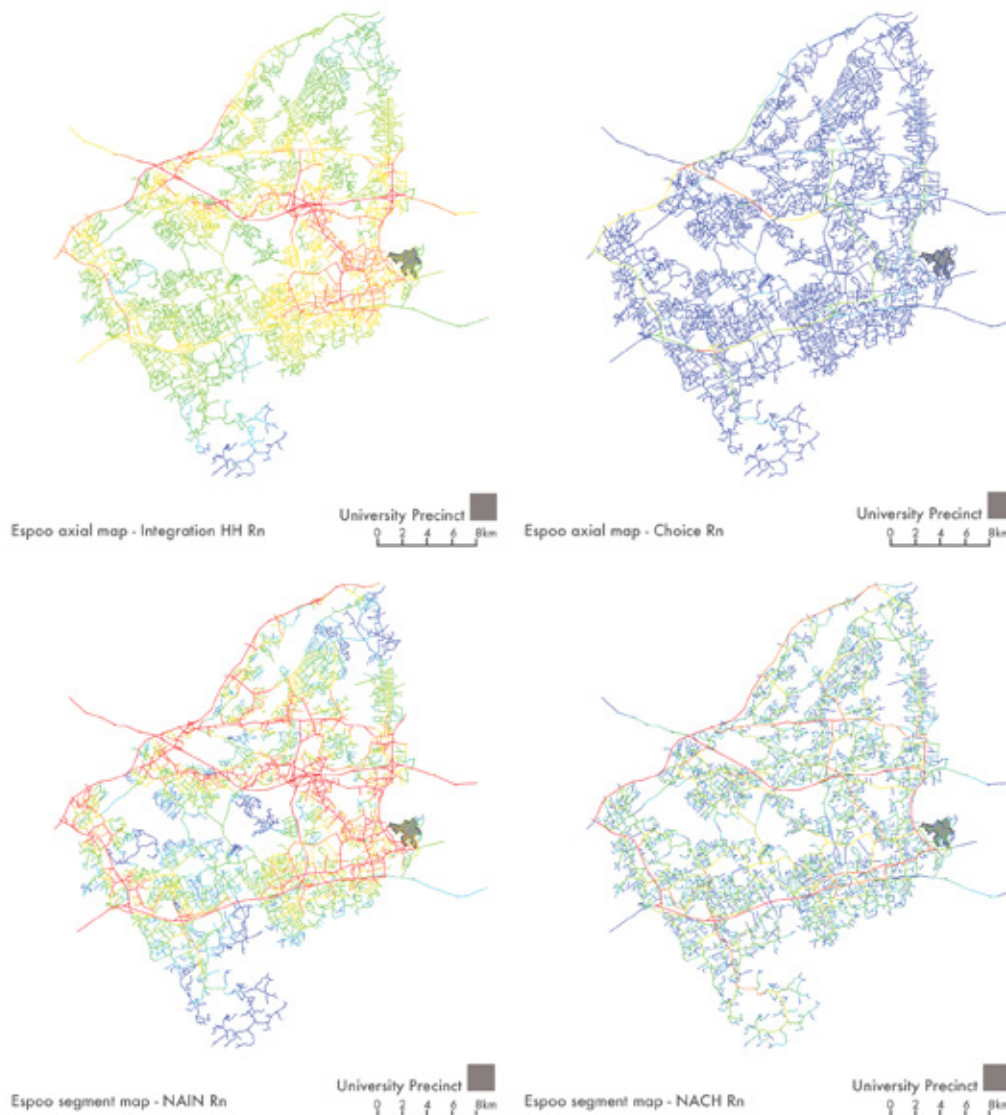


Figure 3 - Inner precinct syntactic analysis. Axial map source: Seabra (2016)

The case of Cambridge, Massachusetts – representing the **inner precinct** – is distinct from the others. The presence of the university exceeds that of MIT, since Harvard University also occupies an important position within the city itself. Together, they add up to a very large portion of the urban fabric, and consequently of the axial lines. In this particular case, the university becomes extremely relevant for the context in which it is inserted, and both universities benefit from the presence and direct competition of the other. However, considering only MIT, both mean integration and mean choice do not present very high levels, probably due to its location on the edge of the city. If we considered Greater Boston instead of Cambridge as limits for the urban region, however, the results would be very different, and MIT would occupy the centre of the region. Nevertheless, considering the importance of MIT and its precinct for the cities of Cambridge and Boston, its low integration and choice values do not diminish its urban capacity or urban attractiveness, since the precinct can act as both an attractor and a generator of movement. Still, if we consider only its topological accessibility, and disregard the fact that MIT's premises are landmarks within the city of Cambridge, the precinct is located in an area that does not support its visibility or make it an attractive destination within the surroundings for external users.

