

## #40

### URBAN SPRAWL OF COASTAL CITIES AND THE ROLE OF CENTRALITIES:

The capão da canoa case.

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#### ABSTRACT

Currently, a large part of the world's population is located in coastal cities and there is a considerable population migration to coastlines areas, once object do seasonal occupation, modifying urbanization patterns in these areas. In Brazilian cities, changes in urban structure due to urbanization and their uneven conurbation processes would tend to cause the loss of the functions and the attractiveness of the historical centres, giving emergency to new centralities. However, as in European cities, it seems that the original urban centres of Brazilian small and medium-sized coastal cities tend to concentrate infrastructure and activities that reinforce their vitality. Therefore, these areas usually attract people and display qualities that support diversified social interactions, and for that, are recognized as symbolic and functional centres of these areas. Thus, this paper aims to describe and analyse the influence of the urban sprawl spatial structure and morphological properties of the Brazilian coastal city of Capão da Canoa in the potential of attractiveness of his original centre and the emergency of new centralities. As a methodological procedure a multiscale analysis based on Space Syntax theory and techniques is realized on global and local levels of the following regions of Capão da Canoa: (1) the original centre of the city, where the occupation of the area has started; (2) the urban centre, which is the most urbanized area of the city; (3) the main district, where the Capão da Canoa resort and the main urban equipment's of the city are located; and (4) the urban area of Capão da Canoa, which incorporates all the existent resorts and land developments that are part of the city. Different spatial network quantitative data obtained based on two models of analysis – axial and angular - are correlated to land use data empirically collected. Space syntax analysis performed on a GIS database enable to correlate syntactic measures to locational patterns of urban activities in order to identify the correlation between functional and morphological centralities robustness that indicate the emergence of symbolic centralities. The results shows, for example, that the spatial configuration emerging from accelerated urbanization of coastal areas identifies the original centre potential of attraction and its vitality, attesting for the relevance of understanding socio-spatial phenomena driving the production and social appropriation of coastal spaces.

## KEYWORDS

Coastal urbanization, urban sprawl, spatial configuration, urban centres, Capão da Canoa

## 1. INTRODUCTION

Currently, a large part of the world's population is located in coastal cities and there is a considerable migration of population to coastline areas (Polette, 1997). The interface with the sea qualifies the coastal cities, attracting a large number of users, especially during summer vacations (Moraes, 1999). Therefore, the urban expansion of coastline areas, including small-sized cities, is increasing, which culminates in significant spatial and morphological transformations of these regions. These changes may influence the degree of polarization of the urban centres of these cities and potentiate the emergence of new centralities. Historically, the urban centres are the most important part of the cities, acting as origins of the urban settlements and as the most economically and socially valued sectors, being more likely to support the diversity of uses (Maraschin and Cabral, 2014). In this context, accessibility is a dominant factor, directly influencing the types of activities developed in the central areas. Specifically, the Brazilian urban centres (from which land division in cities is established) tended to be located in the geometric, functional and topological centre of their regions of influence until the middle of the XX century. These were places of greater accessibility relative to the regional and local scale, tending to the expansion of the deformed wheel type, such as European cities (Villaça, 2001).

However, the recent Brazilian urban expansions promoted by private agents according to the market economic interests is characterized by three aspects: the discontinuity of effectively urbanized areas; the expansion of urban perimeters as a form of increasing real estate value; and the dispersion in the infrastructure allocation, following the process of increasing residential segregation (Abramo, 2007). This phenomenon is characterized by the emergence of discontinuous polycentric systems that refer to an archipelago configuration; new centralities emerge at points of greater concentration of infrastructure and activities, in the convergence between regional and local flow, including activities traditionally located in the consolidated centre of the cities (Dias and Trigueiro, 2012). This process affects urban life at various scales and the historic centres, despite their symbolic value, often lose their functions and attractiveness due to the real estate devaluation (Koch, 2005; Read, 2009).

However, the processes of urban expansion of Brazilian small-sized coastal cities present peculiarities in their regional contexts that demand more in depth investigations in order to understand how such urban centres spatially, functionally and economically evolve.

Specifically, the degree of centrality of dispersed and fragmented urban areas, as occurs in the discontinuous and multinucleated occupation of coastal zones, is related to their connection to the road system. A process of land fragmentation is diffused by private and regionally independent agents from this system (Abramo, 2007). The road network is formed on a local scale from the initial urbanization centre and tends to the continuity of the centre-periphery connections; although the discontinuity of the process of land subdivision is evident, the road system is important for the distribution of vehicles movements, attractiveness of the enterprises and vitality of the emerging centralities, which multiply the localized economic investments (van Nes, 2009). The urban centre of the cities, from which the urban sprawl of coastal cities originates, seems to maintain its symbolic functions, related to the process of evolution and development of the coastal urbanization. Moreover, such urban centres have morphological attributes that explain the process of consolidation of spatial configurations from the interaction between the local and global scales (Holanda and Medeiros, 2007).

Therefore, it seems necessary to analyze the different logics of space production and, especially considering the multi-scale circulation systems, how non-exclusive polarities on a regional scale emerge. Thus, this paper aims to describe and analyse the influence of the urban sprawl spatial structure and morphological properties of the Brazilian coastal city of Capão da Canoa in the potential of attractiveness of its original centre and the emergency of new centralities.

