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GEOGRAPHY OF TALENT FOR UNDERSTANDING REGIONAL DISPARITIES IN SPAIN

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Abstract: Tentative empirical evidence suggests that the agglomeration of talent contributes to regional development. However, given that talented people are not evenly distributed across regions, this paper seeks to determine the role of talent for furthering our understanding of regional disparities in Spain. Here, we empirically evaluate the effects of the distribution of talent on regional differences by means of a detailed analysis of the 17 Autonomous Communities of Spain between 1996 and 2004. The static and non-spatial panel data models are constructed. The unit of analysis is NUTS2. Our findings confirm that the economic performance indicators point to the significant positive impact of talent on regional economic activity. The concentration of talent plays a crucial role in accounting for regional differences. Based on a preliminary analysis of the dispersion in employment and production figures among the Autonomous Communities, the performance of Spain's outperformers and underperformers is clearly not uniform.

Key Words: *talent, regional differences, panel data, Spain.*

Introduction

Talent is an emerging paradigm at the heart of the debate about economic development and a subject of growing interest among not only economists, economic geographers and, regional scientists (Florida 2002a, Mallender and Florida 2007), but also sociologists, and urban planners (Power and Scott 2004, Hartley 2005, Cooke and Lazzeretti 2008, Lazzeretti et al. 2008). Regional development is driven by changes in economic specialization; Karlsson and Johansson (2008) identify talent as the basic driver of such regional specialization and development. Knowledge based economic growth and local development today are found according to Lucas (1988), in association with the productivity gains brought with the „clustering of talented people". Other authors have similarly highlighted that local development is closely related to the presence of high skilled human capital (Glaeser et al. 1992, Henderson et al. 1995, Capone 2006). Indeed, economists have long stressed the link between the agglomeration of talent and regional development, reporting tentative empirical evidences that the agglomeration of human capital contributes to regional development. Given this association between talent and economic development, and the fact that talent is unevenly spread, it becomes critical to understand the factors that account for its varied geography (Mallender and Florida 2007).

This paper contributes to the literature by investigating the Southern European case study, Spain. It attempts to identify the role of talent for furthering our understanding of regional disparities in Spain. Here, talent is identified as the group of individuals who are highly educated and occupied with strategic sectors, which assumed to be strategic for regional

growth in that they provide economic specialization, including the high-tech sector, knowledge intensive services, real estate, architecture and engineering, R&D, advertising and market research, professional, scientific and technical activities, financial and insurance activities and creative activities. This paper constitutes an empirical evaluation of the impact of talent on regional differentiation by means of a detailed analysis of the 17 Autonomous Communities of Spain between 1996 and 2004. The static, non-spatial panel data models are simply constructed. The unit of analysis is NUTS2.

In the following section, discussions in the literature examining the impact of the concentration of talent on regional development are briefly reviewed. In section 3, first, the geography of talent, the characteristics of the Spanish regions and their levels of development are described. Second, data and research methodology are outlined, while the concentration of economic activity and the spatial distribution of talent in Spain's Autonomous Communities are analysed, the models of talent and regional development are discussed and findings are presented. The last section evaluates and discusses the achieved results.

Theoretical Framework: Talent and Regional Development

Many studies demonstrate that the quality of a region's labour force is a key determinant of that region's economic success (Glaeser 2000, Florida 2002a, Simon and Nardinelli 2002, Petrov 2008). Talent have long been linked to urban and regional growth and their presence considered key components of innovation, is essential for economic development. In this section we provide a brief summary of the voluminous literature on the effects of the concentration of talent on regional development. The literature has two types of talent: human capital and creative class (Qian 2008). As discussed above, highly educated people and employment in selected sectors, deemed strategic for the economic performance of regions in that they provide economic specialization, comprise our measure of talent. This paper examines accordingly the impact of both on regional disparities in Spain.

In recent decades, knowledge based and creative sectors have encouraged economic specialization. Thus, cities specializing in these industries characterized by their rapid productivity growth have undergone faster growth, attracting more college graduates from other regions. Thus, it would seem that knowledge based and creative sectors play an important strategic role in urban and regional economics and development (Karlsson et al. 2009). Talent geographically presents uneven distributions, both across countries and across regions or cities within a specific country (Qian 2008). Talent seems to concentrate in larger urban areas (Lucas 1988, Glaeser 1994). Based on the role of talent in explaining the relationship between inequality and economic growth, various studies have sought to determine whether growth is heterogeneous (Paci and Usai 2001, Castello and Domenech 2002, Ahmed 2009).

Karlsson et al. (2009) note that the critical input to the knowledge economy – the human capital – is strongly concentrated in geographical space, much more so than most other types of economic resources and activities. Thus, they conclude that human capital exhibits strong tendencies to agglomerate in certain locations (Karlsson et al. 2009, Berry and Glaeser 2005), human capital levels are diverging and its concentration is likely to continue to occur in certain regions only (Florida 2002, Berry and Glaeser 2005). Growing interest in the knowledge economy has led to the development of new economic growth models, frequently referred to as the theory of endogenous growth, in which the production of knowledge is endogenously determined, and in which the spillover of knowledge plays a critical role in the growth process (Romer 1986, Lucas 1988). The new growth theory associated with Romer (1990) formally highlights the connection between knowledge, human capital, and economic growth. In the new

endogenous growth models, human capital occupies a central role in spurring growth as knowledge spillovers and human capital externalities aid in delaying the tendency for diminishing returns to capital accumulation (Barro and Sala-i-Martin 2004).

There are strong theoretical arguments, supported by tentative empirical evidence that the agglomeration of human capital contributes to regional development. Human capital theorists (Becker 1964, Glaeser 2005) argue that concentrations of educated people will produce high levels of long-term economic growth. The importance of human capital to regional economic growth has been well documented. For years, human capital had been established by economists as a robust predictor of per capita income levels (Hoyman and Faricy 2008). As mentioned by Qian (2008), Ullman (1958) had noted the importance of human capital in regional development half a century earlier. Eaton and Eckstein (1997) and Black and Henderson (1998) suggested that given spillovers in the accumulation of human capital, workers are more productive when they locate near others with high levels of human capital.

Human capital has been shown to correlate with growth both in the service and knowledge economies (Barro 2001, Black and Lynch 1996, Zucker et al. 1998, Hoyman and Faricy 2008). Barro (1991) provided evidence that human capital or education is a significant contributor to economic growth. Glaeser (1998, 1999 and 2000) provided empirical evidence of the association between human capital or talent and regional economic growth. Glaeser et al. (1995) found a strong relationship between human capital and city growth, showing that cities which begin with more educated populations exhibit higher rates of population growth over time (Florida 2002). Simon and Nardinelli (1996) examined the connection between human capital and city growth in the US and the UK finding that the level of human capital in 1880 predicted city growth in subsequent decades. Simon (1998) and Glendon (1998) found a strong relationship between the average level of human capital and regional employment growth over a considerable time frame (Florida 2002). Barro (1991), Rauch (1991), Glaeser (1994, 1998, 2000), Glaeser et al. (1995), Glendon (1998), Simon (1998) claimed that human capital is a crucial driving force of economic development. Other studies (Florida 2002, Lee et al. 2004, Acs and Armington 2006, Audretsch et al. 2006, Mellander and Florida 2007) show that human capital is associated with innovation or entrepreneurship. It is argued that in addition to the skill level, the creative ability of the labor force (or of the creative class) is an essential component of the endogenous development of urban areas (Anderson 1985, Florida 2002, 2002a).

