470

A Study of Bucharest's urban structure discontinuities using space syntax methodology

ANDREEA GABRIELA TRIF 1, & LEONTIN TRIF 2,

1 FACULTY OF HORTA CULTURE, UNIVERSITY OF CRAIOVA, ROMANIA, 2 GETRIX,

ROMANIA

_____

ABSTRACT

Bucharest, Romania's capital, is a city which has an urban structure impacted by two radical interventions regimes. Therefore, it passed through two major restructuring stages. Were these interventions determined by political ideologies and visions rather than by adequate urban renewal strategies? The restructuring regimes are the modernist period and Ceaușescu's regime. Specialists consider that both periods left the city texture full of scars. In this context, the article aims to investigate and compare the effects generated by these interventions. The chosen methodology for the study is space syntax, which is considered optimal for searching disconnections and discontinuities of the networks and built fund in Bucharest's historical center. This research strategy allows us to better understand the specific impact of the interventions made during the two main urban restructuring phases by capturing the integration levels of the elements in different historical stages. Moreover, by comparing the state of the current development, we tried to capture the effects on the architectural values. We found that the discontinuities of the urban structures brought about by the insertions and the reconfiguration of the networks determined very different effects. For example, the Magheru Boulevard proved to be a very well integrated fragment and influenced the development and the levels of activity of the back-fronts, whereas the Antim district is disconnected from the city center and has a poor level of activity. Thus, the use of space syntax theory led to new conclusions on the quality of the interventions upon the pre-existing urban fabric.

KEYWORDS

urban restructuring, discontinuity, historical maps, integration, urban activity

1   INTRODUCTION

Bucharest had a spontaneous, organic development, with sinuous roads and quite large plots. In the 19th century, Bucharest transitioned from the medieval to the modern era. The weakening of Ottoman control during the 19th century led to the opening of the diplomatic relations with Western Europe. This trend will have specific repercussions on the general appearance of the city, defining it as an area of confluence between the East and the West. These differentiations characterize the appearance of the city even today and represent its special charm. These contrasts accentuated in the 20th century as a result of the modernization interventions. Due to the French and American influences, new boulevards appeared, with high buildings on the sides. Decades later, in 1945, the Soviet army occupied the city and the communist regime begun. The city was restructured, while large historical areas were being demolished.

The city bears the mark of its influences - the Orient, the Occident and the socialist era. In the historical centre, one can find fragments of the main restructuring phases: the modernist and the socialist. Both types of interventions were imposed on pre-existing city fabrics generating fractures between architectural styles and concepts: the boulevards with their modernist and Art Deco frontages left behind the classical buildings, while the communist buildings were super-imposed inclusively on the modernist fabric. Understanding and observing the nature of these relations between styles became a main focus of our study.

2   METHODS OF INVESTIGATION

We used the analysis of the historical maps of Bucharest from different evolution periods: 1846/1852 - the medieval city, 1911 - the modernist period, 1938 - the interwar period, and 1991 - the post-communist period. In this way, we were able to observe the effects of interventions upon the city network and connections, changing the usual functionalist narrative and revealing the social one (Griffith 2012).

The morphological study of the historical maps was used in previous studies in order to better understand the effects of certain changing moments on the cities fabrics. For example, Azimzadeh (2001, 2003) and Trigueiro & Madeiros (2007) aimed in their studies to reveal the adaptation of the historical centres to the modern exigencies and reconfigurations. One of the most important studies for our topic is Desyllas's study on Berlin (1997). The analysis of city's centralities changes, as well as the cross research based on *in situ* information were inspirational starting points for our approach.

A Study of Bucharest's urban structure discontinuities using space syntax methodology

In our study, we focus on two city scales:
 - the general network of the city and
- the *places* of the studied case studies.

We start from the hypothesis that even if both intervention types involved demolitions and quite brutal insertions, the socialist ones produced more damage than the modernist ones. Thus, our objective is to investigate this point of view by means of:
- analyzing the stages of urban evolution based on different historical maps, by identifying fractures and fragmentations;
- comparing representative fragments for both types of insertions, in their morphologic conditions, based on VGA analysis;
- investigating architectural qualities (integrity, use, appearance) of the same fragments, based on simple observation.

3   MORPHOLOGICAL CHARACTERISTICS OF THE CASE STUDIES

For each restructuring phase, we have chosen one representative area: the Magheru Boulevard for the modernist interventions and the Antim Monastery district for the communist interventions. Both sites represent important city markers through time.

The Magheru Boulevard represents one of the most important circulation axes of Bucharest city centre. The interventions made for the boulevard envisaged large demolitions and generated empty plots on both sides. Mainly, the buildings evolved in the interwar period and some during the communist period due to earthquake damages. Therefore, along the boulevard, we can still see some very important landmarks of the city, built by important architects, such as Horia Creanga, Duiliu Marcu or State Balosin.