INNER PRECINCT SYNTACTIC ANALYSIS



Figure 4 - Inner precinct syntactic analysis. Axial map source: Seabra (2016)

The case of New Haven – a **developer precinct** – is unique. In this case, the university precinct overlaps with the integration core: it is the centre of the urban settlement both in terms of closeness and betweenness centralities, becoming a very attractive place, whether just to pass through on any journey, for the accessibility that it provides, or becoming a destination due to its configurational properties.

DEVELOPER PRECINCT SYNTACTIC ANALYSIS

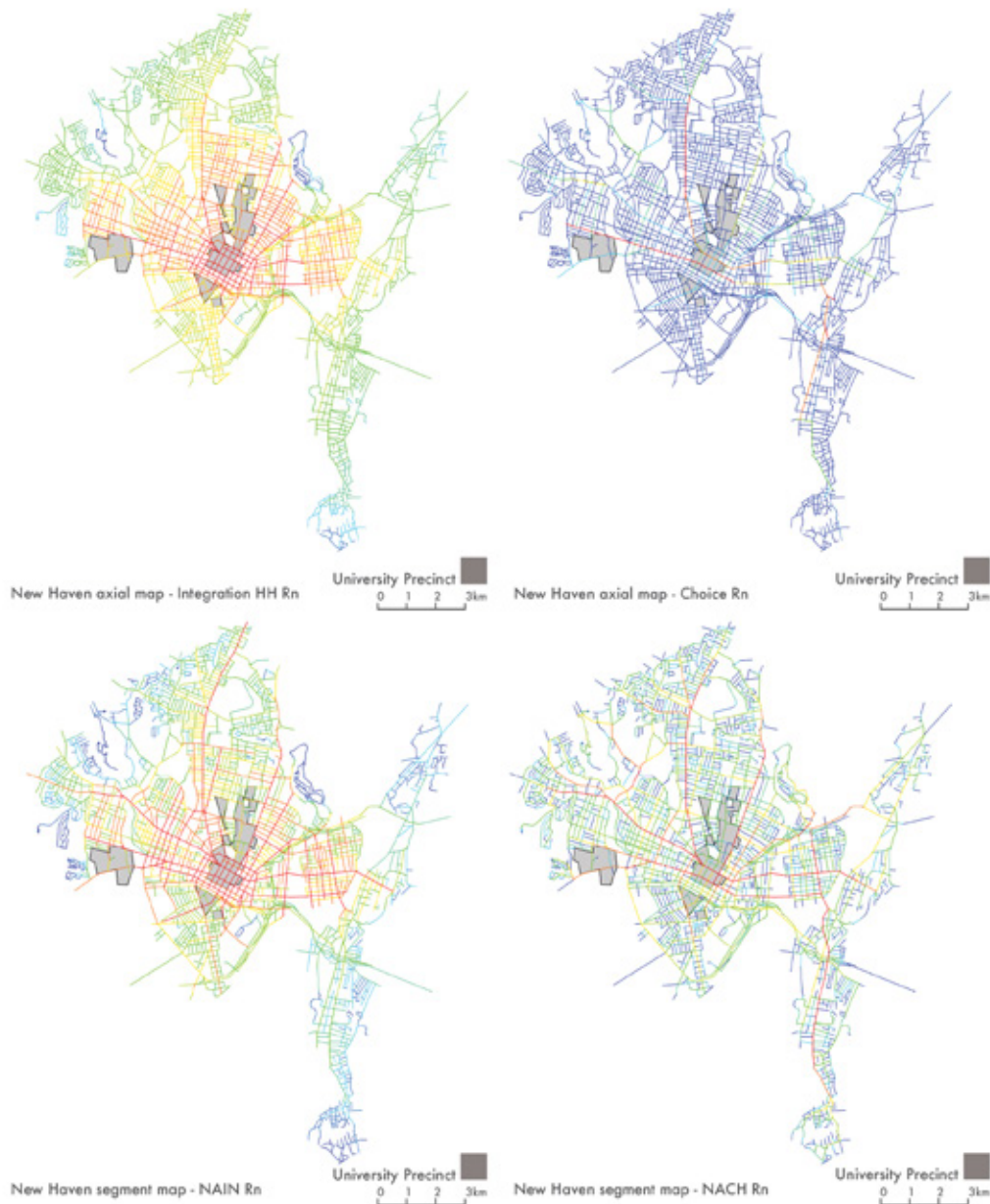


Figure 5 - Developer precinct syntactic analysis. Axial map source: Cannas da Silva (2017)

Lisbon – representing the **self-enclosed precinct** – demonstrates the case in which, even though the precinct shows very high integration values, its morphological traits can cause it to be segregated in its urban surroundings. The IST precinct shows very high mean integration and mean choice values, which make it highly visible and prone to be walked by or crossed through in random movements, and to become a destination through the configuration of the urban fabric in its area. Nevertheless, its morphology contradicts this effect: even though it is highly visible, and several movement flows pass by it, it does not become an attractive destination, used by the outside community.

