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Title: Territorial organization and economic and social cohesion in Portugal

Abstract: The accessibility is a factor that tends to lose relative weight in the theories on the location and the spatial organization. However, urban centres and accessibility are key factors to promote social, economical and territorial cohesion. Due in part of the increase of the accessibility in the last fifteen years the spatial organization of the Portuguese territory has strongly changed. The increment of the accessibility also contributed to increase of interurban accessibility and to widen influence areas of the urban centres. More territorial flexibility and more and easier mobility of people and goods are others consequence. Shaping of territorial polycentric structures at the national and regional levels, is also one of the consequences of the accessibility. This process will tend to be strengthened with the execution of infrastructures foreseen in the road plan. In the past the centrality and the dimension of the urban centres were a major factor in the spatial organization. Today and in the future flexibility and nodality become important factors in the spatial organization. This paper discusses some of these subjects, on the basis of the results obtained in a recent research project.

1.Introduction

This paper aims at to present some aspects related with the territorial cohesion in Portugal. Special importance is attributed to the urban centres and to the accessibility, as key factors of the territorial integration process.

Some of the presented conclusions result from one research project titled " Urban Network and accessibility: recent trends in spatial organization"¹. This project had as essential objective to evaluate the main transformations took place in the spatial organization of the Portuguese territory, namely in the urban system.

In the first part, some aspects related with the evolution of the economic and social cohesion are mentioned in the external and internal context.

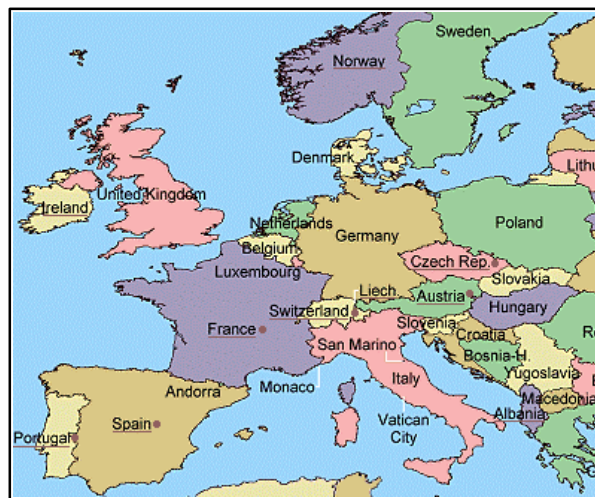
In the second part the results found in the scope of the project are presented and discussed.

Finally, in the conclusion, it is called attention to some chances and threats that may happen in the future due to the increase of the accessibility in the Portuguese territory.

2. Main aspects of the spatial structure of the Portuguese territory

The Portuguese territory may be inserted in one rectangle with about 700km of length and 200km of width, which area does not exceed in a 92000 km² located in the periphery of the European Union territory and the Iberian Peninsula (Figure 1).

Figure 1- Portugal in Europe



The main feature of the spatial structure is the concentration of the economic activities and population of the country in the coastal band, especially in the metropolitan areas of Lisbon and Porto. The great infrastructures and equipment of development (motorways, ports, airports, universities, head hospitals, technological centres, research centres, etc.) and the head offices of the big companies of services are located in this coastal band. The resident population of the Portugal is about 9.7 million inhabitants, living in the coastal band Approximately 90 % of the population

all the country. In the Metropolitan Areas of Lisbon and Porto 38% of the population of the country is concentrated.

Beyond the two metropolitan areas only two urban centres exceed 50 000 inhabitants and eleven urban centres comprised between 40000 and 50000 inhabitants (CEDRU, 1996).

3.Towards of the economic, social and territorial cohesion

According a recent study of the OECD (1999) Portugal has been one of the State Members of the European Union that presented more significant economic performance in the last 25 years. In 1980, Portugal was in the ninth cluster of countries together with Italy, Greece and Ireland, while in 1996 the country integrated the third cluster of countries to the side of Austria, Germany, Italy, United Kingdom and Spain.

According to the EEC, when Portugal adhered to the EEC in 1986, the GDP per capita was 55,8% of the EU average, having gone up to 73% in 1998. In what concerns to some social indicators (schools, education rate, health services, job, dwelling comfort and sanitary conditions, etc.), PDR 2000-2006 presents a positive evolution and convergence to the EU average.

The Composite Index of Human Development defined by the United Nations (CIHD) when applied to Portugal² presented a value of 81,6% in 1997 against 69.4% in 1981 (Ministério do Planeamento, 1999). The different regions of Portugal do not present a homogeneous evolution in the process of convergence in relation to the EU average. Although there has been a global convergence of the values of the CIDH, very contrasted situations in development terms still exist.

The CIHD presents higher values in the regions (NUTS III) of the coastal band and lower values in the regions of the interior (Figure 2 and 3).