Nowadays, the studied area is protected for its cultural values. The Magheru Boulevard frontages has 33 architectural monuments and another 14 propositions. The lateral streets and Calea Victoriei are also protected areas and have many valuable architectural and cultural sites. The public spaces follow the pre-existing fabric of the city as none of the crossing streets was blocked. All the buildings on the boulevard have large public spaces on the ground floors, creating high potential for social interaction.

The protected historical area of Antim Monastery, located behind the socialist buildings screens of the Unirea Boulevard in Bucharest, encloses special architectural values for the history of the city. In terms of evolution, the area was part of the medieval core. It was fractured by systematization interventions in 1984, when the entire Uranus-Antim district was demolished to make way for the Ceausescu's Civic Centre.

A Study of Bucharest's urban structure discontinuities using space syntax methodology

The Uranus-Antim district was predominantly residential and commercial. The streets with organic evolution were narrow and animated with medium-sized volumes, with partly continuous and partly discontinuous fronts, the hills in the area giving a special, bohemian character. Interventions for the construction of the civic centre led to extensive demolitions, which also changed the natural configuration of the terrain.

Figure 1: The case studies, (1) Thea Magheru Boulevard, bucurestiulmeudrag.ro; (2) Antim district from behind the socialist screens, manastireaantim.ro

A Study of Bucharest's urban structure discontinuities using space syntax methodology

The intervention for the new civic centre focused on creating a built ensemble dedicated strictly to the president and his relatives. The Unirea Boulevard with its axial layout has an opening of 100 meters directed perpendicular to the People's House - currently the Parliament House. The boulevard is flanked by blocks of flats dedicated to ministries and housing for the communist nomenclature. At present, the public functions in these buildings are maintained. This privileged area of the former regime was not meant to be circulated by ordinary citizens, nor was it to be served by public transport (Cavalcanti 1997, p.88).

The spatial relations between the fragments are realized without any specific arrangement or protection. The distance between the historical buildings with cultural value and the socialist fabric is sometimes of only four or five meters. The public space of the area has the obvious role of parking, being suffocated by cars.

4   RESULTS

The *Local Integration (HHR3)* parameter applied on the map from 1852 revealed a city with an irregular network, specific of the medieval time. At that moment, before the first stage of modernization, without any boulevards, the Calea Victoriei street (a) was the most important and well integrated in the city fabric.

The 1911 plan revealed that the new boulevards had a major impact on the city network. We can observe that the Magheru Boulevard (b), the Elisabeta Boulevard (c), and the Princess Maria Boulevard, located in the south, near the Antim district (d), were nodes with perfectly integrated streets. At that time, the district networks and the urban fabric were still impacted by the recent building of the new arteries and had levels of integration related to the former city life.
The 1938 plan reveals a marked intensification of relations in the node of the University Square (c), the other forming nodes being subordinated to the boulevards. The Uranus-Antim district was better defined, with internal relations being better integrated, most of them with a medium level. This shows that even though the district had mostly a residential character, it had good connections with the city centre and with the main attractions.

The 1991 plan, made after the reconfiguration of the Uranus district (d) so as to make way for the Civic Centre, demonstrates the effects of the restructuring interventions. Consequently, the south-west quadrant was disconnected. However, a more detailed analysis of the overall links shows some other important changes. Thus, the Magheru Boulevard has a medium connection level, going from maximum integration. Moreover, the Unirea Boulevard, planned together with the construction of the civic center, has a low level of integration in the urban network.