In short, the consensus in the literature appears to be that talent, a measure of human capital based on educational or occupational levels of attainment, is strongly associated with economic development but that it is a factor that displays an uneven spatial distribution. This paper seeks to add some information to this body of literature by examining the situation in a Southern European case study, namely the country of Spain. It sets out to identify regional differentiation associated with the concentration of talent in Spain's Autonomous Communities.

Spanish Autonomous Communities and Geography of Talent

Spain comprises 52 provinces and 19 Autonomous Communities. The crucial future of these regional communities is that they enjoy different levels of autonomy and, hence, there exists a clear differentiation in their competences at the local level. This makes a consideration of Spain‟s Autonomous Communities crucial as they may well hold important lessons for reducing regional imbalances. Indeed, many empirical studies have examined the regional inequality phenomenon in Spain, concluding that, despite some improvements, regional differentiation remains a marked phenomenon (Tortosa-Ausina et al. 2005, Pastor et al. 2010, Cuadrado et al. 1998, Villaverde 2001, de la Fuente 2002, Goerlich et al. 2002, Raymond

2002, Lladós 2002). Drawing on earlier findings, we begin this investigation of Spanish Geography by describing the historical evolution in the country's regional differences.

Historical and descriptive perspective

First and foremost, the size distribution of Spanish regions (in terms of their population) is a crucial factor. Thus, we see that its relatively larger regions are not uniform in terms of their economic performance. For instance, the performance of its regions with the highest populations Andalusia, Catalonia and Madrid and those with the highest population growth between 1981 and 2009 the Balearic and Canary Islands, Murcia, Valencia and Madrid, varied greatly in comparison to the Spanish average performance (Table 1 and Fig. 3). Similarly, Tortosa-Ausina et al. (2005) indicate that while Spanish regions are becoming more alike in terms of their productive characteristics, their welfare continues to present major differences in terms of the size of the dependent population (Tortosa-Ausina et al. 2005). They show that the slowdown in population movement has different origins. First, the deterioration in general economic conditions, which has affected all provinces, has led to a reduction in the possibility of finding a job elsewhere. Second, the new democratic political regime generated strong expectations of improvements in living conditions, thereby reducing the perceived need to emigrate. These expectations were fuelled by a rapid intense process of decentralization as provided for under Spain's democratic constitution passed in 1978. Finally, Spain's accession to the European Common Market, finalized in 1986, together with its declared support for territorial cohesion, further contributed to lowering the willingness to migrate because of investments received by the country's poorer regions from the EU's Structural Funds (Tortosa-Ausina et al. 2005).

Parallel to the size of the regions' respective populations, the highest levels of employment are also to be found in Catalonia, Andalusia and Madrid. Castile and Leon, the Balearic and Canary Islands, and Murcia reported the highest rates of employment growth between 1991 and 2008. In 1991, the highest share of industrial labor in the total regional labor force was recorded in the Basque Country, Catalonia, Navarra, Castile and Leon, La Rioja, while in 2009, Navarra, La Rioja, the Basque Country and Catalonia led this ranking. However, between 1991 and 2009, the greatest fall in the share of industrial labor was observed in Asturias, Catalonia, and the Basque Country, while the highest increase was recorded in Navarra and Extremadura. If we consider the spread of service employment, we find that 50% is concentrated in all regions of the country. The figures regarding the employment of selected sectors, both for 1996 and 2005, indicate that the highest share in the total employment by region is observed in Madrid, the Basque Country and Catalonia.

In terms of the highly educated people, Table 1 illustrates that in 1991 Madrid had the most highly educated labor force, while in 2009 the Basque Country had replaced it. According to Prados de la Escosura and Roses (2009), human capital provided a positive, albeit small, contribution to labor productivity growth thereby facilitating technological innovation, while broad capital accumulation and efficiency gains are complementary in Spain's long-term growth. In the period 1850-2000, Spain experienced a major transformation in the general level of qualifications of its labor force, with the proportion of Spanish workers having completed at least their secondary education more than doubling (from 36.4% in 1985 to 78% in 2002) (Prados de la Escosura and Roses 2009). The rise in the proportion of workers holding a university degree and higher went from 15.97% in 1991 to 47.81% in 2009 in the Basque Country, and from 19.39% in 1991 to 40.82% in 2009 for Madrid (Table 1). The number of jobs for the professionally trained levels has also grown very rapidly in the years between 1850 and 2000 (Prados de la Escosura and Roses 2009).

Table 1

The Ranking of the Spanish Regions

Autonomous communities	Population		Number in employment		Employment in industry				Employment in service sector			
	1981	2009	1991	2008	% in total empl. by region 1991	% in total state em-ploy-ment 1991	% in total empl. by region 2009	% in total state em-ploy-ment 2009	% in total empl. by region 1991	% in total state em-ploy-ment 1991	% in total empl. by region 2009	% in total state em-ploy-ment 2009
Andalusia	6429151	8150467	1847343	3149700	14.98	2.22	8.76	1.46	54.52	8.07	68.10	11.36
Aragon	1196430	1313735	408937	611600	26.73	0.88	17.74	0.57	5.79	1.66	62.02	2.01
Asturias	1128986	1058923	332519	451500	26.90	0.72	13.62	0.33	52.32	1.39	66.93	1.60
Balearic Islands	655134	1070066	254541	509800	13.16	0.27	7.63	0.21	65.46	1.33	72.24	1.95
Canary Islands	1364616	2076585	426521	861700	9.60	0.33	5.80	0.26	69.36	2.37	75.20	3.43
Cantabria	512579	576416	164457	260600	23.69	0.31	16.19	0.22	51.74	0.68	64.24	0.89
Castile and Leon	2582043	2510545	499426	1068100	32.10	1.28	16.76	0.95	81.35	3.26	62.32	3.52
Castile La Mancia	1647876	2022647	790638	842900	14.08	0.89	15.93	0.71	28.29	1.79	59.79	2.67
Catalonia	5948177	7290292	2240086	3494600	33.97	6.10	17.89	3.31	50.70	9.10	62.40	11.54
Valencia	3642816	4991789	1244933	2226200	28.28	2.82	15.19	1.79	51.16	5.10	62.83	7.41
Extremandura	1064289	1080439	270166	409300	12.16	0.26	10.29	0.22	50.96	1.10	63.21	1.37
Galicia	2809201	2738930	901421	1200100	17.23	1.24	16.17	1.03	45.01	3.25	62.50	3.97
Madrid	4679696	6295011	1777594	3064400	0.00	0.00	9.19	1.49	-	-	77.47	12.57
Murcia	953852	1443383	316654	627600	21.61	0.55	12.06	0.40	52.11	1.32	60.26	2.00
Navarra	508679	614526	182660	289400	32.20	0.47	26.74	0.41	47.84	0.70	55.81	0.86
Basque Country	2139860	2136061	701139	995300	35.89	1.96	21.48	1.13	51.92	2.92	63.35	3.34
Rioja	254201	315718	91576	146700	31.81	0.23	23.79	0.18	46.22	0.34	57.12	0.44
Ceuta and Mellila	118615	142637	31192	48100	4.64	0.01	3.53	0.01	85.17	0.21	89.19	0.23