SELF-ENCLOSED PRECINCT SYNTACTIC ANALYSIS

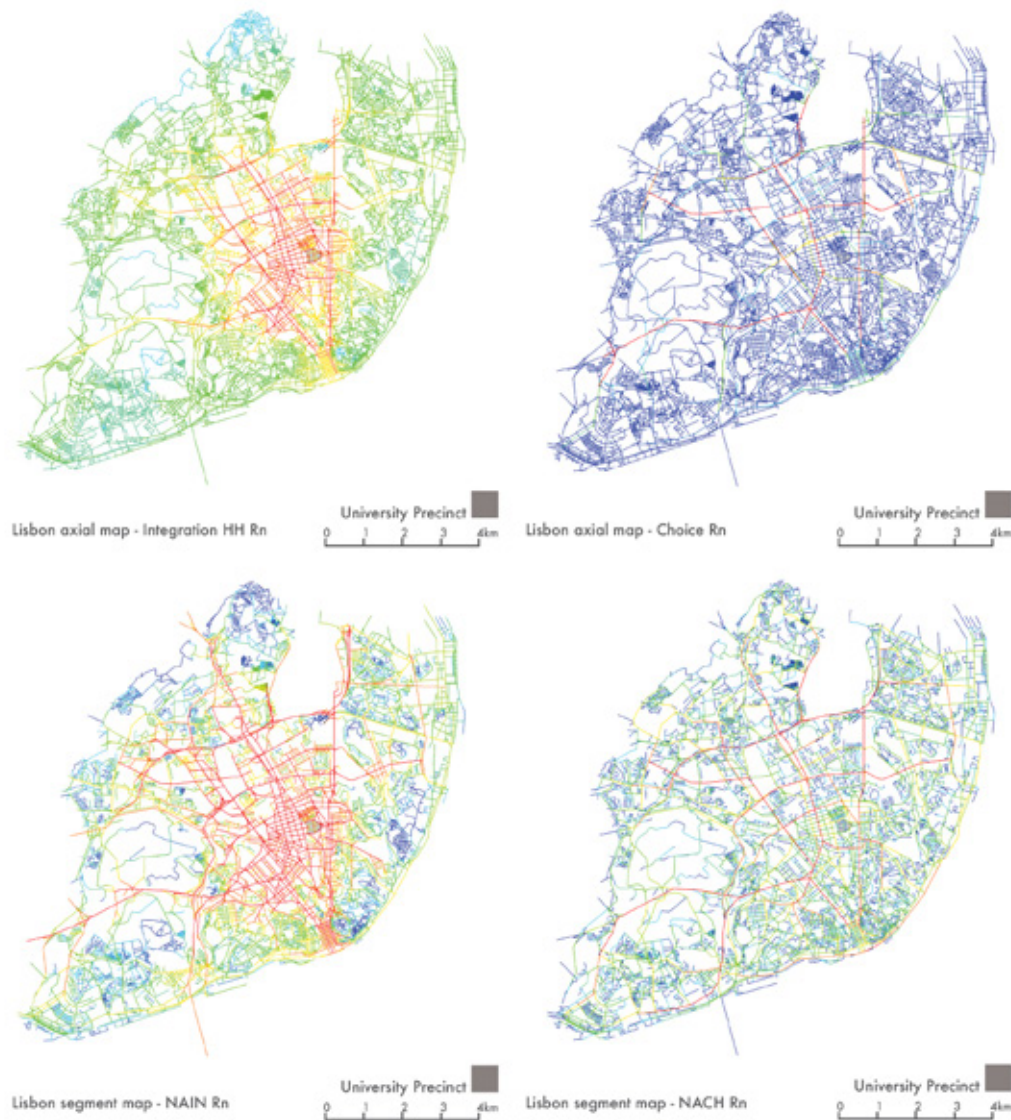


Figure 6 - Self-enclosed precinct syntactic analysis. Axial map source: Heitor and Pinelo (2006)

On the other hand, London – representing the **open precinct** – presents the closest values to Lisbon, proving that, even though location plays a major role in university integration, it is not the only factor, and that morphological traits do impact on the perception of the university. The UCL precinct is very likely to be passed through on random travels, making it extremely visible to most of the population in the city, but it can also easily become a destination, based on its configurational properties. Therefore, the UCL precinct can be successful in attracting people from the outside community, based on its topology, and by promoting synergies at several levels.