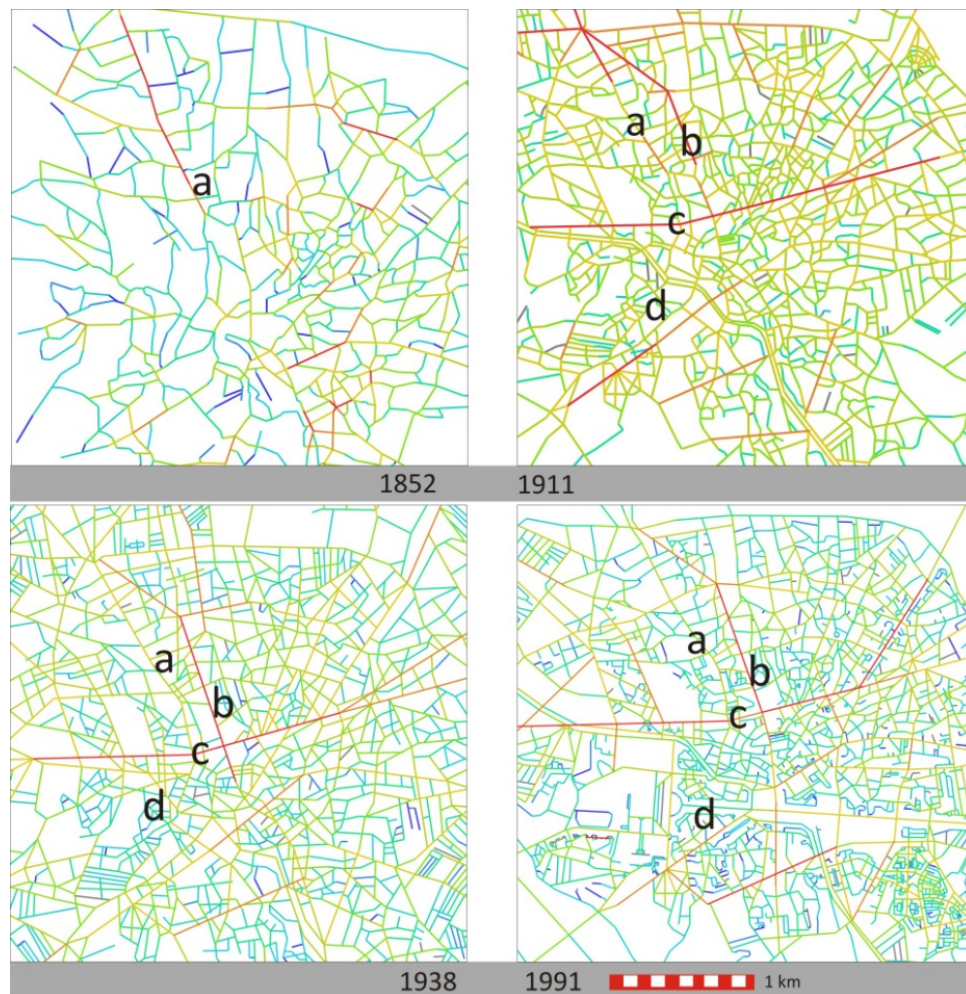A Study of Bucharest's urban structure discontinuities using space syntax methodology

Figure 2: Axial maps of the Magheru Boulevard, local integration (HHR3)

a) Calea Victoriei street; b) The Magheru Boulevard; c) The Elisabeta Boulevard; d) Antim district.

The *Global Integration* parameter revealed quite different results. The map from 1911 showed that the organic evolution of the streets determined good levels of integration, as all connection flows were as natural as possible. The restructuration imposed by the agglomeration of the main nodes generated connections that were efficient and thus the city centre proved to have maximum levels of integration.

The map from 1938 shows the effects of the city extension and of the network regulations. The roads had a clear hierarchic disposition with a central core and gradual dissemination towards the city limits.

The map from 1991 proves that the *global integration* levels had dramatically decreased over time. The *n* radius shows the effects of the communist urban restructuring. The main way of inserting buildings often did not take into consideration the pre-existing networks, interrupting many flows. Therefore, as the number of steps increased, the integration coefficient became smaller, and the discontinuities were revealed.
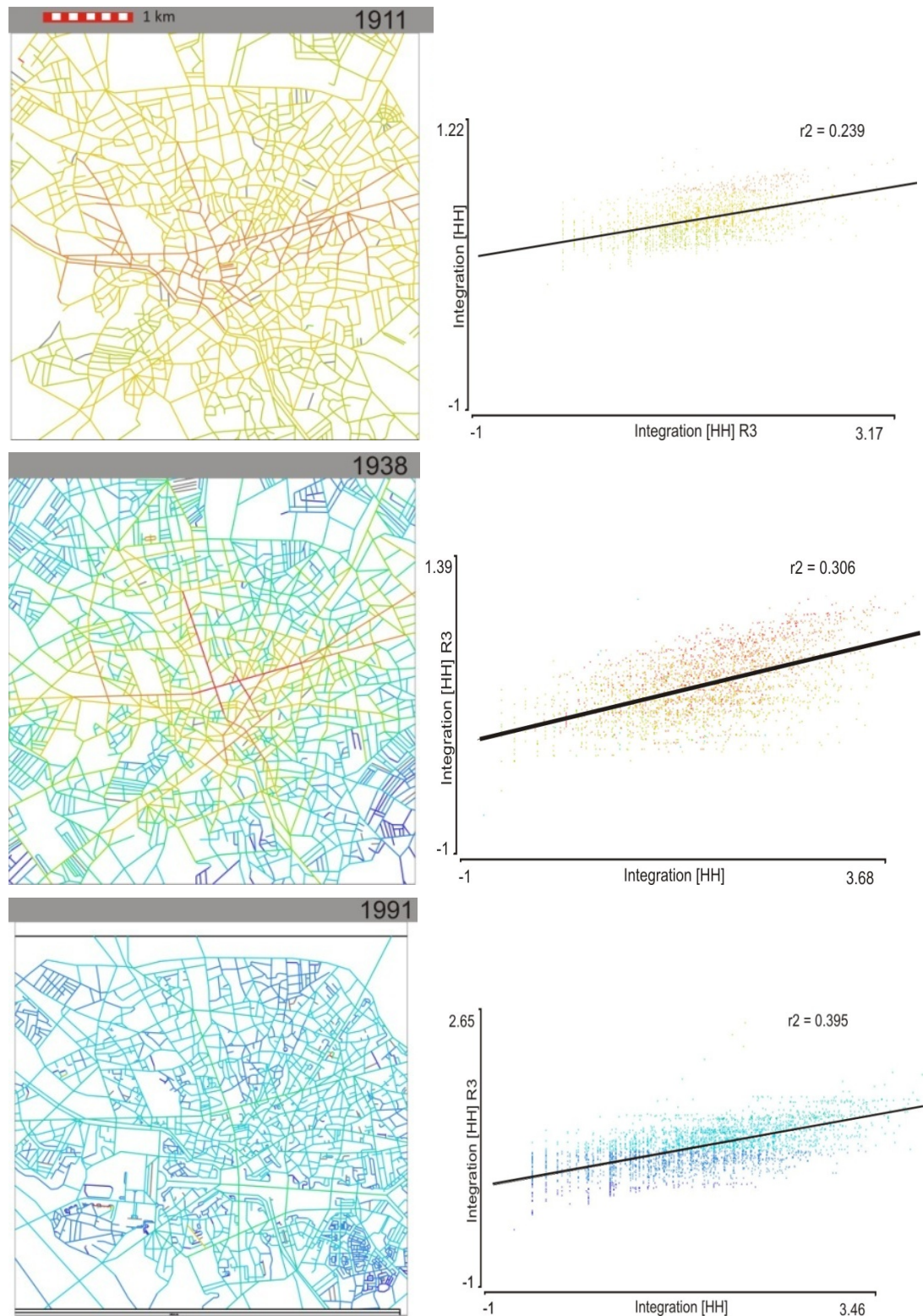
Figure 3: Axial maps analysis, Global Integration [HH]