Table 1

The Ranking of the Spanish Regions

Autonomous communities	GDP per capita			TALENT*)					
				Employment in selected sectors (ES)				Employment with university degree or higher	
				ES by region / total employment by region		ES by region / total talent in Spain		% in total employment by region	% in total employment by region
	1996 - euro	2007 - euro	% change	1996	2005	1996	2005	1991	2009
Andalusia	8943	18298	104.60	10.51	12.72	7.36	9.47	12.73	28.84
Aragon	12973	25749	98.49	17.68	17.86	5.07	4.75	13.84	33.60
Asturias	10383	21664	108.65	12.54	14.44	1.76	1.86	13.71	36.48
Balearic Islands	14603	25777	76.51	10.62	12.77	1.59	1.76	10.45	23.58
Canary Islands	11593	20949	81.55	11.33	16.59	0.83	3.46	13.76	27.41
Cantabria	11030	23679	114.69	13.50	13.35	0.45	0.33	12.80	37.38
Castile and Leon	11376	22698	99.53	11.49	12.43	3.32	3.33	9.35	34.35
Castile La Mancia	9872	18402	86.40	8.32	10.04	1.86	2.51	13.69	27.09
Catalonia	14776	27840	88.42	21.82	21.66	32.42	26.56	12.37	32.53
Valencia	11431	21567	88.67	12.35	14.61	4.30	10.96	11.44	28.24
Extremandura	7666	16198	111.31	6.61	9.70	0.55	0.70	11.72	26.61
Galicia	9673	19865	105.36	10.98	11.74	3.08	4.44	9.41	33.40
Madrid	15745	30863	96.02	24.67	25.47	26.84	20.41	19.39	40.82
Murcia	9934	19707	98.38	9.44	10.96	1.47	1.79	11.48	26.59
Navarra	15255	29744	94.98	18.58	18.26	1.79	1.52	15.02	38.87
Basque Country	14221	30650	115.52	22.59	22.04	6.71	5.70	15.97	47.81
Rioja	13682	25262	84.64	10.06	11.61	0.54	0.43	11.83	37.70
Ceuta and Mellila	10100	21583	113.69	-	-	-	-	17.15	32.85

*) Employment in selected sectors from SABI database (data not available for Ceuta and Melilla)
Employment with university degree or higher from IVIE database.

Source:INE (separate data are not available for Ceuta and Melilla, hence use of aggregated data).

The empirical literature examining inequality has mainly focused primarily on the convergence of economic factors, principally per capita income. The studies reviewed, as well as the authors' own study, point to convergence in per capita income among Spanish regions (Pastor et al. 2010). Similar findings are reported by Cuadrado et al. (1998), Villaverde (2001), de la Fuente (2002), Goerlich et al. (2002), Raymond (2002), Lladós (2002), although signs of stagnation in this convergence, and even divergence, have been detected since the mid-1990s, as well as the existence of "clubs" of regions. Marchante and Ortega (2006) analyzed the 1980–2001 period and found that disparities in regional GDP per capita remained constant. According to Pastor et al. (2010), in 1961 two regions recorded higher per capita income levels than Madrid (namely Catalonia and the Basque Country), while in 2001 Madrid led the ranking (Pastor et al. 2010). In 2007, Madrid was still the leader in terms of per capita income. In Maza and Villaverde"s study (2009), provinces are reported as tending to form clusters with similar levels of income per inhabitant with the north eastern part of Spain being the most developed area and the south and north-west of the country being least developed. These authors highlighted the fact that there is a territorial imbalances in relative per capita income in Spain's provinces and that provinces with per capita income levels above (below) the national average tend to cluster (Maza and Villaverde 2009). For the 1961-1981 period, Leonida and Montolio (2001) highlighted the fact that the rich provinces had lost positions in the distribution of income, but that they still created a separate mode (showing *persistence*), indicating that there were few rich regions in Spain in that period. In the period 1991 to 1997 there began a process of polarization of income level. The provinces were grouped in two income levels: below and above average, indicative of this process of income divergence and polarization. The latter provinces were found to be located, primarily, in the north of Spain, as north-south divide became apparent during the nineties (Leonida and Montolio 2001).

In addition to providing information about regional differences in Spain, Figure 1 illustrates the geographical distribution of income among the Autonomous Communities. Indeed, even taking into consideration developments in terms of regional income, the north-south pattern regional inequalities seems to be persistent with the leading communities of Catalonia, Madrid, Navarra and Basque Country remaining dominant. This phenomenon is similarly associated with the rise in the overall development of the communities, which is apparent from the figures recorded in Table 1.

In 1961, the per capita incomes of Andalusia, the Canary Islands, Castile and León, Castile La Mancha, Extremadura, Galicia and Murcia were half that of Madrid or lower (Pastor et al. 2010). In 1996, Extremadura's GDP per capita was still half of that Madrid's (see Table 1). In 2007, the Basque Country had caught up somewhat with Madrid in terms of GDP per capita but Madrid still led the ranking. These two Autonomous Communities were followed by Navarra and Catalonia. Extremadura, Andalusia, Castile La Mancha, Murcia and Galicia still had the lowest GDPs per capita despite some changes in the ranking and Extremadura's GDP per capita was still approximately half that of Madrid's in 2007. However, between 1996 and 2007, GDP per capita more than doubled for most of the regions, especially in the case of the less developed Autonomous Communities. And yet despite the changes in the regional rankings, the developed and less developed Autonomous Communities remained in the same clusters from 1996 to 2007, with the northern regions making obvious progress in terms of economic development (Table 1).