Figure 2- CIHD in the Portuguese regions in 1997

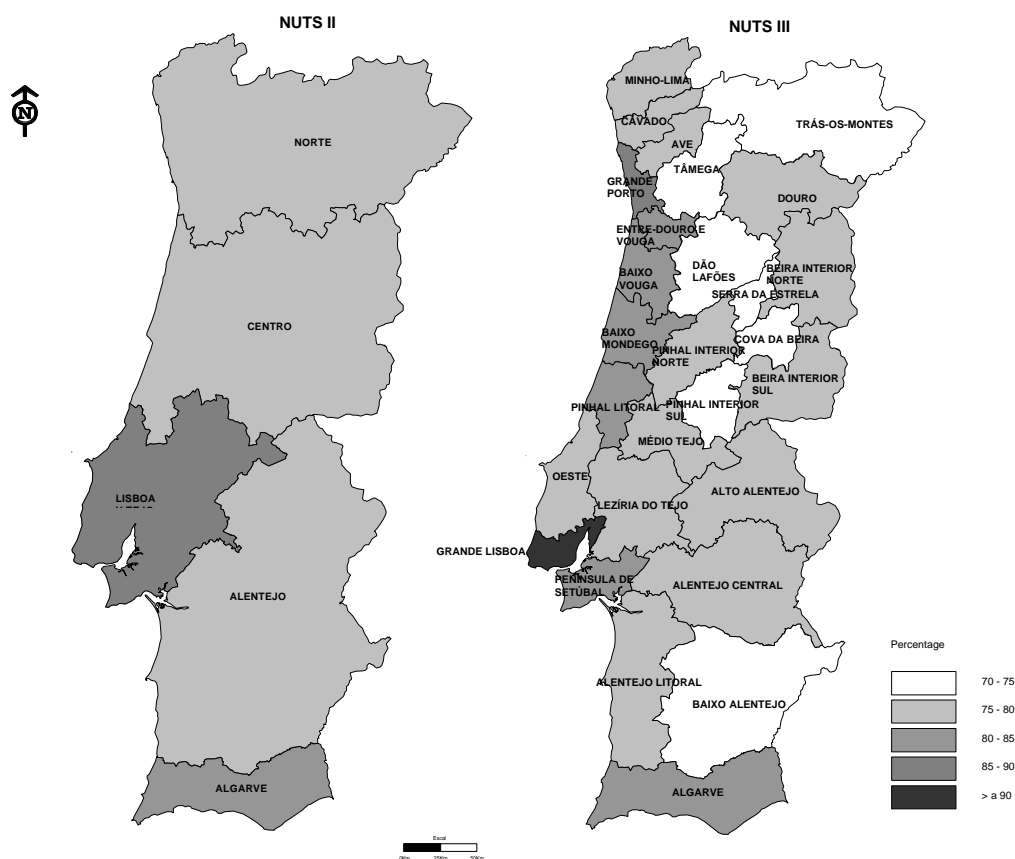


Figure 3- Evolution of the CIHD in the Portuguese regions

Regions (NUTS II)	1970	1981	1991	1997
Norte	54,1	68,5	76,3	79,9
Centro	51,6	65,6	74,4	78,8
Lisboa e Vale do Tejo	66,5	75,1	84,3	86,8
Alentejo	46,4	60,3	72,3	76,0
Algarve	48,2	64,5	77,6	80,3
All Regions	56,1	69,4	78,3	81,6
Standard Deviation	0,127	0,068	0,053	0,046

Source: PDR 2000-06

4. Urban network and accessibility: key factors of the promotion of the territorial cohesion in Portugal

In the last 15 years a strong investment to build and improve of the infrastructures (roads, communications, railroad, airport and telecommunications) has made by Portugal. The level of mobility and the accessibility in territory has strongly increased (Figure 4).

Figure 4 – Evolution of the some indicators related to mobility

Indicators	1983	1998	Var. (83-98)		
			Abs.	(%)	
Motorways (Km)	168,6	1252	1083.4	642.6	
Main National Roads (km)	712	1678	966	135.7	
Second National Roads (km)	609	1133	524	86	
All Motor Vehicles Registrations (10 ³)	2381	6041	3660	135.7	
International Freight Goods Traffic Road	(10 ³ ton.)	1629	18350	16721	1026.5
	(% of total)	6.3	28.6	22.3	354
Fuel Consumption on Traffic Road (10 ³ ton.)	2570.6	3791,3	12207	47.5	

Source: NSI

At the same time side, the urban centres have increased the level of facilities and services to provide the needs of the social community (administrative jobs, health services, schools³, libraries, sport locations etc.), and to promote the economic efficiency of the business sector (banks, jobs of computer science, jobs of telecommunications, accounting, etc.)

These transformations have contributed to the creation of new centrality's and new connections among urban centres which have been studied in the research project "Urban Network and accessibility: recent trends in the spatial organization" already referred.

4.1.Urban Network

Following the " theory of the central places ", the Portuguese urban system can be classified in five hierarchic levels (Figure 5).

Firth Level - Lisbon and Porto: main centres of the two metropolitan areas where the central functions and services of excellency of high level are concerted; economic and social context very diversified and strongly internationalised.