## 2. DATASETS AND METHODS

The city of Capão da Canoa (Figure 1) is located in the urban agglomeration of the north cCoast of Rio Grande do Sul (Brazil). The city is originally characterized by the subdivision, starting in the 1940s, of the beachfront land of former farms. This phenomenon is further accelerated by the emancipation of the city of Capão da Canoa in 1982 from the City of Osório and by road investments in the region like the construction of the RS-389 Road. These aspects gave rise to the current districts (Figure 2) in the form of sub-centralities (Santos, 2005). The city is now composed of twelve resorts located in four districts (Capão da Canoa, Capão Novo, Arroio Teixeira and Curumim) connected by the Paraguassú Avenue (parallel to the seacoast) to the urban centre of the city (Figure 2). Currently, Capão da Canoa is a small city, with about 50 thousand inhabitants, but having a high degree of urbanization and undergoing major transformations, being one of the fastest growing cities in the state of Rio Grande do Sul. Moreover, the region receives around 200 thousand visitors and vacationers during the summer season being of easy access from the Metropolitan Region of Porto Alegre (RMPA) and from the Metropolitan Region of 'Serra Gaúcha' (RMSG), which concentrate the majority of the population of the state (IBGE, 2017).

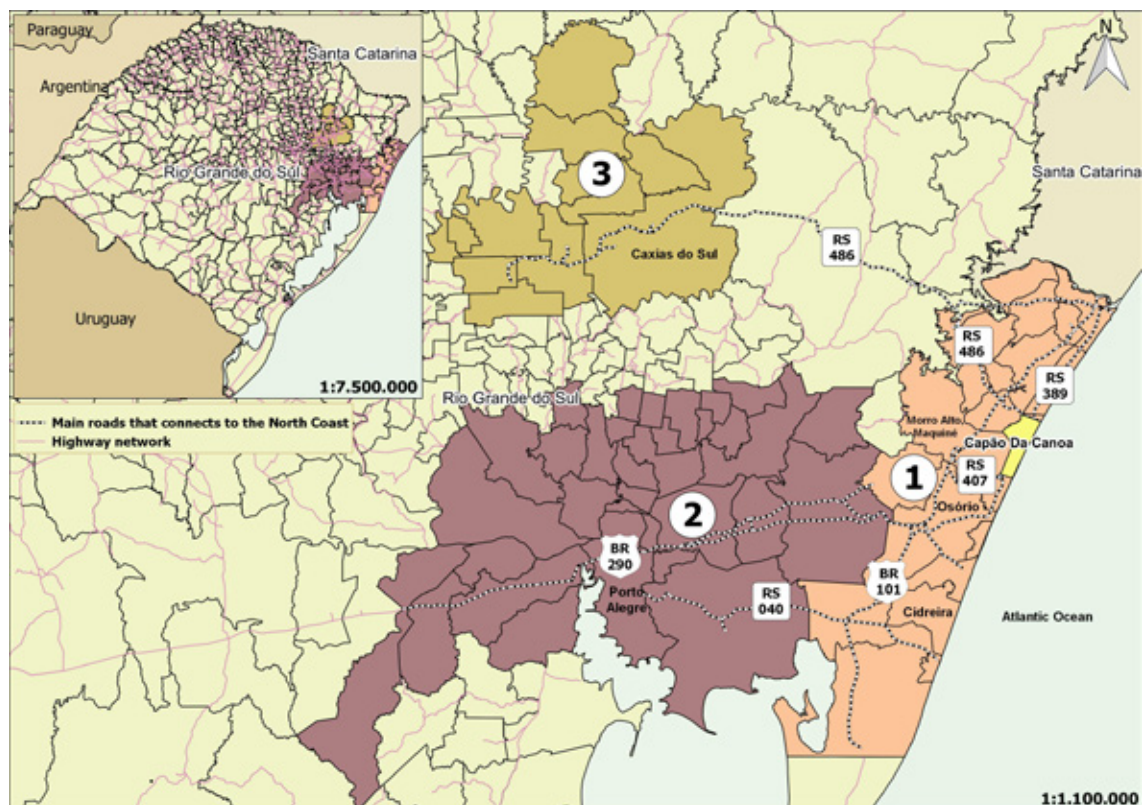


Figure 1 - Location of the city of Capão da Canoa

Note: 1 = Urban Agglomeration of the North Coast; 2 = Metropolitan Region of Porto Alegre (RMPA); 3 = Metropolitan Region of 'Serra Gaúcha' (RMSG).

A multiscale syntactic analysis (Hillier and Hanson, 1984) was carried out to understand the degree of polarization of the original centre of Capão da Canoa and the emergence of new centralities in the following spatial and territorial scales (Figure 3): (1) the original centre of the city, where the occupation of the area has started, located in the 1st District of Capão da Canoa, in the most urbanized sector between the seacoast and the Paraguassú Avenue; (2) the urban centre, which is the most urbanized area of the city; (3) the 1st District, where the Capão da Canoa resort and the main urban facilities of the city are located; and (4) the urban area of Capão da Canoa, which incorporates all the existent resorts and real estate developments that are part of the city.

Through the one-dimensional decomposition of the urban network in an axial map, where each street is represented by the fewest and longest lines of sight (Hillier, 1996), two forms of analysis – axial analysis and angular analysis – were carried out using the *DepthmapX 0.50* software (Varoudis, 2015). In the axial analysis the space system is modelled as an integration structure providing clear notions of the topological distances of the urban network (Holanda, 2002) being analysed the following measures to achieve the objectives of this research (Hillier and Hanson, 1984): the Mean Depth, that is the number of spaces travelled to move from one system space to another; the Global integration ( $R_n$ ), that is the level of accessibility of a line and its potential of movement in relation to all other lines in the system being analysed; the Local Integration ( $R_3$ ), which indicates the level of accessibility of a line and its potential of movement in relation to the lines three steps away; and the measures of Global and Local Choice, that globally (all the lines of the system) and locally (only the considered set of lines) reveals the potential of a line to be chosen as part of a path. In addition, the following correlations were performed (Hillier, 1988): intelligibility, which is the result of the correlation between local integration and connectivity (the number of connections in each line or segment); and synergy, which is the result of the correlation between global and local integration.