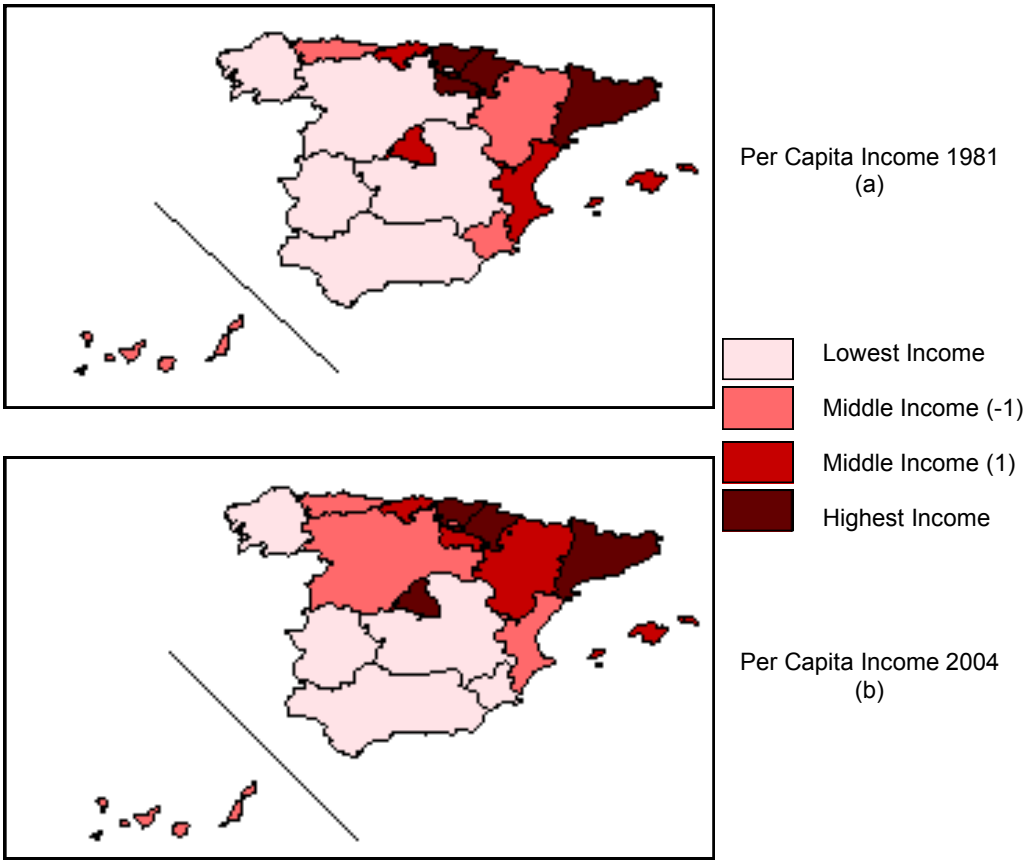

Fig. 1 - **Income Dispersion in Spain (*).** Source: INE
(*) Due to data concerns Ceuta and Melilla are not included
(a) In constant prices (Pesetas)
(b) In constant prices (Euros)

An examination of the contemporary developments in the economic performances of the Autonomous Communities should broaden the perspective on these earlier figures. In the last decade, we can analyze the Autonomous Communities' performance by looking at the industry and service sectors' value added as well as at overall employment levels (relative economic activity level)[1)].Table 2 shows the percentage of working population, and the industrial and service oriented production for in Spanish regions[2)]. Taking the Spanish average as 1.00 for each year, we compute the performance of each community with respect to this average[3)]. This performance also contains information about the concentration of economic activity in Spain.

1) See appendix for the geographical dispersion of industrial and service oriented production in Spain.

2) Ceuta and Melilla are not included because of concerns about the data. As the empirical model is constructed for the 1996- 2004 period, the concentration is also plotted for this same time span.

3) See appendix for the path taken by the index from 1996 to 2004

Although a comparison of such an index over time provides little information about convergence, it nevertheless contains valuable information about the relative position of the regions« economic performances. Overall, the north-south pattern is reflected in the computed index. The dominant Autonomous Communities in the north of Spain still lead the economy. However, a number of interesting findings emerge. Notably, the Balearic and Canary Islands, while presenting figures that are well below the Spanish average for employment and industrial

Table 2

Economic Activity of Spain's Autonomous Communities

	Working population (% of total)		Industrial production (per capita VA)		Service oriented production (per capita VA)	
	1996	**2004**	**1996**	**2004**	**1996**	**2004**
Andalucía	0.47	0.54	0.55	0.6	0.79	0.84
Aragón	1.3	1.4	1.19	1.16	1.03	1.05
Asturias	0.91	0.94	1.05	1.01	0.83	0.86
Balears (Illes)	0.56	0.47	0.68	0.56	1.53	1.26
Canarias	0.39	0.35	0.53	0.56	1.17	1.09
Cantabria	0.99	1.03	0.94	1.03	0.93	0.98
Castilla - La Mancha	0.93	1.02	0.96	1.05	0.88	0.93
Castilla y León	0.89	0.97	0.8	0.8	0.74	0.77
Cataluña	1.67	1.51	1.5	1.34	1.19	1.13
Com. Valenciana	1.31	1.22	0.99	0.97	0.94	0.93
Extremadura	0.35	0.46	0.51	0.55	0.66	0.74
Galicia	0.81	0.97	0.81	0.88	0.77	0.82
Madrid	0.92	0.75	1.13	0.99	1.54	1.55
Murcia	0.91	0.98	0.78	0.77	0.82	0.82
Navarra	1.83	2.06	1.73	1.73	1.11	1.09
País Vasco	1.52	1.8	1.5	1.67	1.1	1.2
Rioja (La)	1.67	1.78	1.34	1.33	0.97	0.94

Source: INE, authors´ own calculations
(*) Spain Average = 1.00

production, enjoy relatively high service oriented production. Moreover, Extremadura, despite some improvements, continues to be the least developed region in the country. An alternative way of examining the picture is to focus on the path taken by this index among the developed and developing regions of Spain. Here, the information contained in Table 2 is complemented by Figures 3, 4 and 5 in the appendix. What is apparent is that no one uniform path has been taken by the leading and lagging communities. For instance, Navarra and the Basque Country, as leading communities in terms of employment and industrial production, seem to deviate from the mean and to have increased their relative standings. Meanwhile, communities such as Catalonia and Valencia have moved towards the Spanish average. Overall, we believe these figures increase concerns about the reasons underlying regional differences in Spain.

By taking the ratios for the whole of Spain, both in 1991 and in 2009, Catalonia stood out as a leader in terms of industrial employment and activities, while Madrid, Catalonia and Andalusia had the largest share of service employment. Meanwhile, in both 1996 and 2005, Catalonia and Madrid were ranked first in terms of employment in the strategic sectors selected for this study (Table 1).

If we look just at the developed regions, Catalonia is ranked second and Madrid third in terms of population while Madrid has the largest service sector labor force followed by Catalonia. The proportion of highly educated people in total employment rose in Madrid from 19.30% in 1991 to 40.82% in 2009, in the Basque Country from 15.97% in 1991 to 47.81% in 2009, in Navarra from 15.02% in 1991 to 38.87% in 2009, and in Catalonia from 12.37% in 1991 to 32.53% in 2009. Catalonia is the country leader in terms of total employment, industrial employment and employment in the strategic sectors selected for this study.

According to the occupational indicator of talent- employment in the strategic sectors selected for this study-, Catalonia, Madrid, the Basque Country and Navarra make up the first cluster in both 1996 and 2004. According to the educational indicator of talent-employment with university degree or higher-Catalonia, Madrid, the Basque Country and Aragon make up the first cluster in 1996, while in 2004 Catalonia, Madrid, the Basque Country and Navarra comprise this first cluster (Figure 2). In 2004, Catalonia, Madrid, the Basque Country and Navarra occupy the first cluster *(highest income)* in terms of income per capita (Fig.1). Some differences can be observed between the trends in the dispersion of income and talent. Andalusia, Valencia and Murcia mark a sharp break in income and talent between the North and South of Spain. Castile La Mancha and Murcia both lost positions, while Andalusia gained positions from 1996 to 2004 in terms of both educational and occupational attainment. However, there was a trend towards the concentration of activity in a few regions with a similar concentration of income during the period.

An empirical research

According to literature, both market factors (including the wage level, wage change, jobs, employment change, economic and financial opportunities etc.) and non-market factors (including cultural, natural, service amenities, openness, quality of life indicators etc.) may affect the geography of talent (Qian 2008). This research is interested in the market factors. Our talent definition contains two separate indicators that presents occupational and educational assessments: highly educated people and employment in selected sectors, including the high-tech sector, knowledge intensive services, real estate, architecture and engineering, R&D, advertising and market research, professional, scientific and technical activities, financial and insurance activities and creative activities, which assumed to be strategic for regional growth in that they provide economic specialization. Our occupational

indicator is measured as the percentage of employment in the selected sectors, while our education indicator is measured as the percentage of employment with a bachelor's degree or higher. In addition, we include two control variables: the percentage of employment in manufacturing industries and the percentage in service industries (Table 3).