OPEN PRECINCT SYNTACTIC ANALYSIS

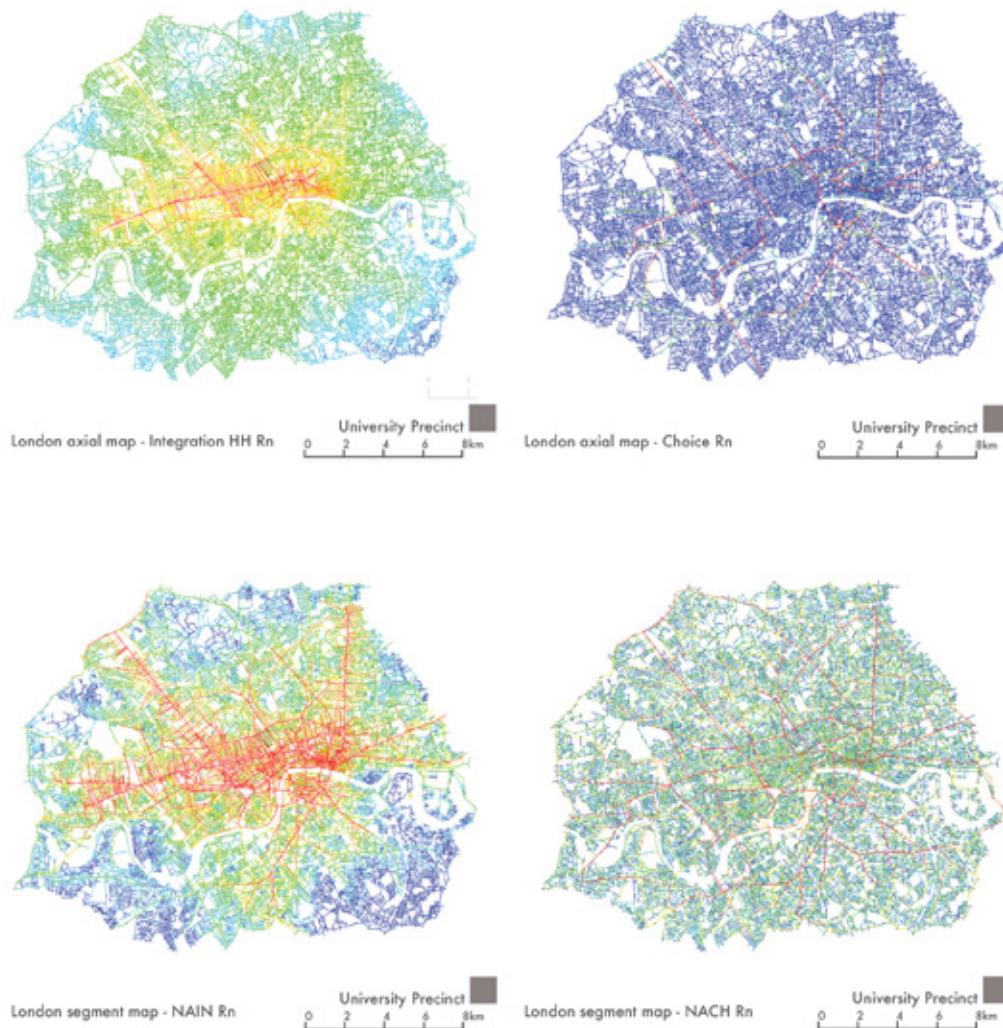


Figure 7 - Open precinct syntactic analysis. Axial map source: UCL 2005

Bergamo – an example of the **scattered precinct** – shows low mean values of both integration and choice despite the number of premises that it occupies and thus its global presence among the different areas of the city. Its very low level of integration makes it difficult to reach and access from the areas that are more inviting due to their configuration. Nevertheless, some of its premises are located in streets with strong potentials for movement.