Figure 2. The city of Capão da Canoa divided into four Districts and eleven resorts

Note: 1 = 1st District of Capão da Canoa; 2 = 2nd District - Capão Novo; 3 = 3rd District – Arroio Teixeira; and 4 = 4th District – Curumim.



Figure 3. Spatial and territorial scales of the city of Capão da Canoa analyzed in the study

Note: 1 = the original city centre, 2 = the most urbanized centre of the city; 3 = the 1st District of Capão da Canoa; 4 (dashed line) = the urban area of the city.

In the angular analysis the spatial network emerges from the segmentation of the axial map (Turner, 2001). The angular analysis adopted the elimination of angles smaller than 25° (by default) that are not perceived as changes of course and direction in urban navigation and can be assumed as a direct route between points (Hillier, Yang and Turner, 2012). This analysis is used in this research because in a large scale system formed by a linear urban expansion with streets that tends to cross the whole system, as in the case of Capão da Canoa, axial lines are not helpful to detect configurational changes at the street segment level. Therefore, the following measures are considered: Global Integration (R<sub>n</sub>) and Local Integration (R<sub>3</sub> step) to predict the potential of each segment to be a desired destination; Global and Local Choice to calculate the potential of each segment to be selected by pedestrians and drivers as part of their paths.

### 3. RESULTS

The original city centre (Scale 1; Table 1) has symbolic importance as the origin of Capão da Canoa and represents a small (30 lines) and a compact chess spatial pattern, and a shallow axial system with a low mean depth (2.71) with practically only three steps depth. The high rates of intelligibility (0.79) and synergy (0.94) creates a robust system that reinforces the co-presence of users with different profiles in the original city centre (Table 1). The maximum global integration (R<sub>n</sub>; 2.48) and local integration (R<sub>3</sub>; 2.83) of the axial analysis are concentrated in the two main parallel streets that cross the original centre – Sepé and Guaraci Streets. Moreover, the axial analysis shows that the main perpendicular roads - Tupinambá Street and Rudá and Flávio Boianovski Avenues - also have higher levels of global integration, acting as main channels of movement of residents and strangers to the original centre of Capão da Canoa (Figure 4).

ANALYSIS	MEASURES AND CORRELATIONS		SCALE 1	SCALE 2	SCALE 3	SCALE 4
			The original Centre (30 lines)	The urban Centre (70 lines)	The District (558 lines)	The City (909 lines)
AXIAL	Mean depth		2.71	3.03	7.79	10.40
	Intelligibility		0.79	0.54	0.20	0.18
	Synergy		0.94	0.92	0.60	0.51
	Global Integration	MÁX	2.48	3.45	1.79	1.24
		MÍN	0.88	1.19	0.41	0.37
		MEAN	1.57	1.91	1.06	0.82
	Local Integration	MÁX	2.83	3.53	4.05	4.05
		MÍN	0.78	1.27	0.33	0.33
		MEAN	1.73	2.24	2.11	2.12
	Global Choice	MÁX	241	1534	98862	280755
		MÍN	0	0	0	0
		MEAN	140.4	140.4	3785.2	8554.1
	Local Choice	MÁX	159	757	4012	3979
		MÍN	0	0	0	0
		MEAN	62.9	62.9	93.8	88
	Global Integration	MÁX	79.32	239.33	1212.41	1958.96
		MÍN	-1.00	209.73	307.73	508.08
		MEAN	62.85	169.23	783.53	1226.24
	Local Integration	MÁX	38.93	40.36	43.45	43.45
		MÍN	-1.00	8.28	5.52	5.27
		MEAN	22.32	27.22	26.60	27.01
	Global Choice	MÁX	2974	41472	4495919	12122563
		MÍN	0	0	0	0
		MEAN	702.3	5076.7	134910.4	337696.9
ANGULAR (SEGMENTED)	Local Choice	MÁX	108	116	126	126
		MÍN	0	0	0	0
		MEAN	38.7	44.3	46.1	46

Table 1 - Summary of measures and correlations in the spatial and territorial scales analysed

On the other hand, the lower global ( $R_n$ ; 1.57) and local ( $R_3$ ; 1.73) mean integration values indicate that there are different centralities through the longer lines of the system. Nonetheless, the segmented analysis shows that the most integrated segments of the system are those located in the most central part of the system. Also, the global and local axial routes choices indicate a greater probability of residents and strangers' movement in the two main lines: Sepé Street - 241 for global choice, 143 for local choice; Guaraci Street - 227 for global choice and 159 for local choice. These lines concentrate commercial and hotels activities, especially on the segments located in the core of the original centre (Table 1 and Figures 4 and 5).