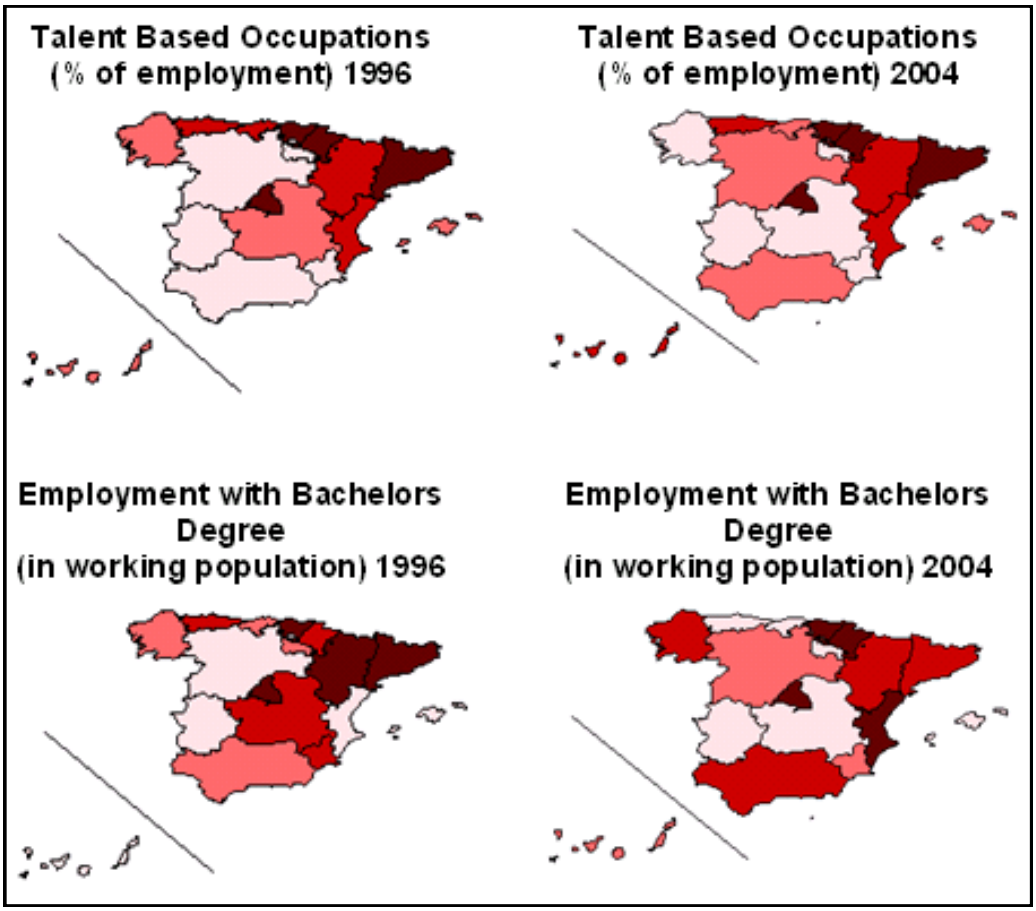

Fig. 2 - **Spatial Distribution of Talent in Spain**
Source: SABI. IVIE

Table 3

Description of the Variables

Variable	*Measure*	*Source*
Independent		
Talent components		
Employment in selected sectors -talent based *(occupational attainment)*	Percentage of employment in the selected sectors*, in total employment by Autonomous Communities of Spain from 1996 to 2004 (the data are not available for Ceuta and Melilla)	„Sistema Anual de Balances Ibéricos" (**SABI**) **database***
Employment with university degree or higher- human capital *(educational attainment)*	Percentage of employment with a bachelor' s degree and higher in total employment by Autonomous Communities of Spain from 1996 to 2004	Instituto Valenciano de Investigaciones Económicas **(IVIE)**
Explanatory/ Controls		
Manufacture based employment	Percentage of manufacture employment in total employment by Autonomous Communities of Spain from 1996 to 2004	Instituto Nacional de Estadística **(INE)**
Service based employment	Percentage of service sector employment in total employment by Autonomous Communities of Spain from 1996 to 2004	Instituto Nacional de Estadística **(INE)**
Dependent		
GDP per capita	Per capita income (GDP) per year by Autonomous Communities of Spain from 1996 to 2004	Instituto Nacional de Estadística **(INE)**
Industrial VA	Per Capita Industry Value Added per year by Autonomous Communities of Spain from 1996 to 2004	Instituto Nacional de Estadística **(INE)**
Service VA	Per Capita Service sector Value Added per year by Autonomous Communities of Spain from 1996 to 2004	Instituto Nacional de Estadística**(INE)**

* Data classified at four-4 digit level for selected occupations, represent talent indicator and, are only available from the SABI database. Given data availability for all variables selected, data can be collected from 1996 to 2004. Panel data models are constructed for 9 year period only.

The theoretical debate summarized in section 2 can be simply formalized as Equation 1.

$$[1]\ y = f(HK, T, IM)$$

Regional differences can be measured using three different indicators. Thus, while; per capita GDP shows the overall development made by the Autonomous Communities, industry and service oriented production value added figures (both in per capita terms) control for the differences in the production structures of the communities. If we examine the different factors affecting regional differences on the one hand, our focus will be on *HK* and *T* which represent the highly educated people (educational attainment) and employment in selected sectors-talent based (occupational attainment) levels, respectively. Based on those variables, static, non-spatial panel data models are simply constructed.

We expect these two indicators to positively affect the development of the Autonomous Communities in Spain. Although there are other region specific factors influencing these differences, we chose to include only the industry mix (*IM*) of the communities as a control for labor demand[4)].

In using Spanish data at the level of the Autonomous Communities for the period 1996-2004, we favored a number of different panel data models[5)]. As discussed above, Ceuta and Melilla are not included in the analysis for reasons of data availability and so, the number of cross sections is 17. Thus, our data are taken from three separate Spanish sources: INE, SABI and IVIE.

Equation 2 is a static, non-spatial panel data model, where y represents the three indicators used to evaluate regional differences: GDP (per capita), industrial production (per capita value added), and services oriented production (per capita value added), respectively. X represents the relevant talent indicator and Q is the share of manufacturing and service based employment used to control for the industry mix of the autonomous communities[6)]. As discussed by Baltagi (2005), the one way error model is represented in Equation 1, where v_i is the individual specific error and $u_{i,t}$ is a remaining independent identically distributed error. Here the central discussion is related to the individual specific effect v_i. In the case of a fixed effect model (FE), it is by construction a fixed parameter and will be correlated with the explanatory variables. In such a case, Baltagi (2005) proposes that the within transformation, also labelled the fixed effect transformation, is the right procedure. However, if one assumes that the individual specific effect is random and it cannot be correlated with the other exogenous variables, then use of an efficient GLS estimator will be more accurate. While the random effect (RE) estimator is also efficient. It may suffer from the consistency problem. Hence, it will be more informative to verify the consistency of the estimator by using a typical Hausman test (1978)[7)].

$$[2]\ Y_{i,t} = \alpha + \beta X_{i,t} + \phi Q_{i,t} + v_i + u_{i,t}$$

4) See Marlet and van Woerkens (2007).

5) The time span of the research is determined by the occupational assessment .

6) While a number of different social and economic indicators may be preferred, we limit the number of variables to avoid specification biases that might arise due to the relatively low number of observations. As an independent variable, we do not include employment; rather we prefer to observe GDP per capita.