SCATTERED PRECINCT SYNTACTIC ANALYSIS

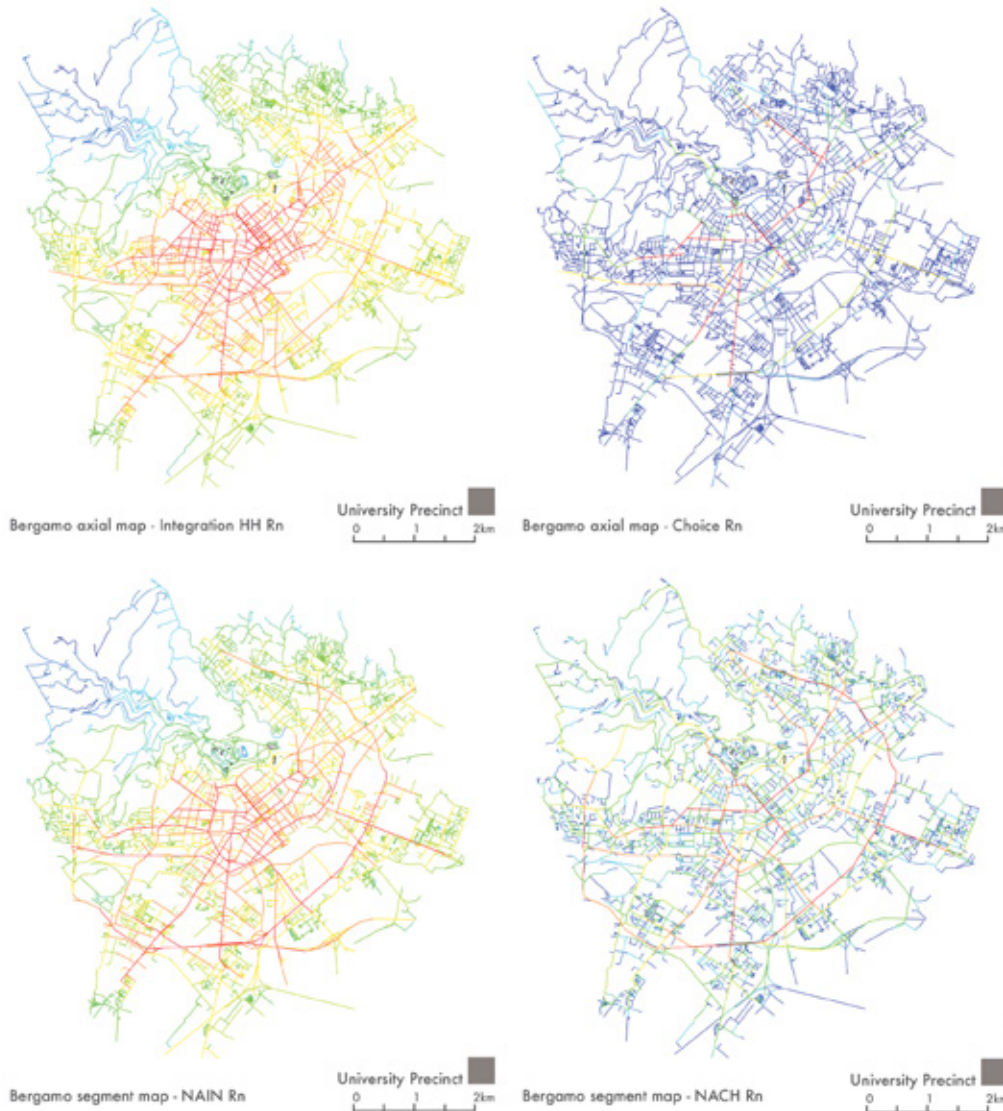


Figure 8 - Scattered precinct syntactic analysis. Axial map source: Cannas da Silva (2014)

Finally, Louvain-la-Neuve – exemplifying the **ubiquitous precinct** – shows values that are not among the highest, either for integration or choice, but which are consistent with a location in the most central areas of the system, paired with the occupation of a large area within the city. This means that the university premises form the average value of the system, since they are so deeply embedded in it. Their impact is vital. In these cases, the university is the most visible presence among the city's various stakeholders, being the main promoter, a strong decision-maker, and responsible for creating many synergies and relationships.