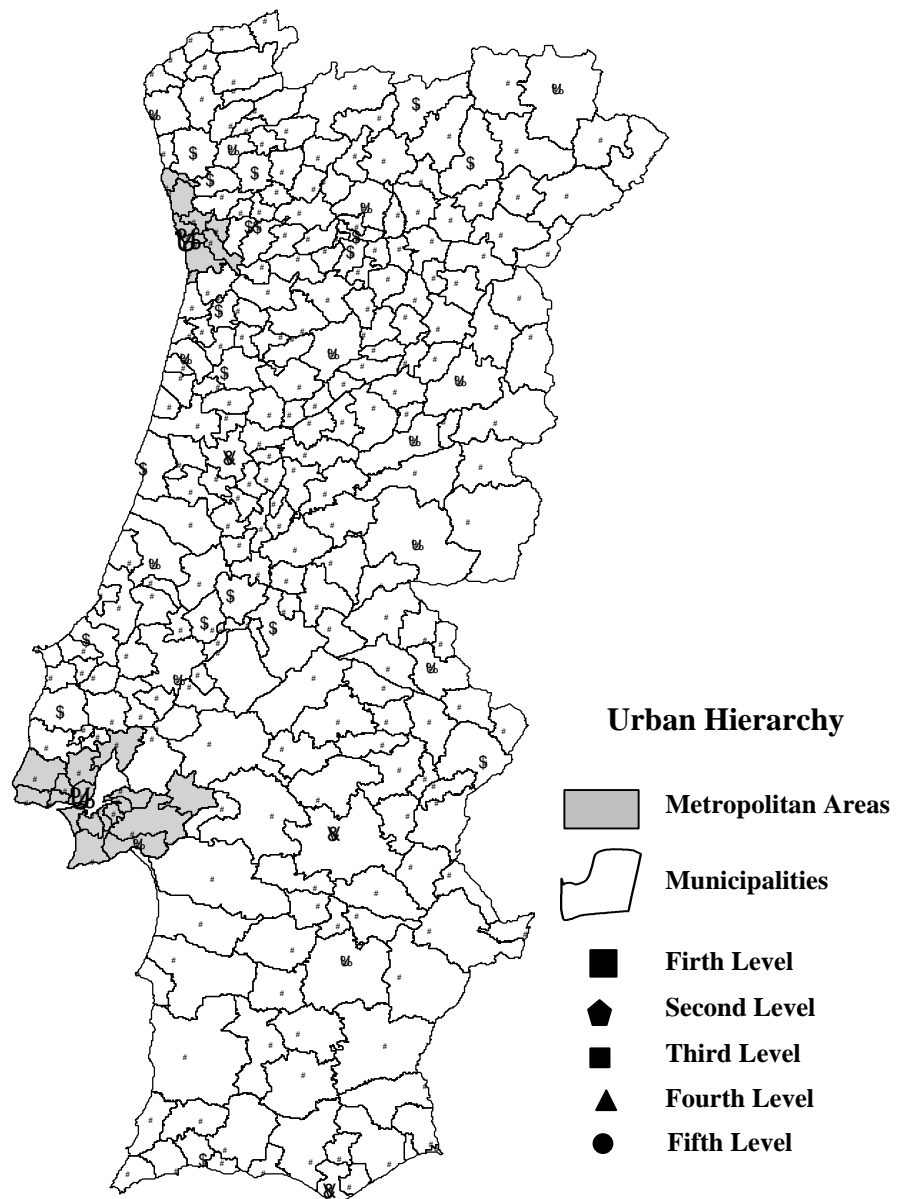
Second Level - Regional urban centres: to which some regional administrative functions have been decentralized and disconcentrated.

Third Level – Head of district urban centres and equivalent: with strong administrative tradition where there are some regional delegations of the Public Management and with important weight of high and medium education level.

Fourth Level – Supra-municipal urban centres outside the metropolitan areas: with significant population and equipment and functions of intermediate level (hospitals of first level and institutions of high and medium education level).

Fifth Level - Municipal Centres: basic level of the urban network where there is a minimum set of equipment and services which satisfy social and economic activities needs (postal delivers, public health, basic schools, banks, insurance, jobs, etc.).

Figure 5 – Portuguese Urban Network



For each urban centre of each level the evolution of the accessibility by car in three different dates in accordance with the existing plans for the road network (1985, 1998) and proposal of National Road Plan 2000 was evaluated regarding having the criteria established in Figure 6.

Figure 6 – Urban Centres and calculated indicators

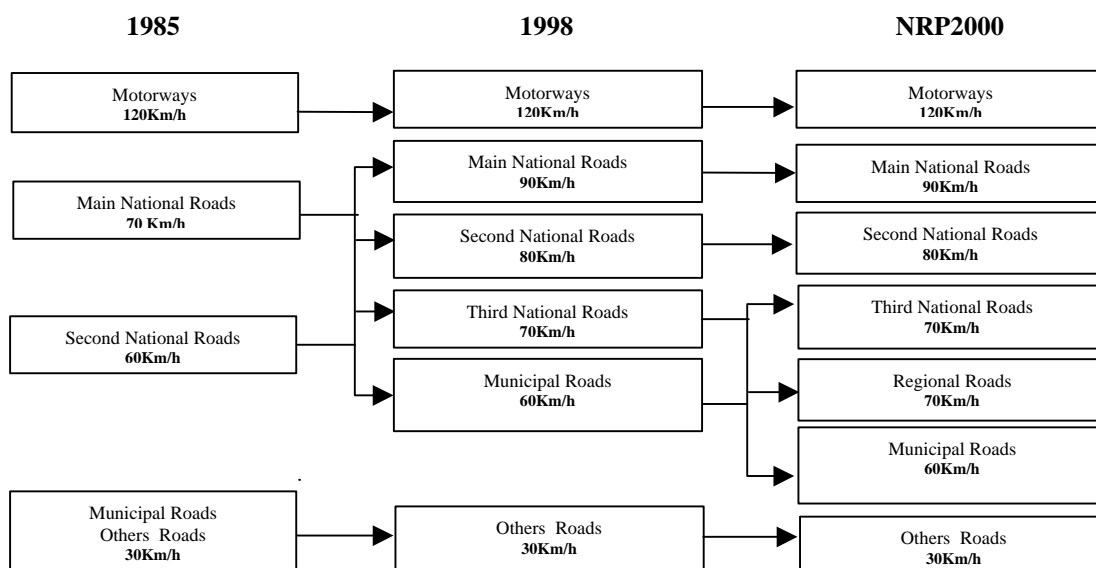
Urban Hierarchy	Urban Centres	Isochrone First threshold Second threshold	Territorial Integration Indicators ¹		
			1985	1998	NRP 2000
First Level	Lisboa and Porto	2 hours 4 hours	Inhabitants 1981 Area Number of municipal centres Population Density	Inhabitants 1991 Area Number of municipal centres Population Density	Area Number of municipal centres
Second Level	Regional (5 centres)	1 hour 2 hours			
Third Level	District (19 centres)	30 minutes 1 hour			
Fourth Level	Supra-municipal (38 centres)	30 minutes 1 hour			
Fifth Level	Municipal (275 centres)	15 minutes 30 minutes			