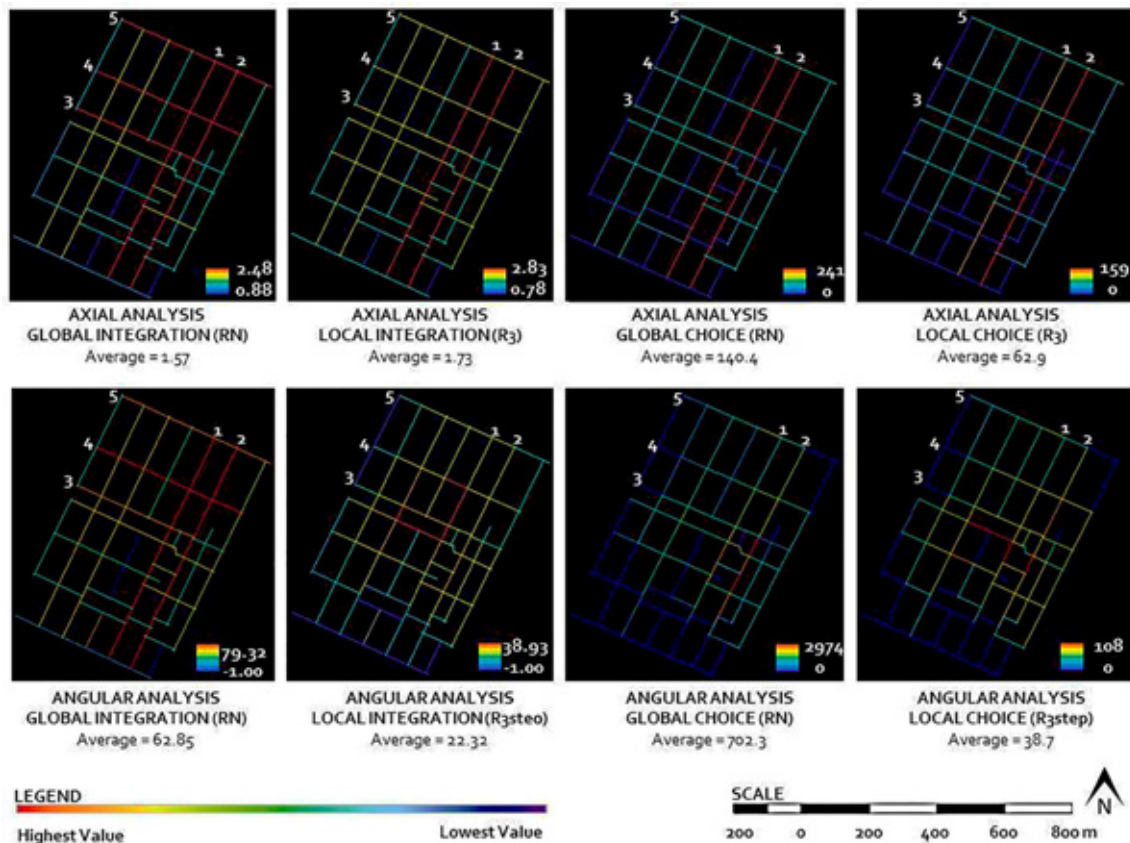


Figure 4 - Syntax analysis of the original centre of the city

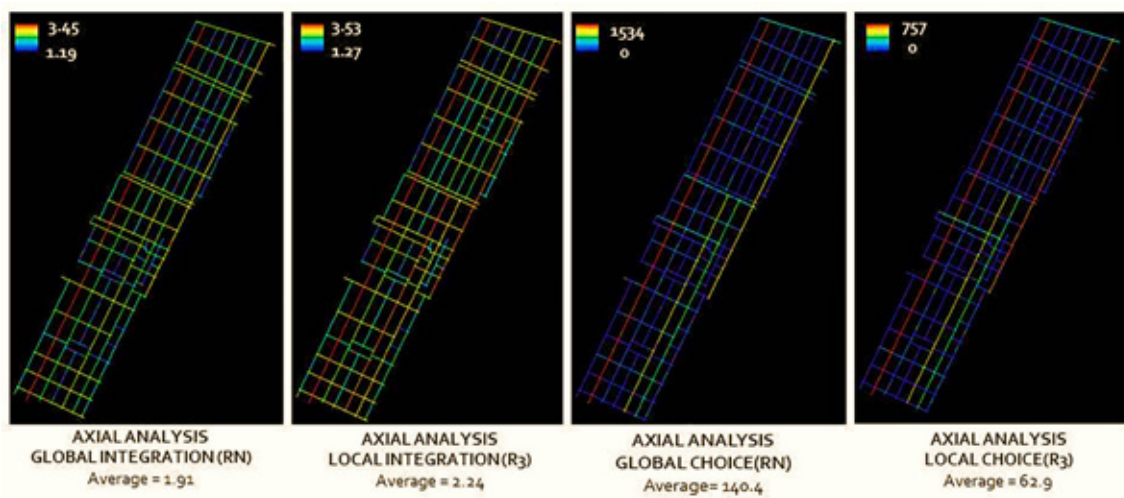
Note: 1 = Sepé Street; 2 = Guaraci Street; 3 = Tupinambá Street; 4 = Rudá Avenue; 5 = Flávio Boianovski Avenue.



Figure 5 - The original city centre and its main urban facilities

Note: Dark grey area rectangle = original city centre; 1 = recreation centre of the city; 2 = segment with commerce in Paraguassú Avenue; 3 = City Hall; 4 = 'Mini Golf 'Square; 5 = segment with shops and services in Sepé Street; 6 = Lighthouse Square; 7 = segment with shops and services in Guaraci Street; 8 = street market.

Extending the scale of analysis, is observed that the urban centre of Capão da Canoa is the most urbanized area of the city and has a shallow system with 70 lines and a mean depth (3.03) that indicates a low deformation in the urban grid, favouring the appropriation of the space by residents and strangers. This configuration is fundamental to strengthen the centrality of this area and the predominant commercial activities in the region, such as shops, restaurants and markets, and services such as real state agencies, that acts as the economic base of Capão da Canoa. In addition, the intelligibility (0.54) of the urban centre of Capão da Canoa decreases significantly (31.7%) in relation to the original centre (intelligibility = 0.79) while the synergy of the system continues to be high (0.92), decreasing only 2.1% in relation to the original centre of the city (synergy = 0.94), reinforcing the potential of polarization of the original centre (Table 1).