and scatter plots local to global integration values

A Study of Bucharest's urban structure discontinuities using space syntax methodology

Applying the VGA analysis to the area connected to the Magheru Boulevard, we could observe changes in the visual integration parameter. In 1856, the main attraction of the area was on its eastern part, opposed to Calea Victoriei Street (a). According to the map data, in that area, there were some public spaces and the houses of aristocracy (b). Therefore, taking into consideration that the global integration proved to be a good indicator for interaction, the VGA analysis of 1856 map could be accurate.

On the map from 1911, the Magheru Boulevard (d) was partially executed, except from the fragment towards the Elisabeta Boulevard. The immediate results of the boulevards can be easily observed, since the executed fragments have maximum level of integration. We can also acknowledge that the general level of integration in the area is quite high, even on the lateral streets. At that time, the boulevards frontages were under construction.

On the map from 1991, the continuation of the Magheru Boulevard determined a maximum level of integration of the street (c). Nevertheless, even if the importance of the Elisabeta Boulevard seams to have diminished, the total integration level is still very high. During that time, the Art Deco and modernist frontages of the boulevards were entirely built. Additionally, some reconfigurations made during the communist period apparently determined some disconnections as the integration levels decrease (e).
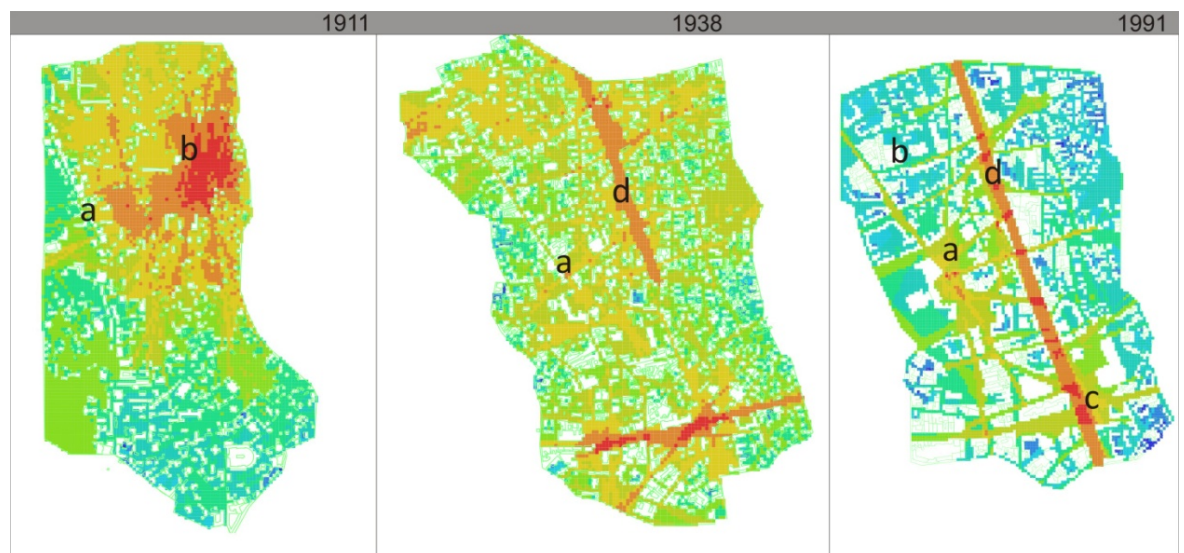

Figure 5: VGA analysis of the Balcescu Boulevard area:

a) Calea Victoriei street; b) The ruler quarter; c) The University intersection; d) The Magheru Boulevard,

e) Socialist restructuring zones.