7) Note that this test is not designed to compare the two models; rather it is implemented to decide between two estimators of the same model.

Table 4

Role of Talent in Dispersion of Industrial Production

	Model I		Model II		Model III	
	FE	RE	FE	RE	FE	RE
Talent Based	0.046*	0.046*	0.017*	0.019*	0.018*	0.016*
Occupations (%emp.)	(0.005)	(0.005)	(0.006)	(0.005)	(0.003)	(0.002)
Employment with	-	-	4.403*	4.255	1.164	1.315*
University Degree (% emp.)			(0.579)	(0.571)	(0.407)	(0.396)
Employment in	-	-	-	-	9.496*	9.072*
Manufacturing (% of emp.)					(0.806)	(0.581)
Employment in	-	-	-	-	0.642*	0.676*
Services (% of emp.)					(0.201)	(0.172)
# of observations	153	153	153	153	136	136
F-Wald Test	82.63	421.94	93.02	192.35	233.46	1044.42
(p-value)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Hausman Test	0.14		3.61		3.64	
(p-value)	(0.71)		(0.16)		(0.46)	

* ** *** represents significance at 1%, 5% and 10% respectively. Robust standard errors for coefficient estimates are in ( )

Table 5

Role of Talent in Dispersion of Service Oriented Production

	Model I		Model II		Model III	
	FE	RE	FE	RE	FE	RE
Talent Based	0.030*	0.031*	0.005	0.010*	0.004	0.007**
Occupations (% emp.)	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)
Employment with	-	-	3.721*	3.314*	1.039**	-0.281
University Degree (% emp.)			(0.458)	(0.456)	(0.428)	(0.426)
Employment in	-	-	-	-	6.088*	1.401*
Manufacturing (% of emp.)					(0.774)	(0.339)
Employment in	-	-	-	-	0.789*	1.911*
Services (% of emp.)					(0.217)	(0.175)
# of observations	153	153	153	153	153	153
F-Wald Test	37.91	3954.26	74.96	152.93	127.77	38427.53
(p-value)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Hausman Test	0.07		4.56		113.07	
(p-value)	(0.79)		(0.10)		(0.00)	

* ** *** represents significance at 1% 5% and 10% respectively. Robust standard errors for coefficient estimates are in ( )

Table 6

Role of Talent in Dispersion of per capita GDP

	Model I		Model II		Model III	
	FE	RE	FE	RE	FE	RE
Talent Based Occupations (% emp.)	1.275* (0.104)	0.883* (0.069)	0.563* (0.099)	0.475* (0.091)	0.144* (0.044)	0.415* (0.090)
Employment with University Degree (% emp.)	-	-	0.791 (0.080)	0.695* (0.087)	0.099** (0.038)	0.580* (0.082)
Employment in Manufacturing (% of emp.)	-	-	-	-	0.769* (0.088)	-0.176*** (0.096)
Employment in Services (% of emp.)	-	-	-	-	0.726* (0.062)	0.440* (0.098)
# of observations	153	153	153	153	153	153
F-Wald Test	149.79	6747.77	221.54	9284.25	550.22	2980.34
(p-value)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Hausman Test	25.39		2.12		769.20	
(p-value)	(0.00)		(0.35)		(0.00)	

* ** *** represents significance at 1% 5% and 10% respectively. Robust standard errors for coefficient estimates are in ( )

Estimation findings are given in Tables 4 to 6. In general, the results reported for the economic performance indicators signal the significant positive impact of talent on regional economic activity. This is in line with theoretical expectations. The concentration of talent based occupation in employment plays a crucial role in understanding regional differences. On another note, the impact of highly educated employment is also crucial for each economic activity. However, when the share of services in overall employment is included, the effect is observed to be negligible for the differences between service oriented production.

We believe relatively well educated service sector employment already captures the indirect effect of educated employment on these two specific economic activity indicators. However, additional results reported for the differentiation of service sector value added as well as for regional GDP show that highly educated employment has a significant impact even when the share of the service sector employment is included.

Discussion

The concentration of talent and related social and economic properties of locations have been examined from distinct theoretical points of view. While different channels can be defined, in the end a common expectation postulates that talent is unevenly distributed among regions and that this unequal distribution creates differences in the economic performances of these locations. From these general arguments, this study has focused on Spain's 17 Autonomous Communities and validates the fact that talent is unevenly distributed among the regions. This uneven distribution has a marked impact on differences in the economic activity levels, measured in terms of industry and service value added as well as in terms of regional GDP (all in per capita terms).

We find that the economic performance indicators point to the significant positive impact of talent on regional economic activity. The concentration of employment in certain sectors plays

a crucial role in accounting for regional differences, while the impact of highly educated employment is also crucial for economic activity. Based on a preliminary analysis of the dispersion in employment and production figures among the Autonomous Communities, the performance of Spain's outperformers and underperformers is clearly not uniform. This picture validates our decision to focus on the roots of this differentiation. In line with the central thesis of this paper, an evaluation of how talented people locate across the country should provide valuable information. Thus, not only the specific impact of human capital accumulation on regional differences but also the innovative and creative role of employment can be understood by examining this dispersion.

We believe our results can be considered important from a number of different perspectives. First, the spatial dispersion of the talent base and of the economic activity indicators present identical geographically patterns. Second, the dispersion in talent based employment follows a trend towards a more equal distribution. However, an improvement in the distribution of employment among those holding a university degree cannot be detected. Finally, our panel data results reveal the overall connection between the talent bases and the economic performance of regions, providing clear evidence that talent is a vital element in accounting for regional differences. From this perspective, it would not be naive to propose that the promotion of talent based occupations (and/or jobs) and educational attainment in a region will have both direct and indirect consequences on regional development.

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APPENDIX
(Fig. 3, 4, 5, 6)