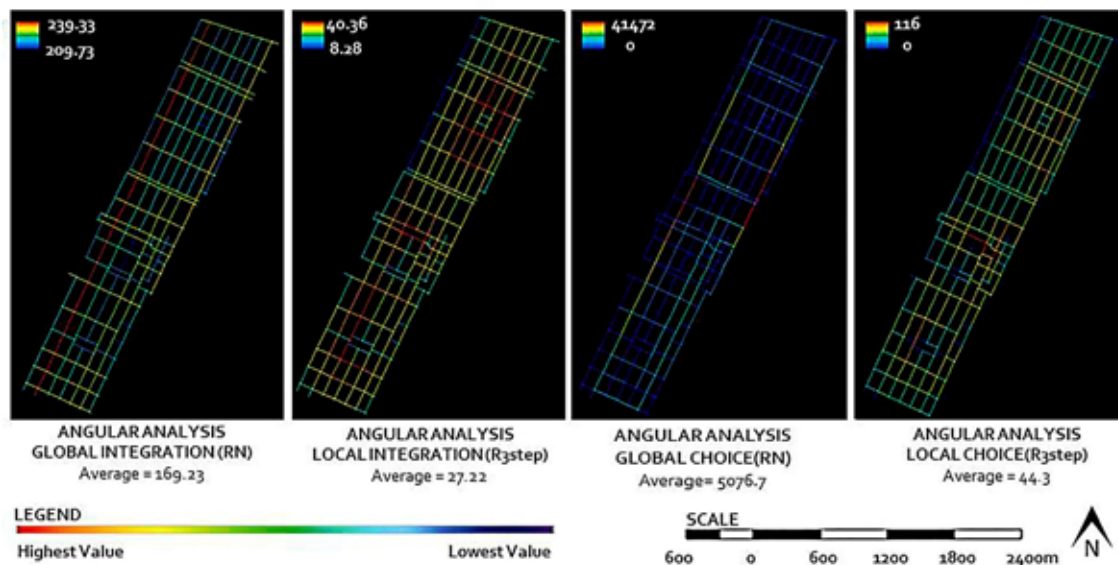


Figure 6 - Syntax analysis of the urban centre of the city

Moreover, the axial analysis shows that the global ( $R_n$ ; 1.91) and the local ( $R_3$ ; 2.24) mean integration values reinforce each other, indicating strong coherence between the movement at city scale and at the local scale of the neighbourhood (Figure 6). The Paraguassú Avenue (Figure 4) captures the global centrality, having the largest global Integration value of the system (3.53) and acting as the main route (1534), connecting to the original centre of the city and to the main local route (757). In addition, this Avenue has the highest local Integration value ( $R_3$ ; 3.53), favouring the co-presence of residents and strangers and the establishment of shops and services along its extension. These results tend to be repeated in the angular analysis (Table 1 and Figure 6). The Beira-Mar Avenue also has high global ( $R_n$ ; 2.83) and local integration ( $R_3$ ; 3.20) values revealed by the axial analysis, been the main access to the waterfront area, where the largest pedestrians and vehicles movements are concentrated. This is one of the reasons why this avenue and adjacent streets concentrates the tallest buildings (up to 12 storeys high) and the highest density developments of the city.

As revealed by the angular analysis ( $R_{3step}$ ), the local integration shows, that there is also a formation of two local centralities, one to the south and one to the north of the original city centre. These areas have been recently urbanized with a predominance of 12 storey blocks of flats (Figures 6 and 7) and small local shops, directing residents to shop in the original city centre or along Paraguassú Avenue. However, these blocks of flats tend to be occupied only during vacation periods, culminating in a large number of vacant flats during the year and negatively influencing the movement of people in the original centre of Capão da Canoa. Additionally, these buildings are located in peripheral areas of the urban centre. These blocks of flats and the more segregated location from the original city centre are in tune with the profile of users with higher purchasing power who tend to choose such flats for greater security (especially in the south local centrality due to the proximity of the police station), individuality and privacy, and the fact that they do not use public space frequently. In addition, even with the proximity to the sea and the existence of well-maintained squares in the vicinity of these buildings, residents often prefer to enjoy the vertical condominium facilities.



Figure 7 - The urban centre of Capão da Canoa

Note: 1 = North local centrality; 2 = Original centre of the city; 3 = South local centrality; A = Police station.

Thus, as allowed by the current master plans (Capão da Canoa, 2004), an intense morphological transformation is observed in the urban centre of Capão da Canoa characterized by the construction of high rise buildings. Moreover, there is a tendency that these tall buildings will expand to the central areas, to areas near to other resorts waterfronts in Capão da Canoa and in neighboring cities due to the demands of the real estate market.