¹ For each municipal centre the number of inhabitants within a circle with a 5 km ray was evaluated (based upon the population census) and the population density in the so defined circles was calculated for those dates.

4.2.Roads

For the calculation of the accessibility the roads of Military Map of Portugal at the scale 1:250 000 and of the classification established in have road plans had been used, having been loaded in a GIS conceived for this purpose (Figure 7).

Figure 7 – Typology of roads and average speeds considered

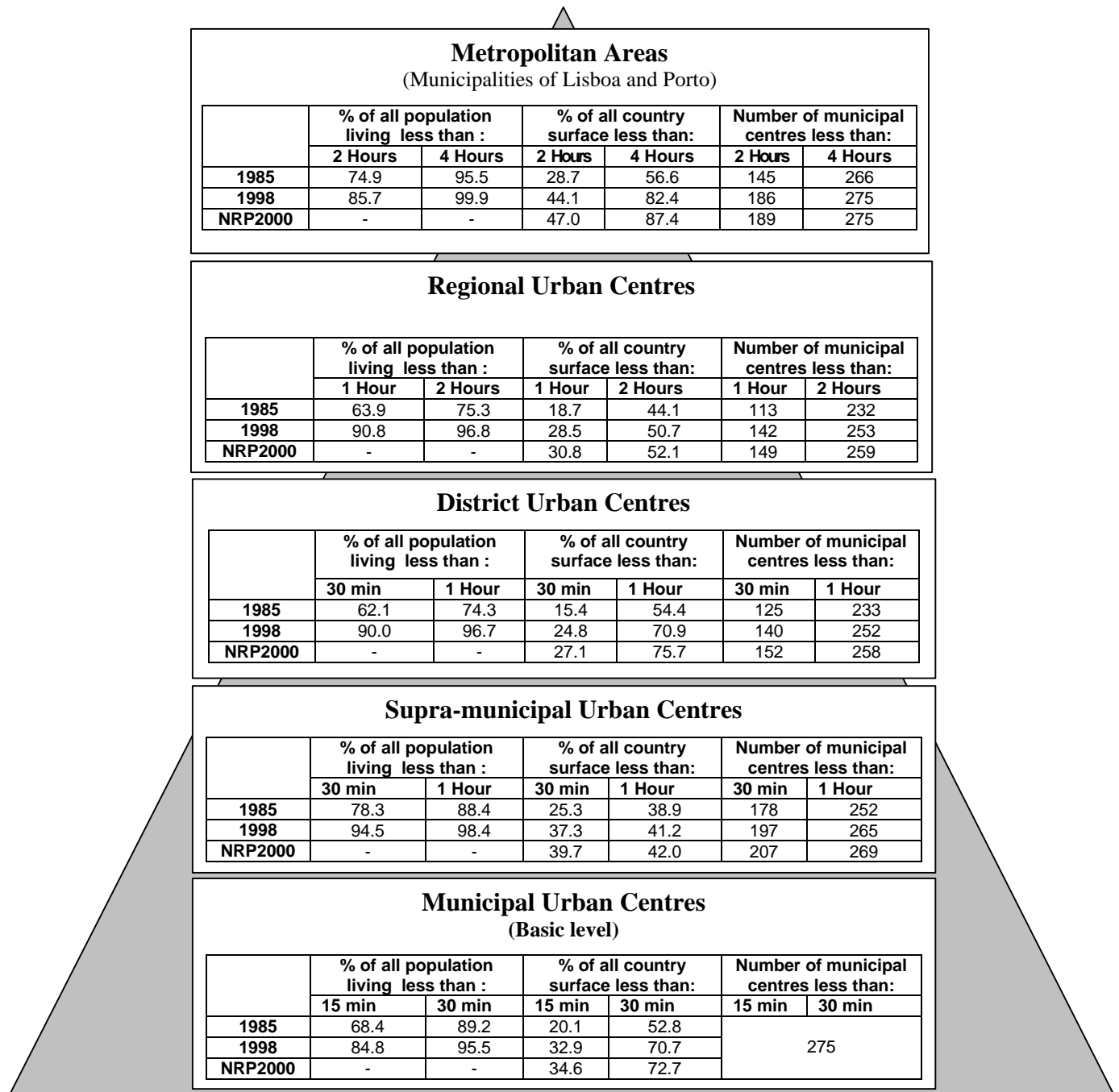


4.3.Territorial integration and urban centres articulation

For every urban centre despite of the hierarchy level to which it belongs to the percentage of the resident population in the first threshold of accessibility in 1998 was

placed above 95,5% of the total population. The minimum value of the same index was placed around 74.3 % in 1985 (Figure 8).