UBIQUITOUS PRECINCT SYNTACTIC ANALYSIS

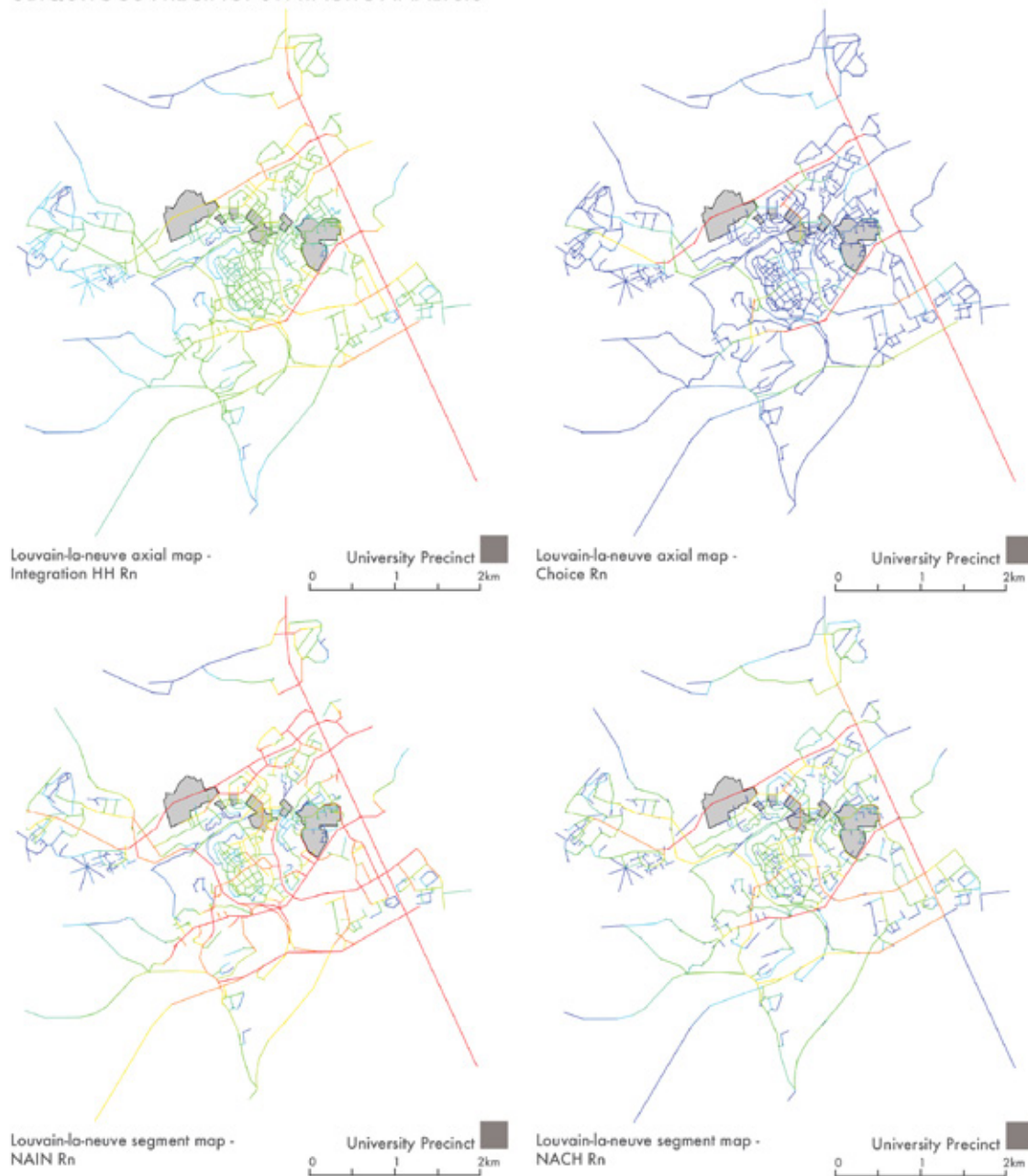


Figure 9 - Ubiquitous precinct syntactic analysis. Axial map source: Cannas da Silva (2017)

The segment analysis reinforces the results obtained in the axial analysis, namely:

In the case of the **autonomous precinct** – exemplified by Burnaby and Simon Fraser University – this increased the segregation of the university precinct and accentuated its low tendency for being crossed or used in random movements, because of its low potential for both to-and-through-movement. Nevertheless, the university's tendency to behave like a "city in a microcosm" (Turner 1984) appears justified in its internal structure, with a foreground and background network of its own when considering smaller radii of analysis.

Espoo – an example of the **attached precinct** or a campus bordering on the city – behaves differently because of the fragmentation of its fabric. The whole city presents the lowest values of mean NACH and NAIN, representative of a very weak background structure, and a very

fragmented fabric. In this case, the foreground structure becomes more relevant, being used for most journeys between different areas, since it assumes a very important connecting role between areas. Since the precinct is located in an area adjacent to the foreground network, it becomes more visible and likely to be visited during people's travels. The precinct itself behaves as a background network and presents similar dimensions to many of the other fragmented sections of the urban territory, behaving as a unit within the fabric. The fact that the values of mean NACH and NAIN for the precinct are slightly higher than the ones observed when analysing the whole city, is a reflection of the structure of the precinct, as an urban unit that is not as weak as the average for the city.

MIT—an **inner precinct**—displays a similar situation, for opposite reasons. Despite its openness and its central location, close to the integration core, MIT presents an urban structure of its own, with a foreground network on the main campus axis, and a background network composing its inner territory. This dual structure, in the case of MIT, contributes to the success of the precinct. On the one hand, the importance of the main axes and their visibility within the system of the city of Cambridge make the university highly visible, turning it into an important element in the dynamics of the city, not only due to its location, but also because of the emphasis it places on opening its premises to the community and offering several activities and events for both the academic and the civil community. On the other hand, the seclusion of the inner areas of the precinct creates the isolation that is necessary for the development of some activities. In a very rational way, the precinct organises the more public uses in its most visible area, and the more private uses in its internal areas, which are characteristically difficult to navigate and less intelligible to outsiders. In contrast to the situation observed at Espoo, its inner structure does not behave as a background network because the system is fragmented or discontinuous. This is due to the configuration of its inner structure, designed to be fit for purpose.

The case of the city of New Haven—a **developer precinct**—shows the particularity of a university precinct that occupies the areas located in the integration core, while also simultaneously being a part of both the foreground and the background network. This urban behaviour can be extremely beneficial for the university, since it creates spaces with different characters which can be used for different purposes. The most visible area, with the highest through-movement potential, can be an important factor in promoting the university, making it highly visible to the outside community, and creating a sense of openness towards the city. The most secluded areas can be used for more private functions, such as laboratories and graduate schools and colleges. Considering that a university precinct of this type includes all the necessary living functions on its premises, it can also serve as a tool for urban regeneration, since it guarantees the presence of people in the city centre at all times of the day.