The urban centre is located in the 1st District of Capão da Canoa, the largest of the four districts of the city with 558 lines and a shallow system due to the low deformation of the predominantly orthogonal urban grid. This system has a mean depth (7.79) that is lower than the mean depth of the urban centre (3.03) and of the original city centre (2.71). Consequently, the intelligibility (0.20) decreases significantly, 63.4% lower than the urban centre and 75% lower than the original centre. The synergy value (0.60) still indicates a robust system, suggesting the permanence of diverse co-presence of residents and strangers. On the other hand, this synergy value is 34.8% smaller than the synergy value of the urbanized area of the city and 36.2% smaller than the synergy of the original centre, what highlights the degree of polarization of the original centre (Table 1). Furthermore, the mean global integration value ( $R_n$ ; 1.06) shown by the axial analysis is also smaller than the mean global integration values of the urban centre of the city ( $R_n$ ; 1.91) and of the original centre ( $R_n$ ; 1.57); this shows that the ring system comprising these areas reflects the coherence of the location of the functional and symbolic centre which originated Capão da Canoa due to the greater level of accessibility to this area (Figure 8).

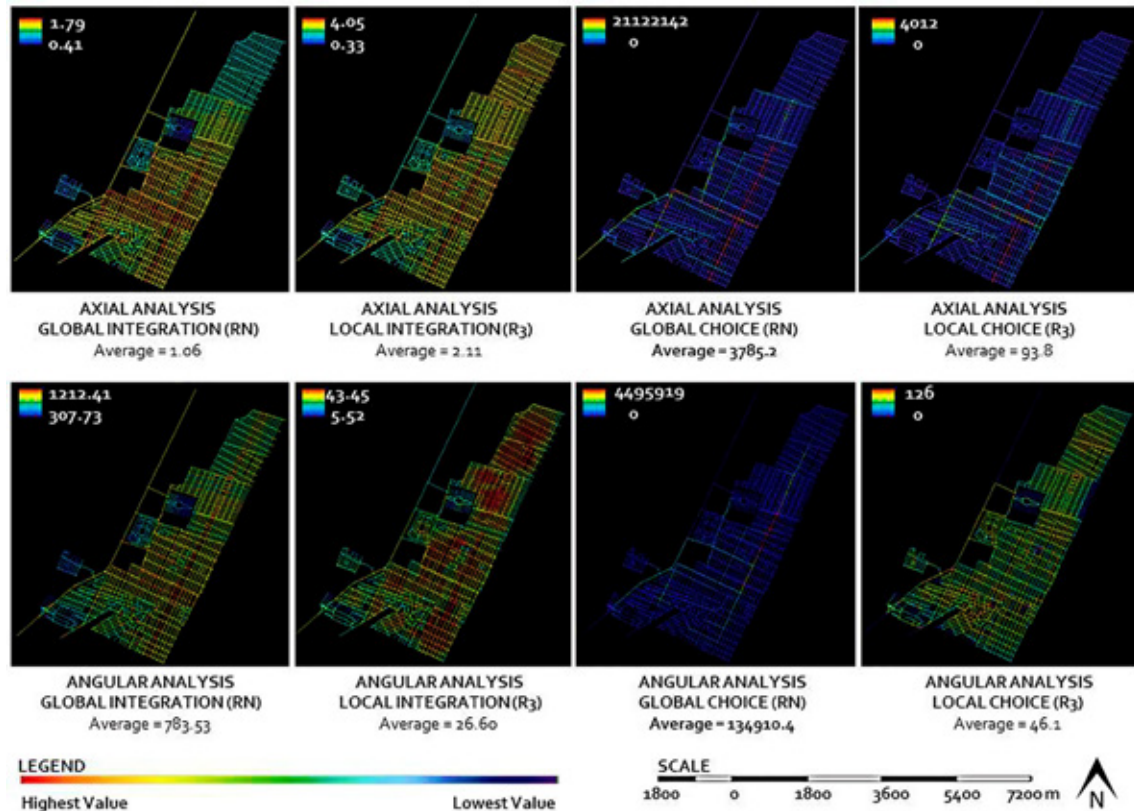


Figure 8 - Syntax analysis of the 1st District of Capão da Canoa

While the level of local control tends to remain the same, with a mean local integration ( $R_3$ ) value of 2.11 revealed by the axial analysis, the lines with the highest global integration values ( $R_n$ ) are those representing the main accesses to the city, including part of the RS-389 Road and of the Paraguassú Avenue. In a system tending to orthogonal grid hegemony, this avenue functions as a generator of centrality, concentrating shops and services, the main urban facilities (e.g., city hall, bus station, police station, and airport) and the greatest pedestrians and vehicles movement (Figure 9). Thus, the area between Paraguassú Avenue and the seaside, which encompasses the original and the urban centres of the city, has a more global centre, aimed at residents and mainly at vacationers.

On the other hand, the characteristic “edge effect” of the orthogonal grid highlights the spatial segregation at the limits of the urban system, and the “patchwork” effect resulting from the private management of the urban land. In these areas the real estate sector stimulates the construction of gated communities, which has become a striking feature of the urban expansion of the city of Capão da Canoa (Figure 9). Aimed at users with higher purchasing power and located in the peripheral areas close to the main access road to the city (RS-389), these gated communities are connected by streets with high global integration values and so, that favour the rapid access to these places.

These gated communities are surrounded by walls and have access control with the aim of offering greater security to its residents, emphasizing its spatial segregation in the system. These communities also have a wide range of recreational facilities such as squares, swimming pools, gym, artificial beaches, shops and restaurants, so that residents do not need to leave the walled gated condominium to participate in leisure activities. Additionally, local shops begin to appear on the main access routes to these gated communities, reducing the need for their residents to travel long distances to the original city centre or to Paraguassú Avenue. Besides, these residents usually prioritize the use of the car, which facilitates the trips to neighbouring cities centres.