Figure 8- Territorial and social integration indicators

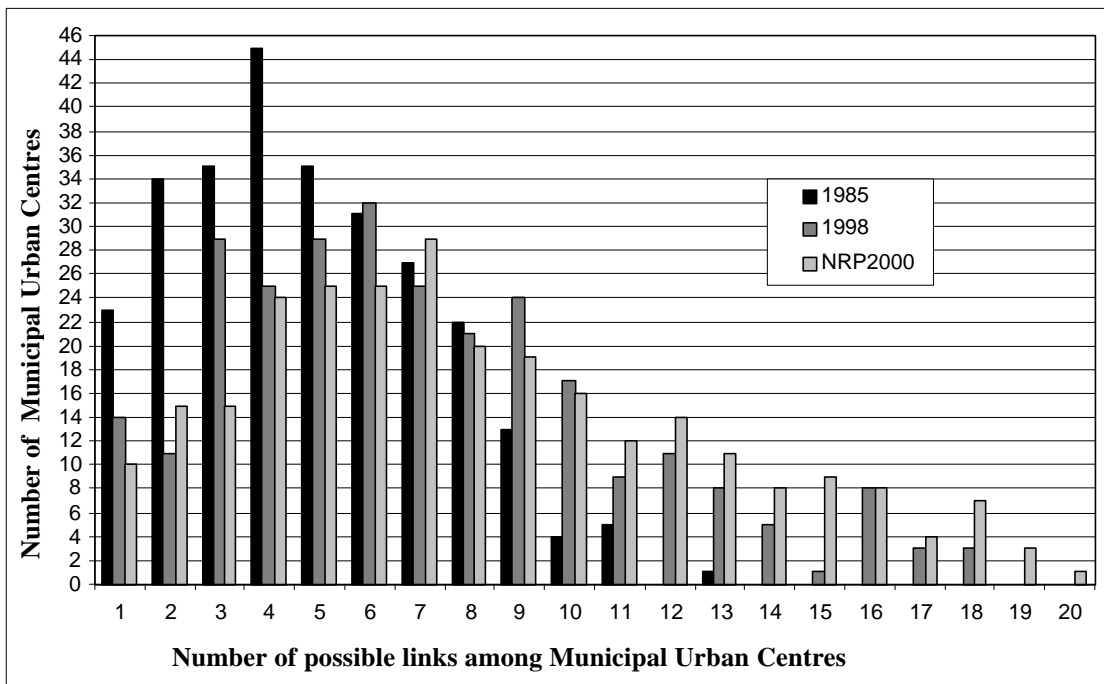


In what concerns to the area integrated in the first threshold of accessibility the minimum value passed from 38,9% to 42% of the area of the Portuguese territory. However, considering the first threshold of accessibility the minimum value of the

resident population in 1985 was 62,15% while in 1998 this value was 84,8%. For the integrated area these values correspond to 15,4% and 27,4%, respectively.

The total number of possible links between municipal centres and the average number of possible links that it is within 30 minutes from one municipal centre has magnified significantly changed (Figure 9 and 10).

Figure 9 - Evolution of the number of possible links among municipal centres within isochrone of the 30 minutes



The values found for 1985 reveal a certain "territorial isolation" and the difficulty of articulation among the urban centres. There were forty-five centres that could establish link with three other municipal centres within in the isochrone of the 30 minutes. Also in this date only one urban centre could establish twelve links with others, within the same time.

On another hand the values found for 1998 and for the end of the National Road Plan 2000 (NRP2000) reveal a bigger easiness of articulation between the urban centres, in the perspective of the accessibility. The average number of possible links and the maximum number of possible links have increased in a significant way (Figure 10).

Figure 10 - Evolution of the number of links among urban municipal centres in the isochrone of 30 minutes

	1985	1998	NRP2000
Number of possible links among all municipal centres	1327	1940	2240
Greatest number of possible links among municipal centres; (number of municipal centres)	13 (1)	18 (3)	20 (1)
Number of municipal centres without link another urban centre	23	14	10
Number more frequent of possible links among municipal centres; (number of municipal centres)	4 (45)	6 (32)	7 (29)
Average of number of possible links among municipal centres	5	7	8
Standard Deviation	2,5	3,9	4,5
Coefficient of variation	0.50	0.56	0.57

In 1985, twenty-three urban centres did not establish any link with another centre in the isochrone of 30 minutes, while this value lowered to fourteen centres in 1998 and it is expected to reach only 10 centres in the end of the NRP2000.

The lower values of the standard deviation and of the coefficient of variation in 1985 are the results of a bigger homogeneity of the accessibility conditions, however in a context of lower global accessibility. In this context, the centrality and the dimension of the urban centres were a major factor in the spatial organization.