Antim Monastery (a) has been the catalyst for the neighbourhood for at least 250 years. The historical plans also reveal a balance of relations in the area, as the built tissue develops. On the

plan of 1846, the large squares were attractive for the city life, being distributed around the monastery. The plan from 1911, with a much cohesive structure of the built elements, shows a concentration of catalytic spaces in front of the Antim Monastery (a). In 1974, the same structure of public spaces can be observed, with a maximum integration of the plot in front of the monastery. We noticed that all the streets that converged on this square, had a good level of activity.

The VGA analysis on the plan from 1991, after the construction of the civic centre (b), demonstrates the severe disconnection of the district from the rest of the city fabric. The study on this plan was carried out with two limits: a limit which included the Parliament Palace building and the fronts on the opposite side of the Unirea Boulevard (c) - study area corresponding to previous plans, and a second limit on the fragment of the Antim district behind the walls of the civic center. The analysis, focused strictly on the remnant fragment, shows a very weak capacity of attraction, this being visible only on the points that pierce the built socialist frontages screens. However, the Antim Monastery is completely disconnected, being surrounded by spaces with a minimum level of integration.
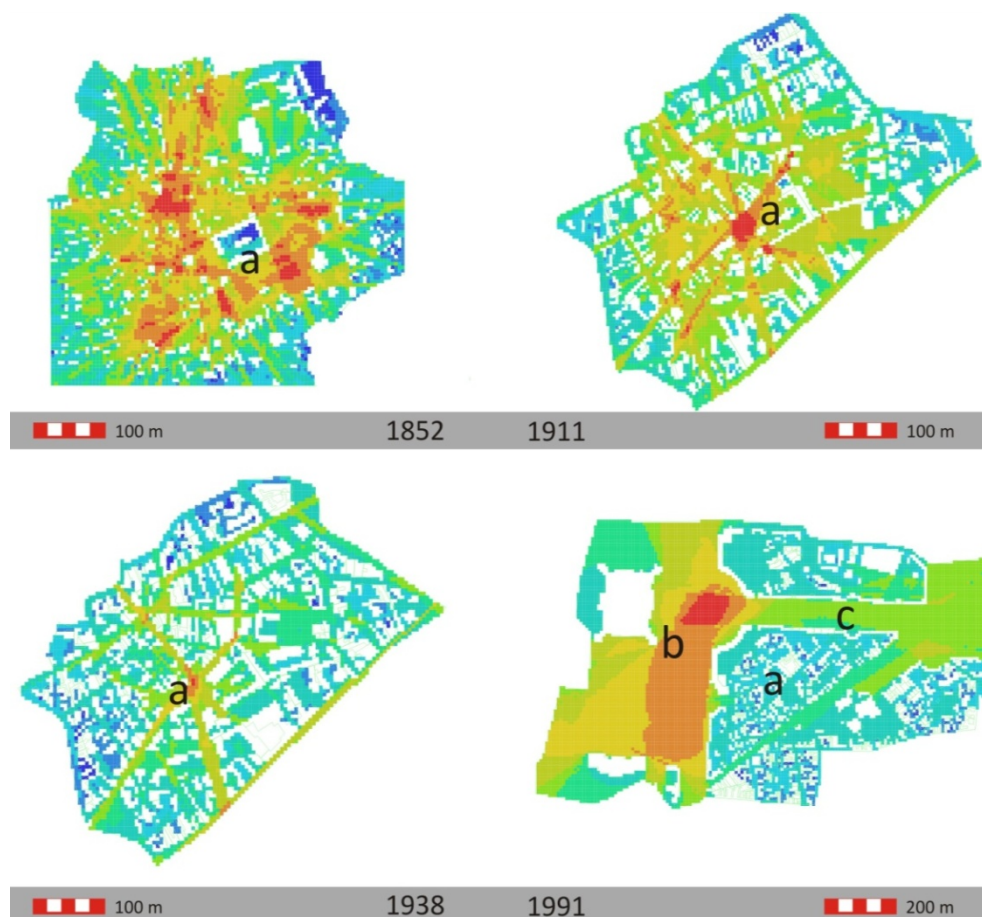

Figure 6: VGA analysis of the Antim district:

a) Antim Monastery; b) the Parliament House; c) The Unirea Boulevard

A Study of Bucharest's urban structure discontinuities using space syntax methodology