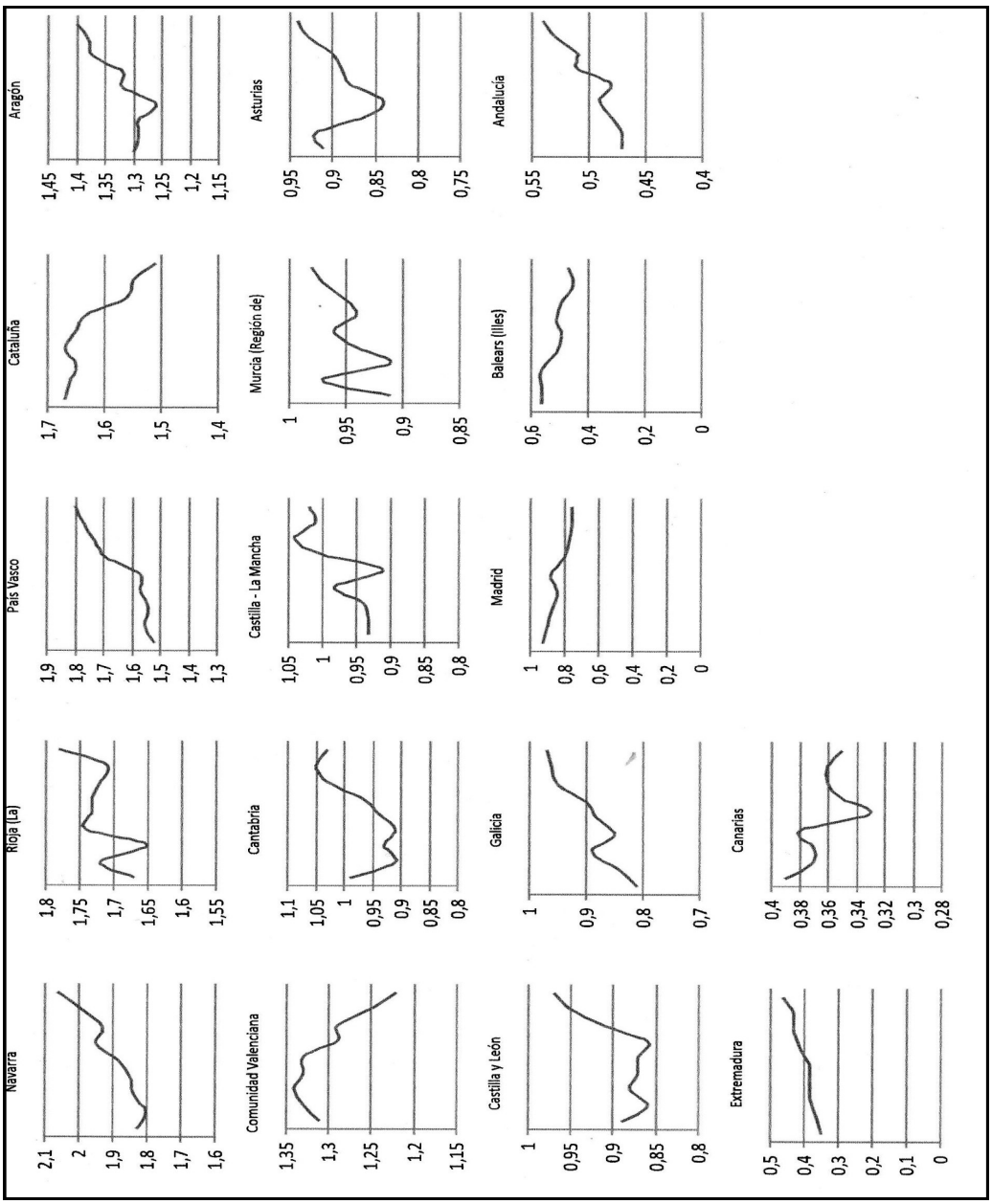

Fig. 3 - **Performance of Autonomous Communities - Working Population from 1996 to 2004 (% of total Population) Spain Average=1.00**

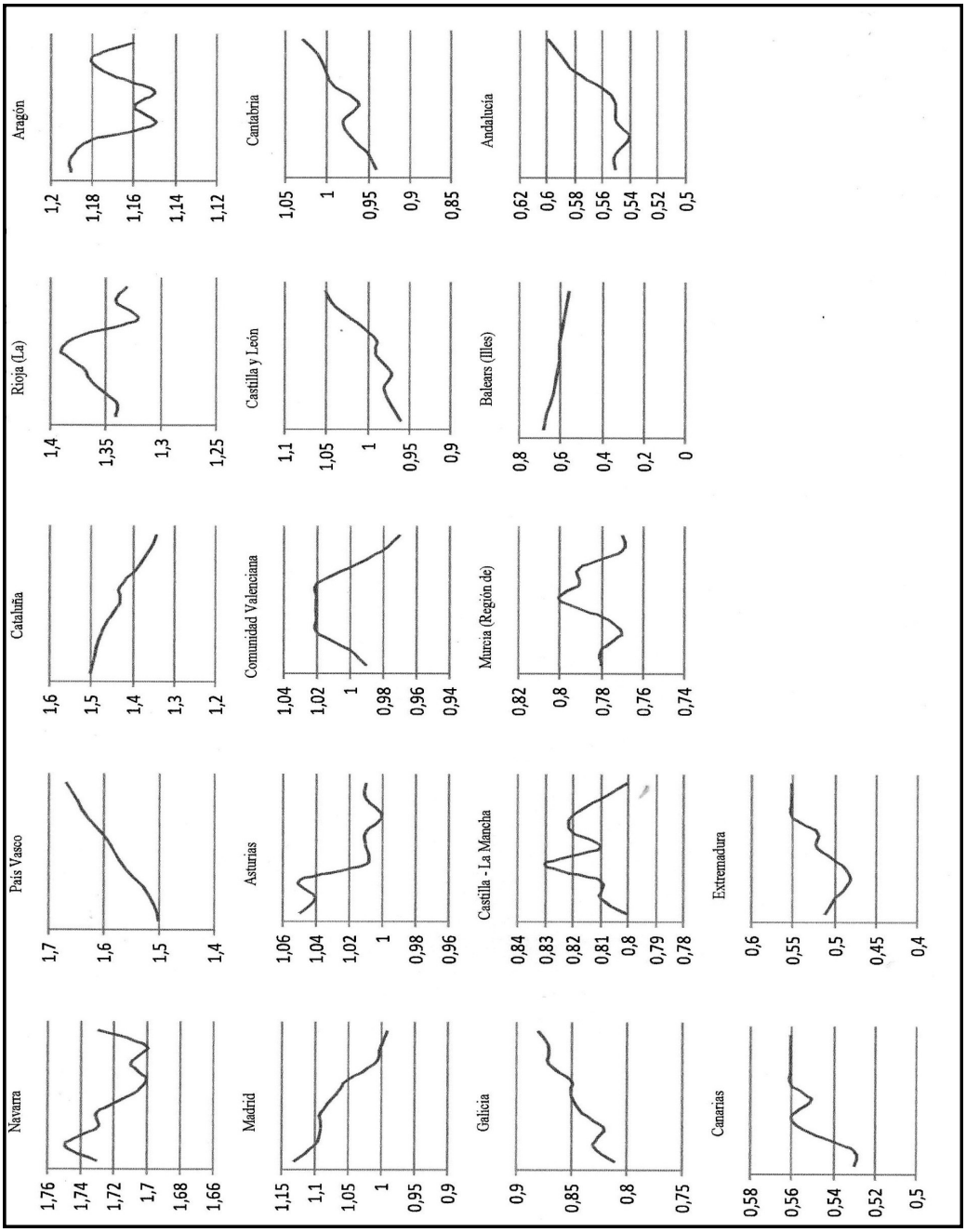

Fig. 4 - **Performance of Autonomous Communities Industrial Production from 1996 to 2004 (Per capita VA) Spain Average=1.00**