The higher values of the standard deviation and of the coefficient of variation in the most recent date and in the future result from significant increments of the number of possible links among the urban centres. These values reveal a lower homogeneity of the accessibility conditions, although in a general context of higher accessibility.

Flexibility and nodality become important factors in the spatial organization. The increase of accessibility and territorial integration also translates a bigger easiness of territorial articulation. These facts may lead either to favour processes of territorial dispersion or to promote a deepening of the territorial concentration and polarisation, having in account the reduced dimension of the major set of Portuguese urban centres.

4.4. Territorial polarisation

Despite the generalised increase in the accessibility in the whole Portuguese territory, it is in the coastal band that this increase promotes more significant processes of urban articulation and territorial polarisation and shaping urban conurbation's (Figure 11). These processes result from the widening of the influence areas of the urban centres and from a process of urbanisation in extension with higher population densities.

In the interior regions inward, there is only one urban centre concentrates simultaneously, more than 30 000 inhabitants in a ray of 5 km and more than 100 000 inhabitants in the isochrone of the 30 minutes. Another one only congregates a number slightly higher than 30 000 inhabitants in a ray of 5 km (Figures 12 and 13).

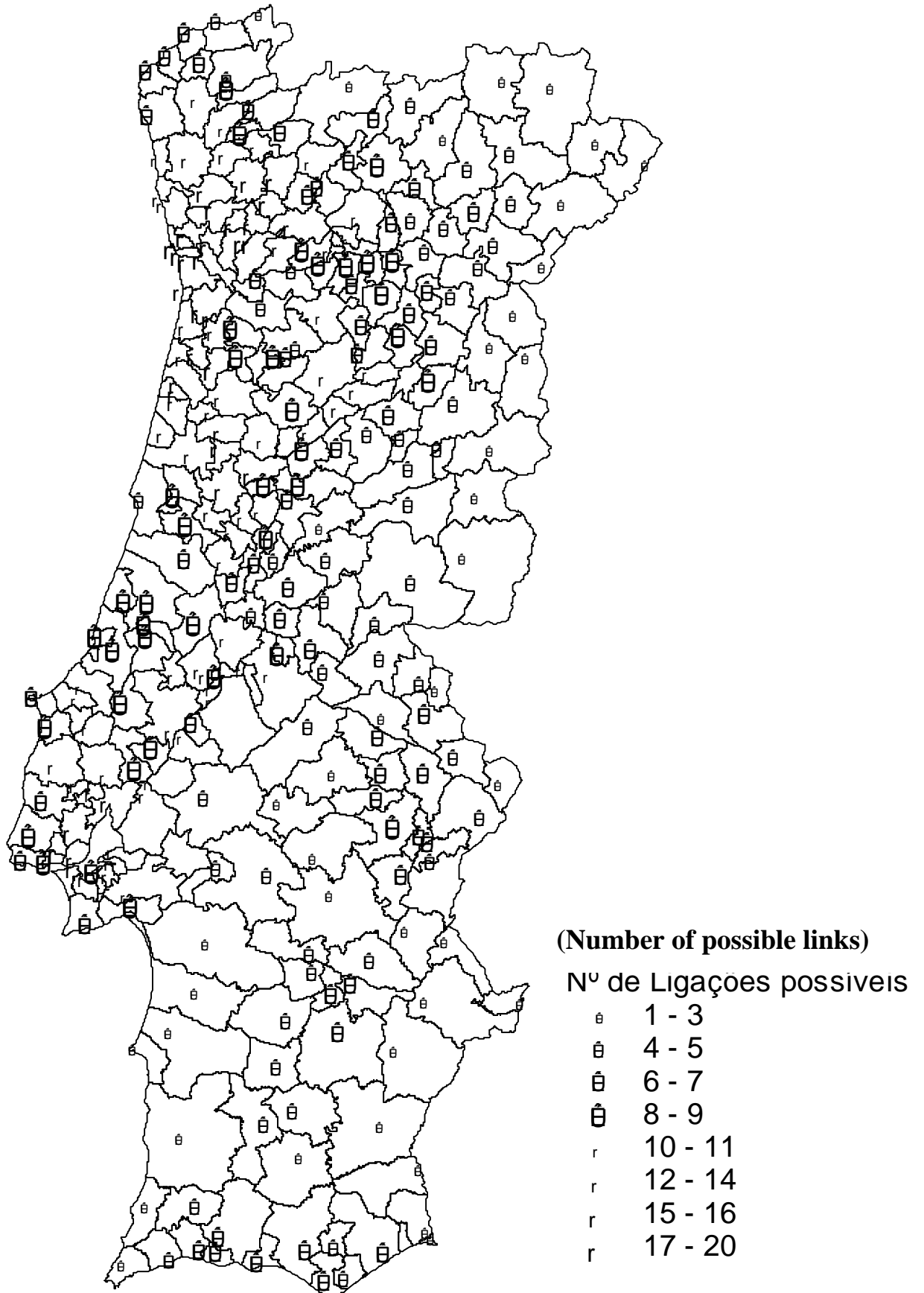
Still there is one reduced number of urban centres with more than 100000 inhabitants in the isochrone of the 30 minutes. All the remaining territory of the interior regions is characterised by low levels of polarisation and concentration of population in small and medium urban centres.