5   ARCHITECTURAL AND URBAN *IN SITU* ANALYSIS OF THE CURRENT SITUATION

5.1   The Magheru Boulevard

In order to evaluate the results obtained by means of the space syntax method, we also searched for some clear indicators of city life quality. We established that among the 824 buildings that we have chosen to include in the studied area, 168 were refurbished in the last five years. In addition, 17 new buildings were built in the area. Therefore, 22% of the buildings were entirely renovated or rebuilt. We have to acknowledge that the rhythm of public interventions is very low due to diverse factors, including the property problems. Also, the mentioned interventions represent almost exclusively private budget interventions.
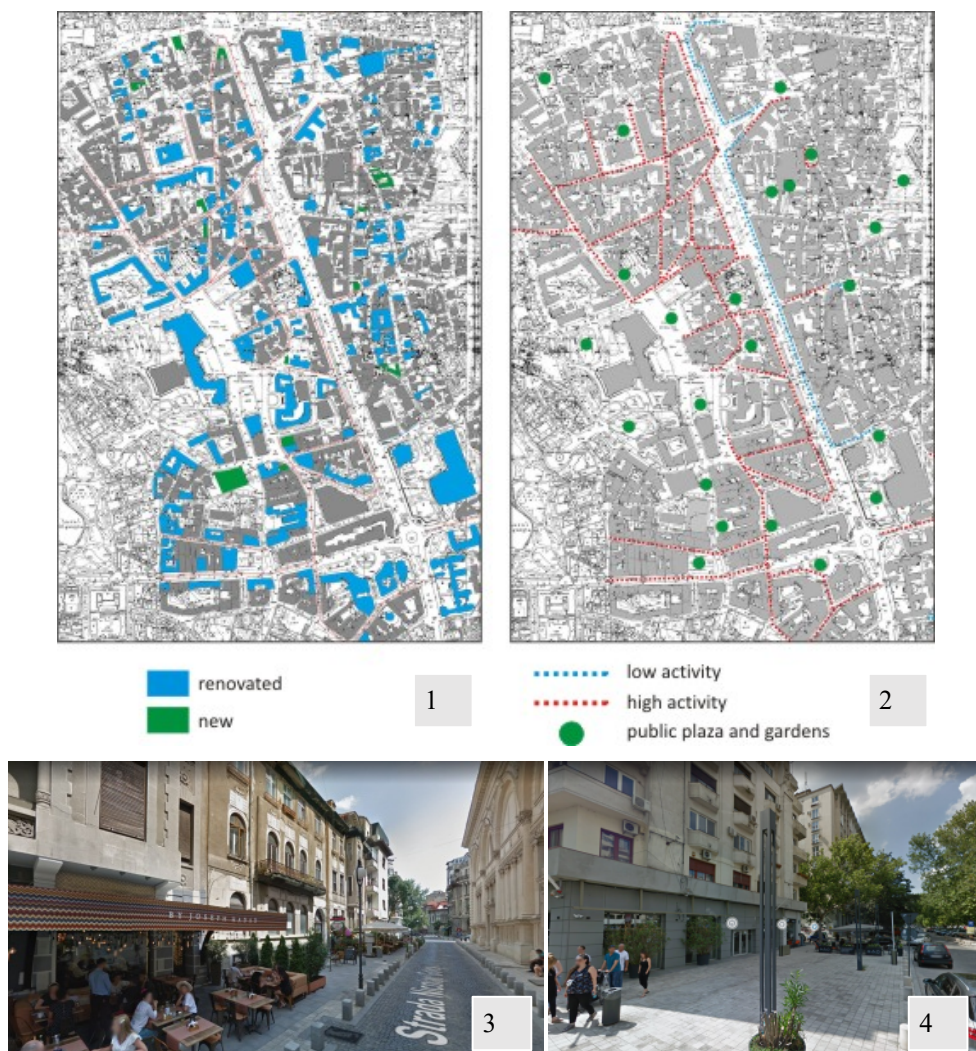

Figure 7: The Magheru Boulevard: (1) Renovated buildings; (2) Commercial fronts; (3); (4) Street fronts and public spaces, www.googlemaps.ro., 30.01.2022

A Study of Bucharest's urban structure discontinuities using space syntax methodology

Another criterion taken into consideration for the analysis of the activity levels in the area concentrated on the presence of commercial fronts and on the quality of the public spaces. We observed that the area between the Magheru Boulevard and Calea Victoriei have many commercial fronts that are very well functioning. The area on the right side of the boulevard has more restaurants and public gardens, but the commercial fronts are less developed compared to the left side, many spaces being abandoned.

Among the buildings which have not yet been renovated, there are the ones with many floors, built before the second World War. However, in these cases, the main cause of decay was generated by the difficulties brought by the property rights. These buildings have flats which belong to different people. Most of them do not have the means to afford such investments. Therefore, the restoration process is very slow and the blocks represent a great danger for the workers in the commercial spaces. As a secondary proof, we observed that where the buildings were renovated, the commercial spaces are well functioning.

5.2 The Antim area

Analyzing through the lens of the activity level in the area, we discovered that from a total of 500 buildings which were included in the studied zone, only 36 were restored and 9 were new built. So, a total of 9 %. Taking into consideration that most of the buildings in the area are quite small, and that most of the renovation projects are from public budget, we can appreciate that the total level of interest of the private investors is quite low.