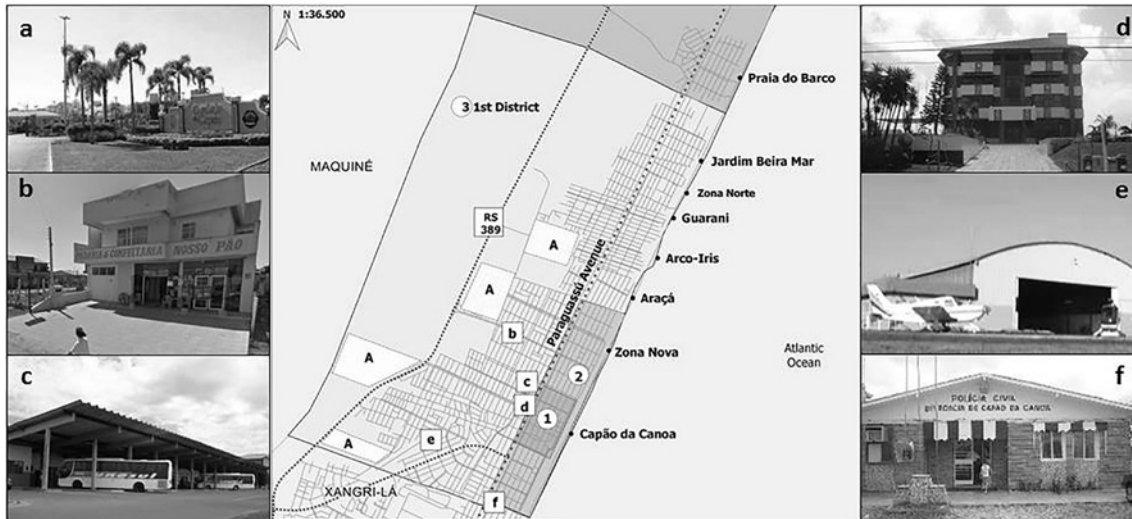


Figure 9 - The 1st District of Capão da Canoa

Note: 1 = original centre of the city; 2 = urban centre of the city; 3 = 1st District of Capão da Canoa; A = gated communities; B = local businesses; C = bus station; D = city hall; E = airport; F = police station.

Thus, as occurs with the high rise buildings, the private spaces of the gated communities tend to negatively influence the pedestrians flow in the original city centre. Nonetheless, these gated communities are already predominant in the 1<sup>o</sup> District of Capão da Canoa, and tend to increase even more expanding to other districts of the city. Thus, there is a need for greater control of this urban expansion through urban indicators that should be included in the current master plan and other local legislations.

The urban sprawl of the City of Capão da Canoa occurs mainly through the use of the grid model tending to the orthogonal, discontinuous and variable in grain size, in private lots distributed along the seafront. In this context, the intelligibility (0.18) and the synergy (0.51) of the system at the City scale are low due to the discontinuity of the system formed by a fragmented and discontinuous linear urban expansion, resulting in a non-robust system and in social segregation of the city users, reproducing socioeconomic inequalities of daily life also in recreational spaces. Furthermore, the discontinuity of the urban network between the different resorts of the city generates a deep system (mean depth of 10.40) with a low mean global integration ( $R_n$ ; 0.82), tending to a fishbone, interconnected only by the RS-389 Road and Paraguassú Avenue (Table 1 and Figure 10).