4.5. Conurbation's and polycentric spatial structure

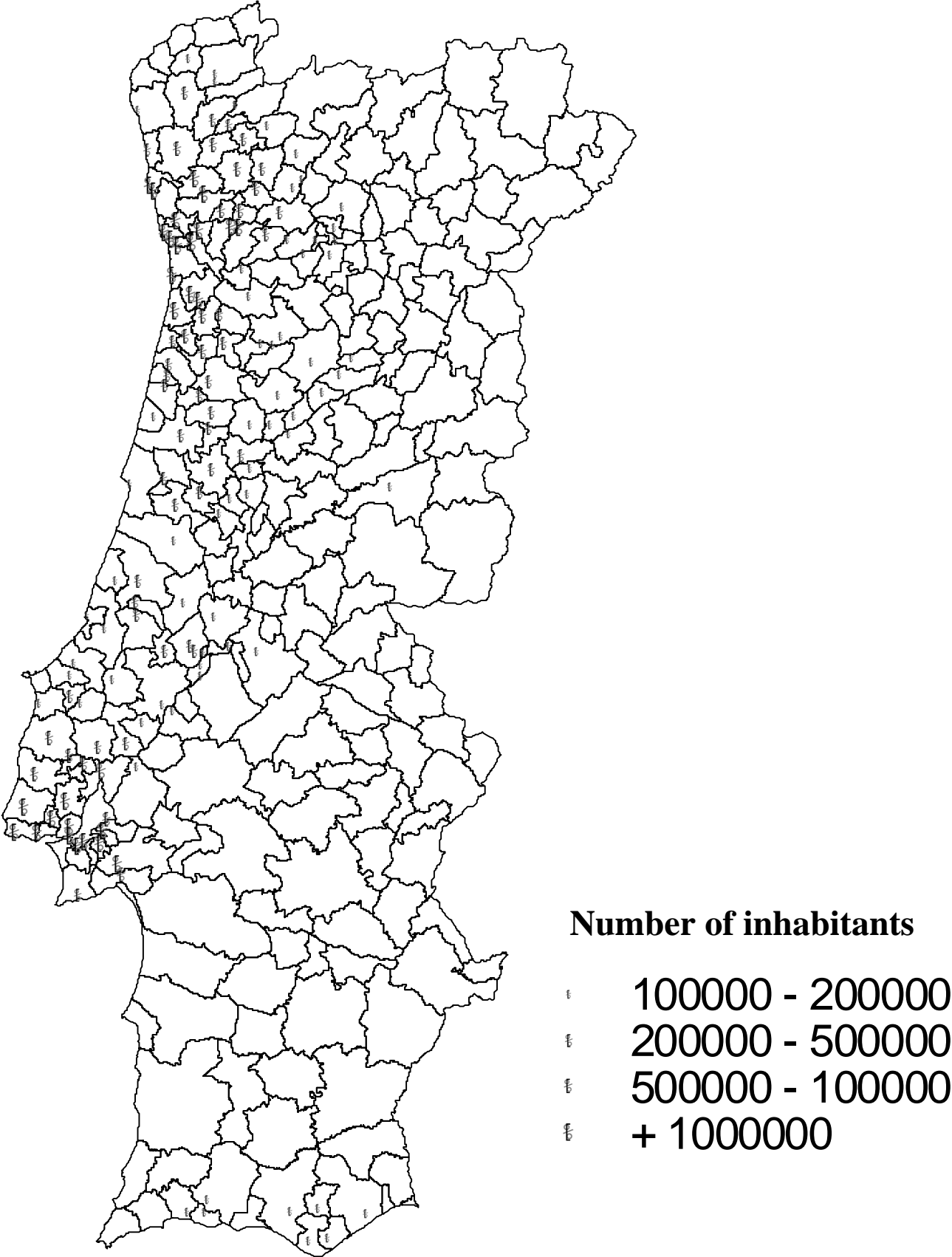
The urban conurbation and the polycentric spatial structure are empirical evidence in the spatial organization of the Portuguese territory that will tend to develop with the conclusion of the great infrastructure of transports. These territorial structures have been and are developed in a similar way in the coastal band and in the interior regions.

One must pay the due attention to use the advantages of these territorial structures as form to promote the more sustainable development in a similar way as it happens in other countries. Strengthen the polycentrism in spatial structure and adequate sectorial policies (transports, economic activities, facilities and equipment) and urban formulation policies of "networks of cities" must be done with that goal.