IST in the city of Lisbon represents the **self-enclosed precinct**. Despite its central location and its proximity to the integration core, IST has an isolated interior, completely separated from the highly integrated and highly visible axes around it. Like MIT, the precinct is rooted in the foreground network (but in this case due to its proximity relationship and not through its direct deployment) despite composing a background network with its inner structure. The precinct creates an urban unit within the city's fabric. Its reclusive character is accentuated by its morphological traits, of which the wall marking out the limits of the precinct is the predominant feature.

Similarly, UCL, representing the **open precinct**, is also located in close proximity to the foreground structure, despite forming a strong background network with its precinct. The precinct behaves like a neighbourhood, with its unified and strong structure. Its openness, associated with its highly visible location, enhances the character that is defined by its spatial configuration, making it an area with a very high to- and through-movement potential.

The main difference between the precincts of MIT, IST and UCL is the strength of the background network that they are mostly composed of, which is a very strong structure in the case of UCL, but weaker in Lisbon and Cambridge. Furthermore, MIT is crossed by one of the main axes of the city of Cambridge, with high values in terms of integration, choice, NACH and NAIN, making it the precinct with the greatest potential for attracting movement both in the form of random movements and as a destination.

Bergamo – a **scattered precinct** – represents a different urban deployment of the university, not concentrating its premises in a clearly defined area, but rather disposing its buildings around the urban fabric. Such urban insertion can provide the university with greater visibility, or instead make its impact so diffuse that it lessens its importance. In Bergamo, due to the configuration of the city, where a strong sense of segregation is felt in the old upper area, the university suffers from a lack of visibility. Its buildings are located mostly in secluded areas, with very little potential for attracting to-movement, although displaying a slightly better behaviour when considering through-movement. This is a characteristic of the city of Bergamo, and not of the type of precinct, which can be very centrally located and present very high values of integration and choice.

Louvain-la-Neuve – a **ubiquitous precinct** – displays different characteristics. The city's small dimension makes it structurally different from the other cases in the set. Despite the possibility of evaluating it with the use of the same tools, it would be important to analyse similar sections in each of the cities, in terms of their total number of segments, in order to fully understand the different behaviours of the university precincts within their immediate surroundings. The low values presented by the city in the segment analysis are coherent with its dimensions, but they still make it possible to understand the connection between the city and the university. These are intertwined, and the university occupies several locations within the urban fabric, having very similar configurations to those of the city, since the university composes the city and vice-versa, as was previously described in the axial analysis.

Some similarities can be observed between the different types of precincts, as far as the level of interdependence with the host city is concerned, as well as the level of the university's inclusion within the urban fabric. Autonomous precincts and attached precincts present the lowest levels of interdependence with the host city, as well as a very low level of inclusion in the urban fabric. Nevertheless, it is still possible to distinguish between these, for the autonomous precinct presents lower values at both levels. Inner precincts present a similar level of interdependence with the host city to the one found in attached precincts, despite having a higher level of inclusion in the urban fabric, occupying areas that are fully encircled by this fabric. Self-enclosed precincts and open precincts present the same level of interdependence to and from the host city, despite occupying very different positions within the urban fabric. Despite the very central location of both types, the former present morphological features that afford them a severely isolated character, while the latter are completely incorporated into the urban fabric. Scattered precincts and developer precincts present both a very high level of interdependence to and from the host city, being slightly higher in the case of the developer precinct. Both present a very high level of inclusion in the urban fabric of their host city, being completely interwoven into it. Finally, ubiquitous precincts present the highest values, both in terms of their inclusion in the urban fabric and their interdependence with the host city.

PRECINCT TYPE	AUTONOMOUS PRECINCT	ATTACHED PRECINCT	INNER PRECINCT	DEVELOPER PRECINCT	SELF-ENCLOSED PRECINCT	OPEN PRECINCT	SCATTERED PRECINCT	UBIQUITOUS PRECINCT
CASES	BURNABY	ESPOO	CAMBRIDGE	NEW HAVEN	LISBON	LONDON	BERGAMO	LOUVAIN-LA-NEUVE
CITY AXIAL LINES	3941	6440	3479	2360	7858	15901	6027	1001
UNIVERSITY AXIAL LINES	147	42	269	106	20	35	53	114
% OF UNIVERSITY AREA	4%	0,7%	8%	4%	0,2%	0,2%	0,8%	11%
CITY SEGMENTS	10293	16275	8158	6696	21980	71155	10970	2407
UNIVERSITY SEGMENTS	230	95	585	285	51	134	138	288
% OF UNIVERSITY SEGMENTS	2,2%	0,6%	7,2%	4,3%	0,2%	0,2%	1,3%	12%
UNIVERSITY MEAN INTEGRATION	1st quartile	3rd quartile	2nd quartile	4th quartile	4th quartile	4th quartile	2nd quartile	3rd quartile
UNIVERSITY MEAN CHOICE	3rd quartile	2nd quartile	2nd quartile	4th quartile	4th quartile	4th quartile	3rd quartile	3rd quartile
MEAN NACH CITY	0,911	0,603	0,892	0,82	0,867	0,753	0,839	0,727
MEAN NACH PRECINCT	0,815	0,741	0,858	0,999	0,981	1	0,946	0,806
MAX NACH CITY	1,606	1,509	1,564	1,594	1,581	1,667	1,478	1,523
MAX NACH PRECINCT	1,289	1,209	1,401	1,594	1,262	1,506	1,312	1,48
MEAN NAIN CITY	1,069	0,452	1,023	0,857	0,946	1,279	0,697	0,617
MEAN NAIN PRECINCT	0,571	0,488	0,975	1,074	1,225	1,568	0,56	0,618
MAX NAIN CITY	1,652	0,693	1,631	1,365	1,54	2,116	1,046	0,957
MAX NAIN PRECINCT	0,862	0,581	1,47	1,365	1,344	1,84	0,834	0,888