From the point of view of social endowments, the spatial arrangement of the fragments determines the curtain effect of the socialist fabric on the historical one. Thus, the perception of the historical fabric in the Constitution Square is impossible from the point of view of the physical arrangement of the elements, being completely blocked by the socialist intervention. As regards the specific spaces meant to facilitate the social interaction, we observed a new contrast: the ground floor of the buildings on the Unirea Boulevard is endowed with commercial functions, while those in the inner courtyard of the blocks are completely devoid of public facilities. Furthermore, the overcrowded road traffic of parking lots is an important obstacle for the development of public life. Basically, the interstitial tissue of the area is used exclusively as a utilitarian platform for the functions of the area. In fact, the imposed change in the density of the area by implementing buildings made on a scale completely foreign to the traditional fabric has generated extreme pressure on historical fabric. Therefore, the cultural values are menaced by the chaotic parking lots and unfriendly public spaces.
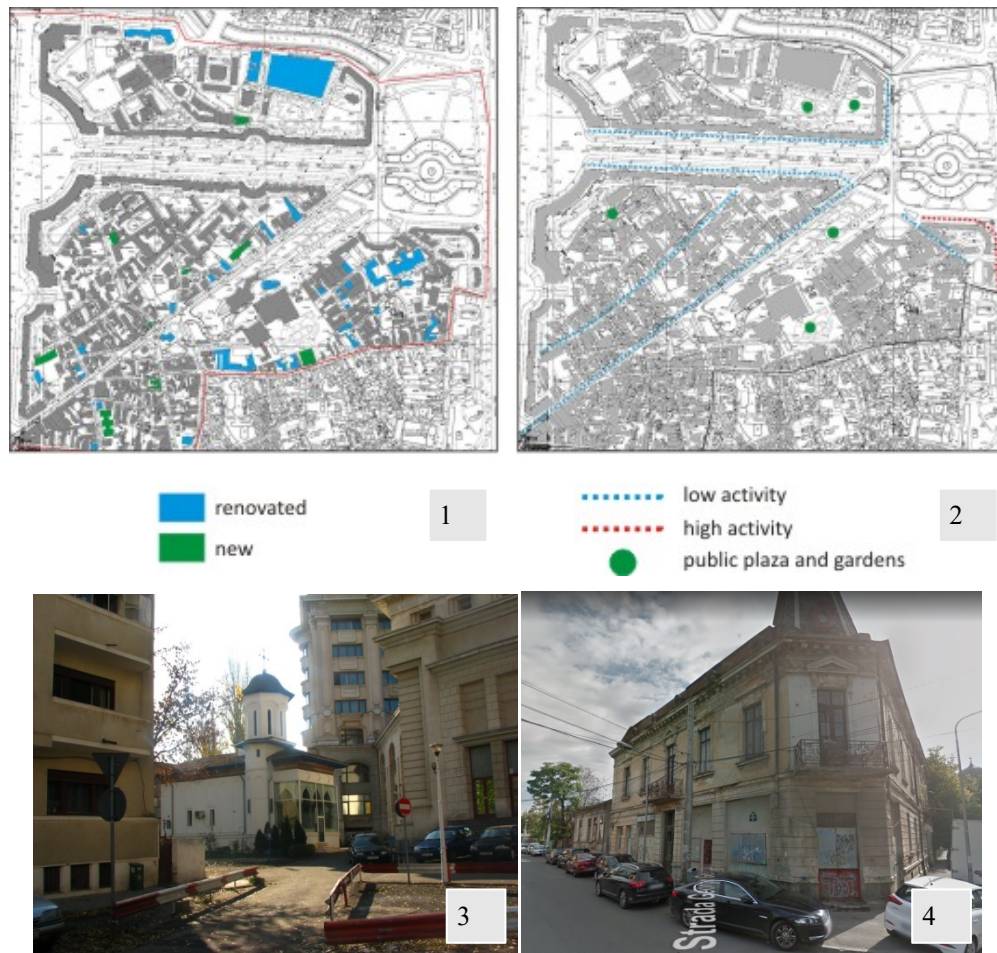
Figure 8: The Antim district: (1) Renovated buildings; (2) Commercial fronts;

(3); (4); Street fronts and public spaces, www.googlemaps.ro., 30.01.2022

6   CONCLUSIONS

The network analysis using space syntax methodology proved that both stages of major interventions on the city fabric produced irreversible effects at local levels. However, as the modernist interventions, which consisted in the making of boulevards, generated new nodes and new relations with a maximum degree of integration, the communist insertions had as main results the disconnection of large areas of the city, stating that the projects were very different. Local analysis of the evolution of public spaces and their ability to form the concept of "place" in the consciousness of citizens also revealed dramatic changes. The *VGA analysis* focused on the *connectivity* and the *integration* concepts.