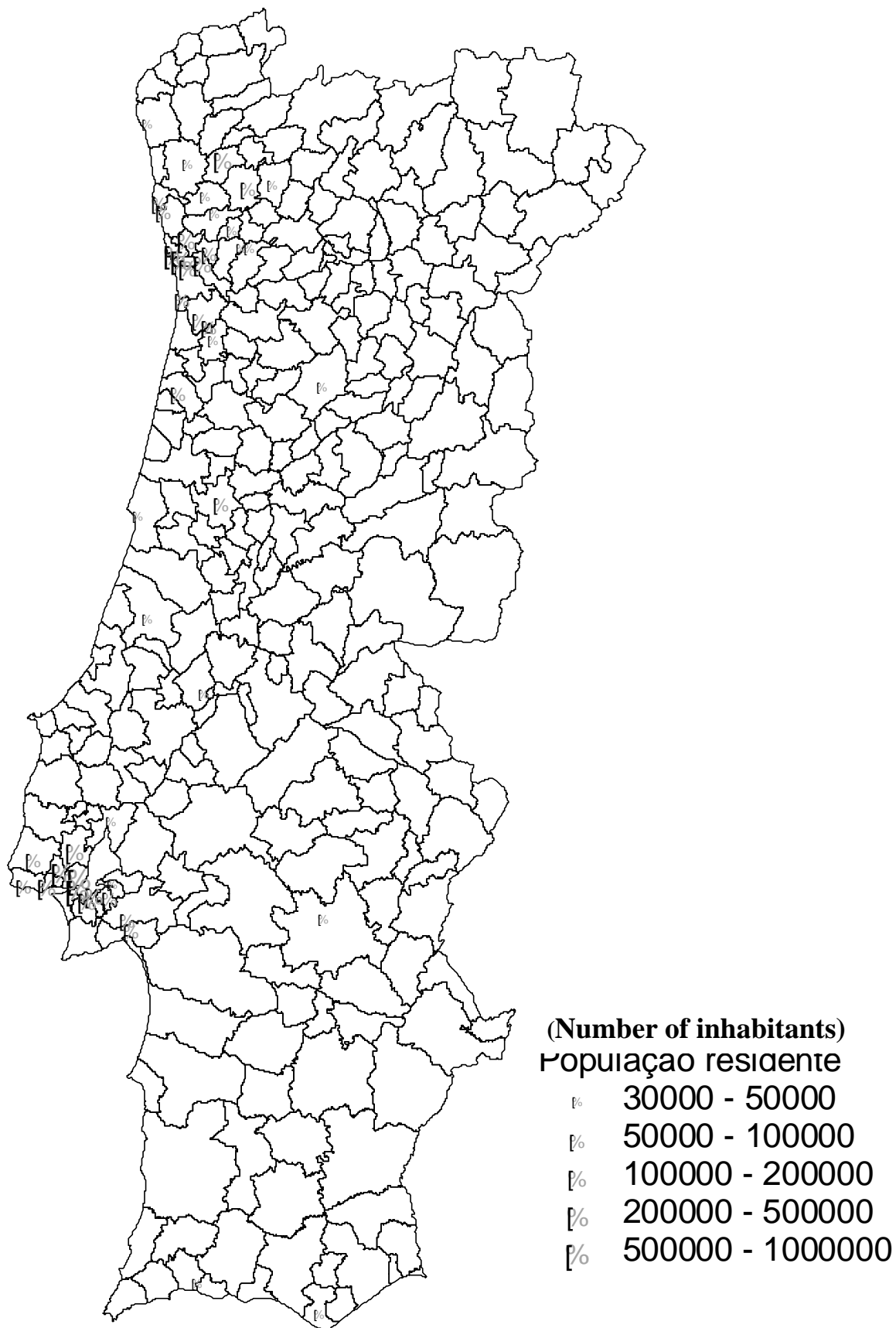
Figure 11 – Number of possible links predicted among municipal centres within



**Figure 12 – Population living within less than 30 minutes of one Urban Centre in 1998
(Only the municipal urban centres with population ≥ 100000 inhabitants are represented)**



**Figure 13 – Population living within a circle a ray of 5 km to one Urban Centre in 1998
(Only the municipal urban centres with population $\geq 30\ 000$ inhabitants are represented)**



5. Conclusion

The accessibility is a factor that tends to lose relative weight in the theories on the location and the spatial organization. However, in last the 15 years, the increment of the accessibility was one of the factors that had more influence in the spatial organization of the Portuguese territory (and it will have influence in the next years) owing to the deficient road infrastructure existing in the middles of the decade of 80.

This increment was followed by a bigger dispersion of urban functions and had immediate consequences in the satisfaction of many existing deficiencies namely to the physical access to the economic and social providers. More territorial flexibility and more and easier mobility of people and good are other consequences.

The increase of the accessibility also contributed to a better definition and a bigger balance of the territorial structure at the national level. The reinforcement of the territorial cohesion and interurban connections are also increased. Better accessibility promotes bigger integration and articulation of the urban system and the reinforcement of relationships between urban areas and rural areas.

Shaping of territorial polycentric structures at the national and regional levels is also one of the consequences of the accessibility increase will tend to be strengthened with the execution of infrastructures foreseen in the road plan. The accessibility increase will also have to be guided, in the time and the space, to reinforce these territorial structures.

However, accessibility places in evidence an important fragility of the national urban system: the small dimension of the majority of the urban centres. In the coastal band the advantages are clear and point to the direction of the reinforcement of the increase of population and economic activities, as consequences of widen influence areas of the urban centres. In the other regions this increase of the accessibility represents in itself a threat and a chance.

6. Acknowledgements

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7. Notes

¹ This project was carried out in the National Centre of Geographic Information with the collaboration of the Department of Geography and Regional Planning of the New University of Lisbon

²The Index is constructed from pointers related with the Average Hope of life, Illiteracy, comfort of dwellings and GDP the per capita.

³ In high and medium education level in 1984 only 22 urban centres make use of an educational establishment, but, in 1998, 60 urban centres made use already of an educational establishment

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