Table 1 - Syntactic analysis summary - university precinct types

5. CONCLUSION

Through the identification and characterisation of the different types of university precincts, there are some patterns that emerge in terms of their common features in relation to the host city. This provides us a deeper understanding of the levels of morphological integration that university precincts can achieve, which can have strong social and cultural consequences.

Most of the precincts analysed occupy areas within the most integrated half of the axes belonging to the system as a whole. The exceptions—autonomous precincts, attached precincts and inner precincts—tend to compensate for their low integration values with higher choice values, indicating that permeability is a valued feature sought by universities in establishing their precincts.

Comparing inner precincts to self-enclosed and open precincts also provided some interesting insights. While the first of these tend to present low integration values, despite being completely embedded in the urban fabric, the others display soaring integration values. Nevertheless, their inner structures are very similar, mimicking the fabric of their host cities by assuming different characters in the more visible areas to the ones that are to be found in the deepest areas within their limits. Furthermore, self-enclosed precincts and open precincts present even more similar behaviours, being located in the integration core of their host cities. Scattered precincts presented very low values in terms of integration, but this might be a reflection of the structure of Bergamo as a host city, with the dichotomy between its old and new town, and the fragmentation and detachment of the two areas. Attached precincts and ubiquitous precincts present mean integration values above the average figure for their respective host cities. Finally, due to their location in the most central and visible areas of their host city, developer precincts also present extremely high integration values.

When choice is considered, attached precincts and inner precincts present the lowest values, but these are only slightly below the average of their respective host cities. Scattered precincts and ubiquitous precincts also present high choice values, above the average of the cities in which they are embedded. Finally, self-enclosed precincts, open precincts, and developer precincts present the highest values among the types analysed, being an indicator of a strong visibility of the university within its host city, in these cases.

There is a strong correlation between the nature and amount of the precinct's boundaries and barriers, and the limits of its influence. The stronger the barriers and the definition of the boundaries encircling the precinct, the sharper the limits. In fact, strong impervious boundaries are perceived as an obstacle, not only limiting access to the university facilities, but also being perceived as creating a discontinuity in the urban fabric that can be damaging for the liveliness of the urban area in which the university is embedded. Furthermore, strongly closed boundaries project a University image quite opposite to its institutional "universal" nature. This aspect is highly visible when we compare the cases of University College, London (UCL) and Instituto Superior Técnico, Lisbon (IST). Despite the similarities in their locations within the urban fabric, both in terms of integration and choice, which would suggest that both precincts would behave similarly, the impact of IST's surrounding non-permeable wall, completely changes the perception of the university territory in the adjacent areas. In the case of UCL, the precinct area behaves as an urban territory that is accessible and available to all, with the necessary exceptions in the interior of the buildings. At IST, despite its highly central location and the very high visibility of its precinct, its territory presents clear limits, so that it is not perceived as part of the urban realm.

Most of the university precincts assessed here are located in integrated areas of the city. However, a trend towards achieving a certain degree of seclusion is observed, protecting the academic environment from the city. This trend may be materialised in the form of different features, ranging from the syntactic properties to the presence of physical barriers and boundaries. Even in the cases where the precinct is located in highly visible and accessible areas, intelligibility within its premises can be used to enhance privacy in certain areas.

In a context in which this tendency is gradually reverting to a posture of openness towards the urban environment that fosters the creation of links and connections, bridging the "academic divide", space syntax tools provide valuable insights into key aspects, such as the need to enhance visibility and improve integration.

This paper attempts to identify patterns of university precincts location considering their hosting cities. It considers eight precinct genotypes, morphologically different. Despite the evidence suggesting different genotypes present different location characteristics, as well as different configurational properties, materialized in different behaviours towards the hosting city, the sample is too small to allow for a generalization. However, space syntax tools and methodologies seem promising in assessing, characterizing and understanding the urban behaviour of universities, thus allowing to inform and predict possible connections and relationships between the university precinct and its urban surroundings.

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