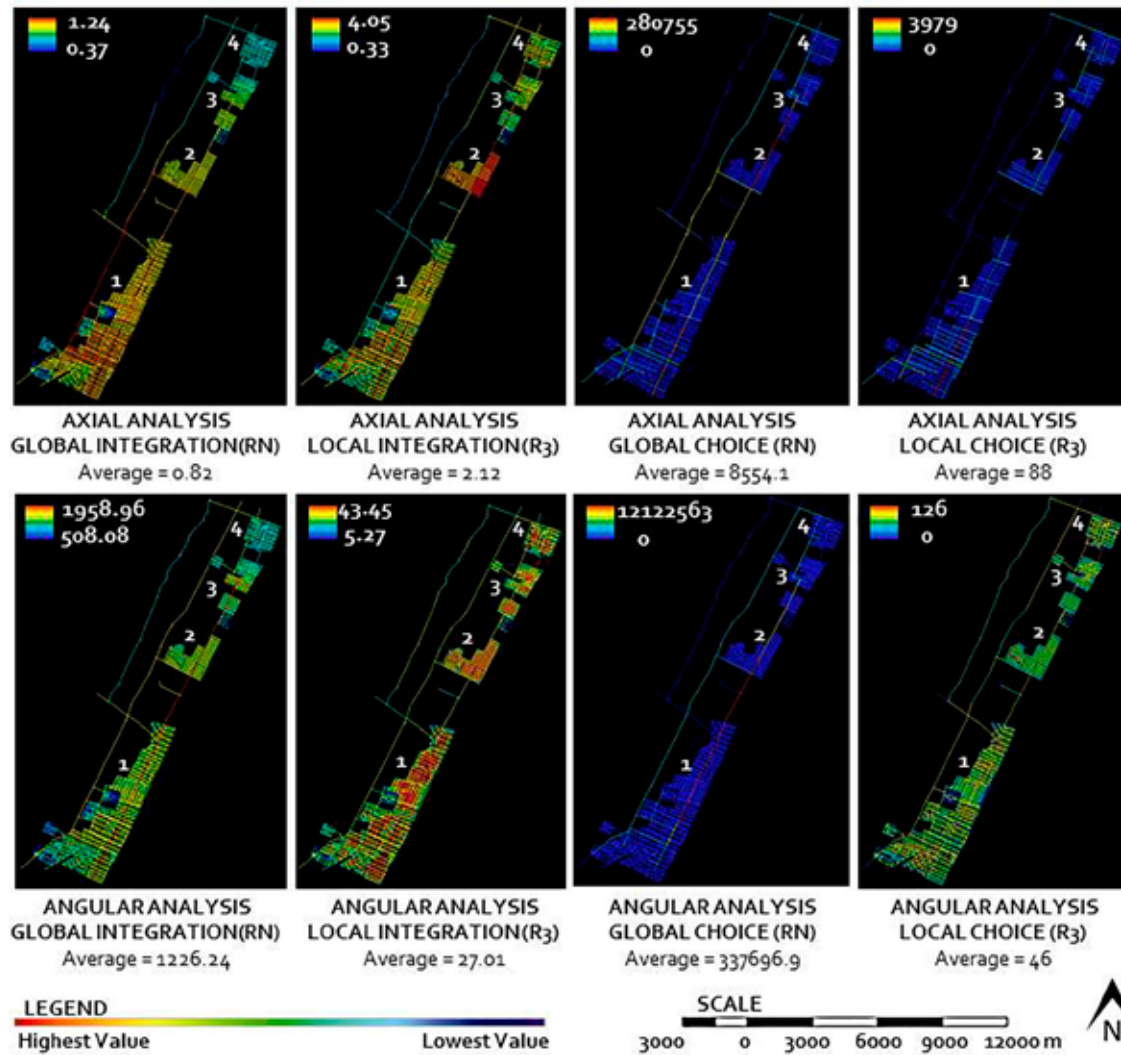


Figure 10 - Syntax analysis of the urban area of the city of Capão da Canoa

Note: 1 = 1st District of Capão da Canoa; 2 = 2nd District - Capão Novo; 3 = 3rd District – Arroio Teixeira; and 4= 4th District – Curumim.

The longest line represent Paraguassú Avenue that is located in the 1st District of Capão da Canoa City has the greater global (RN; 1.24) and local integration (R<sub>3</sub>; 4.05) being the most connected line to the old and consolidated urban fabric of the city. Hence, this line favours the movement of residents and strangers and the flow of vehicles in the city and connects the resorts of Capão da Canoa and the city itself to the City of Xangri-lá in the south. The continuity of the Paraguassú Avenue organizes the distribution of the residential plots, resulting in a tree type configuration, capturing the movement and becoming a linear centrality in the city scale. This configuration type favors the local control of constant users (mean local integration - R<sub>3</sub> = 2.12), mainly in areas where the orthogonal grid size with reduced grain is maintained, as is the case of the segment with the higher local integration value between the seaside and the Paraguassú Avenue in the District of Capão Novo (Figure 10). Furthermore, through the measure of local integration (R<sub>3</sub> step) revealed by the angular analysis it is possible to identify the different resorts (Figure 2) that make up the City of Capão da Canoa and the new centralities that are emerging in the central area of each resort (Figure 10).

In addition, the highest measure of global choice (RN; 280755) and, mainly, the highest measure of angular global choice (RN; 12122563) have their routes shifted to the geometric centre of the system at Paraguassú Avenue. Unequal allocation of morphological properties between parts

of the system formed by different resorts of the city give rise to a new type of structure of integration and accessibility due to the process of urban expansion; this causes the dependence of the original urban network in the 1<sup>st</sup> District of Capão da Canoa to 2<sup>nd</sup> District of Capão Novo. Thereby, this spatial configuration formed by the urban expansion of the city directly influences the degree of polarization of the original centre of Capão da Canoa and the new centralities that begin to emerge locally in other resorts.

#### 4. CONCLUSIONS

The analysis of the urban sprawl of the coastal city of Capão da Canoa shows that its original centre maintains its centrality and the greatest polarization potential in the various scales considered. The orthogonal grid of the city centre, besides having a symbolic character related to the origins of Capão da Canoa, establishes a main functional hierarchy of the analysed system. These results contradict those which reveal the decay of old centers of other cities and a consequent change of centrality. In the city of João Pessoa (Brazil), for example, it has been noticed the transference of bank agencies and notarial offices located in the historical centre to areas that now have more intense movement. This kind of changes attends the market interests, which search for new highly profitable developments as the old city centres decay (Dias and Trigueiro, 2012).

On the other hand, the urban expansion of Capão da Canoa occurs along the waterfront, creating a discontinuity among the resorts of the city, connected only by RS-389 Road and Paraguassú Avenue in a non-distributive system, what weakens the characteristic land subdivision chess pattern. In this context, it is possible to identify the emergence of polarizing new centralities in the street segments where other resorts networks connect to Paraguassú Avenue. These results are supported by the fact, as highlighted by Hillier (2007), that the urban network is formed from the aggregation at the local scale, justifying the importance of multiescalar analysis in space syntax. The continuity of the linear circulation system along the coast is also an intrinsic characteristic of the coastal occupation in Brazil, including that of large cities such as Rio de Janeiro (Azevedo, 1992). The proliferation of high rise buildings next to the beach and gated communities in the periphery of the city also seems to affect the degree of polarization of the original centre of Capão da Canoa. This is related to the fact that these real estate developments are often occupied only temporarily during vacations and are aimed for a certain type of user, that prefers privacy and to avoid the use of the public open spaces.

Thus, the research results show that the centralities are related to configurational and non-configurational parameters, been directly affected by the morphological and spatial transformations resulting from the urban expansion of the city. Additionally, it is highlighted the applicability and importance of the multiscale syntactic analysis in relation to the polarization of urban centres, the emergence of new centralities, and concerning the influence of the urban sprawl in such centralities.

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