The plans from 1846, 1911 and 1991 show a gradual increase in activity in the area for the Magheru Boulevard. On the contrary, the residential area of the Antim district changed from a monastery attraction node to a very low activity area, as seen on the 1991 map.

A Study of Bucharest's urban structure discontinuities using space syntax methodology

The *in situ* analysis proved that the two areas have totally different scales of activity levels. Based on the observations, the investments of local actors in the two areas are clearly orientated towards the Magheru Boulevard.

Therefore, we can conclude that the urban results of the two restructuring stages brought about opposite effects. In the case of the Magheru Boulevard, even if the visual contrasts between the classical and modernist buildings remain visible, the city structure adapted and it is functional and well integrated. In contrast, the Antim Monastery area is disconnected and continuously menaced to be forgotten.

REFERENCES

Balbo, M., Navez-Bouchanine, F. (1995) 'Urban fragmentation as a research hypothesis: Rabat-Salé case study'. *Habitat International*, 19(4), pp.571-582.

Al-Sayed, K., (2014). *Space syntax methodology*, Bartlett School of Architecture, London.

Cavalcanti, M., (1997). 'Urban reconstruction and autocratic regimes: Ceausescu's Bucharest in its historic context'. *Planning Perspectives*, 12 1), pp.71-109

Desyllas, J., (1997). 'Berlin in Transition', *Proceedings Space Syntax Today*, vol. I, pp. 04:01-04:15.

Griffiths, S., (2012) 'The use of space syntax in historical research: current practice and future possibilities', *Proceedings of English International Space Syntax Symposium*, UCL, pp.1-26.

Griffiths, S., (2014). 'Space Syntax as interdisciplinary urban design pedagogy', *Explorations in Urban Design: An Urban Design Research Primer*, doi:9781315581606

Hanna, S. (2009), 'Spectral comparison of large urban graphs', *Proceedings of the 7th International Space Syntax Symposium*, pp. 39:1-11.

Hanson, J., (2000), 'Urban transformations, a history of design ideas', *Urban Design International*, no.5, pp 97–122.

Hillier, B., Hanson, J., (1984) *The Social Logic of Space*, Cambridge University Press, Cambridge.

Hillier, B., (1998), *Space is the machine*, Cambridge University Press, Cambridge.

Hirt, S., (2006), 'Post-socialist urban forms: notes from Sofia', *Urban Geography*, no. 27, pp. 464 – 486

Koutsolampros, P; Sailer, K; Varoudis, T; Haslem, R; (2019), 'Dissecting Visibility Graph Analysis:The metrics and their role in understanding workplace human behaviour', *Proceedings of the 12th International Space Syntax Symposium*

Lascu, N., (2011), *Bulevardele Bucurestene pana la primul razboi mondial*, Bucharest: Simetria

Light, D., (2000), 'An Unwanted Past: contemporary tourism and the heritage of communism in Romania', *International Journal of Heritage Studies,* 6(2), pp.145-160.

Light, D., Young, C., (2010), 'Reconfiguring social urban landscapes: the left-over spaces of state-socialism in Bucharest', *Human Geographies*, no. 4.1, pp. 5-16

Marcus, L. , Legeby, A., (2012). 'The need for co-presence in urban complexity : Measuring social capital using space syntax', *Proceedings of the 7th International Space Syntax Symposium*, pp.1-25.

Medeiros, V., Holanda, F. (2005), 'Urbis Brasiliae: investigating topological and geometrical features in Brazilian Cities', *Proceedings of 5th International Space Syntax Symposium*, i. pp. 331-339.

Medieros, V., de Holanda, F. & Barros A.P (2009), 'The Myth of the Intention: The Portuguese Urban Heritage Overseas', *Proceedings of the 7th International Space Syntax Symposium*, pp. 1-12.

Medeiros, V., Holanda, F., Trigueiro, E. (2003), 'From Compact Colonial Villages to Sparse Metropolis', *Proceedings of 4th International Space Syntax Symposium* pp. 12.1-12.16.

Mucenic, C. (1997), *Un veac de arhitectură civilă, secolul XIX*, Bucharest: Silex.

Musterd, S. , Ostendorf, W., (1998), 'Urban Segregation and the Welfare State: Inequality and Exclusion in Western Cities' *Journal of Housing and Built Environment*, 15, pp. 201-204.

Navez-Bouchanine, F., (2005), 'La fragmentation en question: des villes entre fragmentation spatiale et fragmentation sociale?*',* L'Information Géographique, 69(2), pp. 207*.*

Popescu, A., (2011), 'Anii 80-demolarea unui oraș', www.ideiurbane.ro, June, 23.

Suciu, O., (2020), 'In cartierul Uranus s-au demolat nu numai niște case, ci și niște vieți', www.newsweek.ro, interview, September, 04.

Zahariade, A.(2011) *Arhitectura in proiectul comunist. Romania 1944-1989*, Simetria, Bucharest.