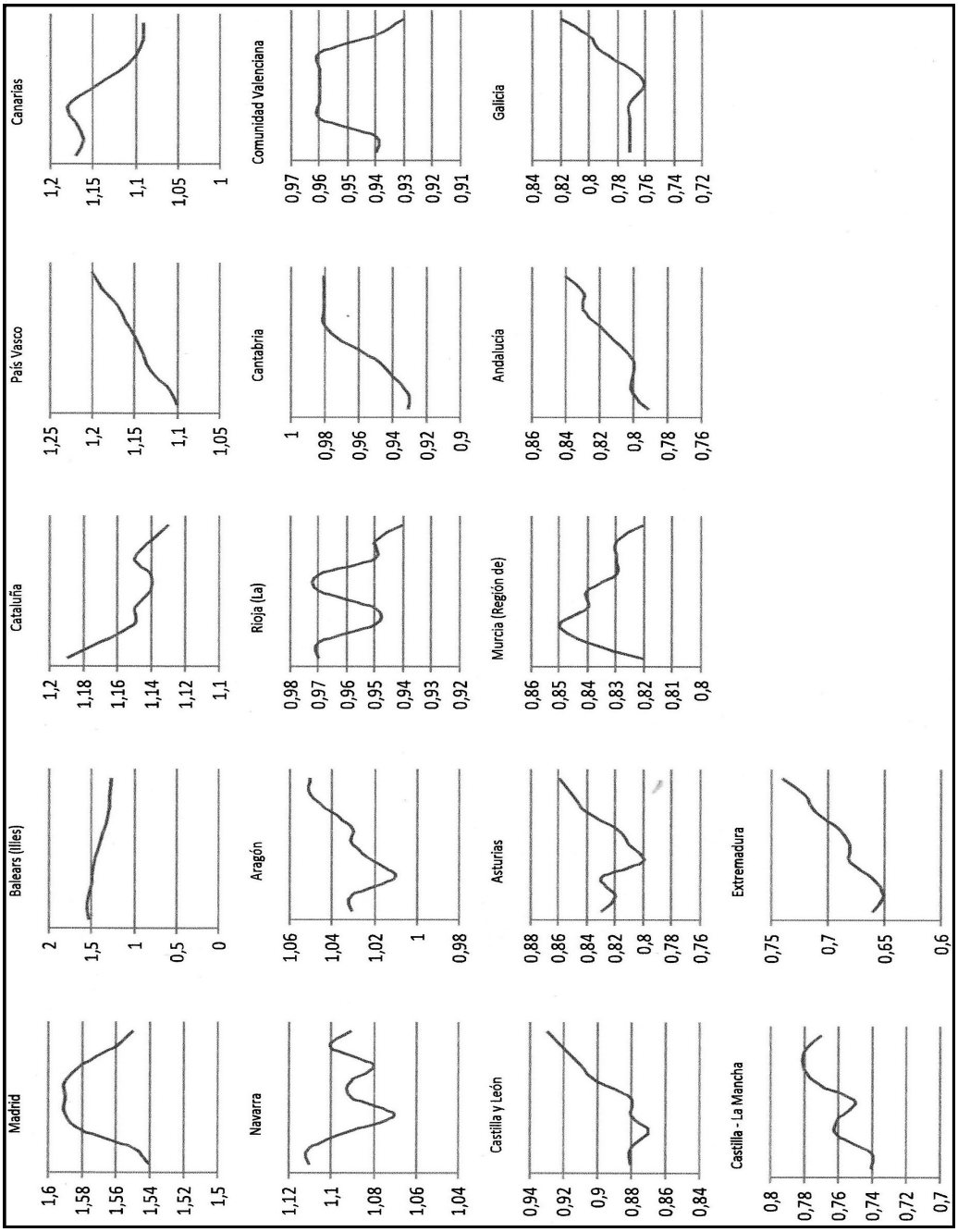

Fig. 5 - **Performance of Autonomous Communities Service Related Production from 1996 to 2004 (Per capita VA) Spain Average=1.00**

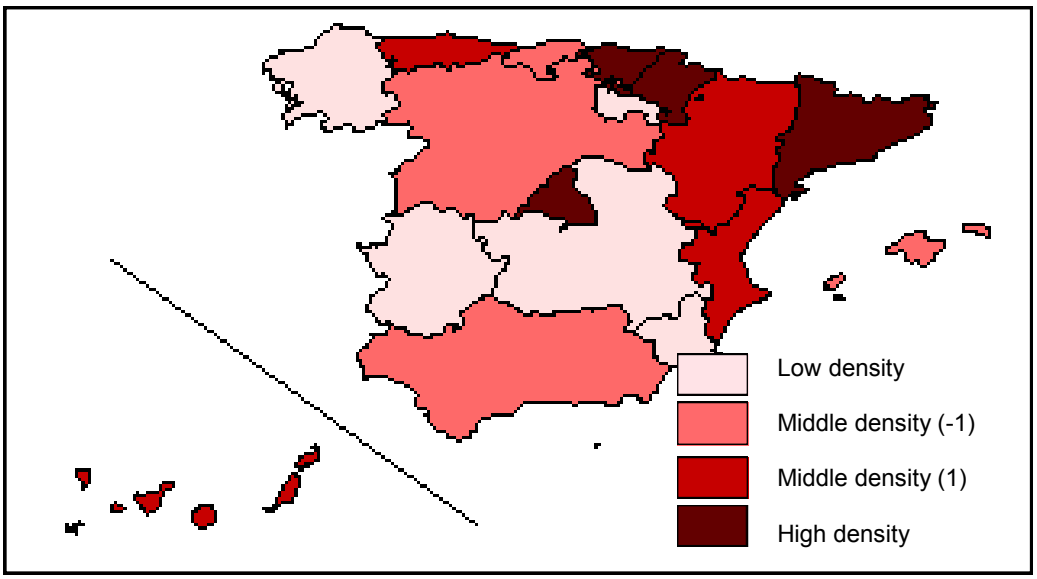

Fig. 6 a - **Relationship between Talent and Regional Differentiation in Spain (2004)**
Talent Based Occupations (% of employment)
Source: INE, IVIE, SABI

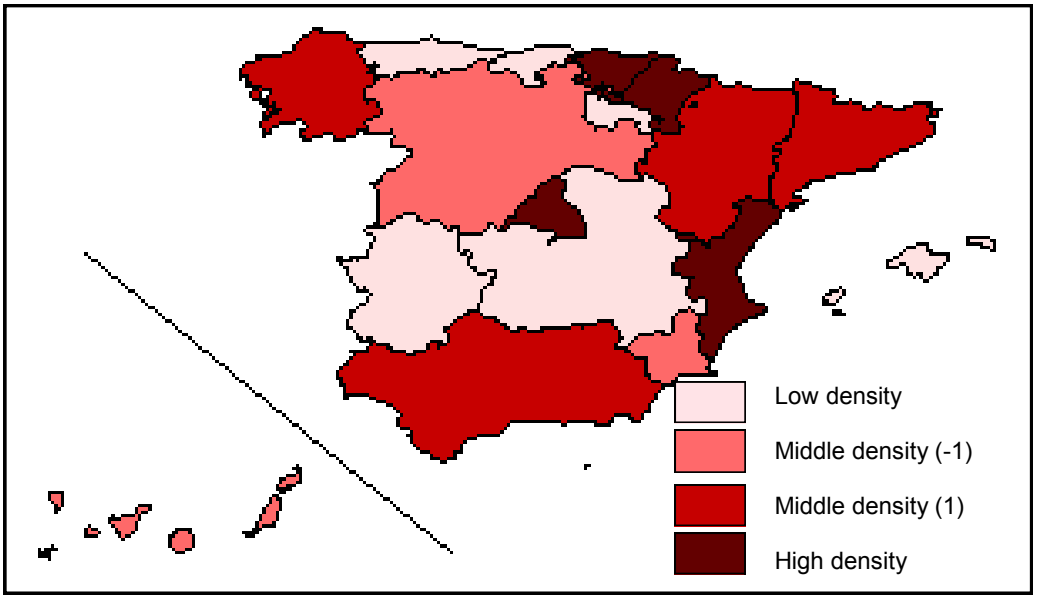

Fig. 6 b - **Relationship between Talent and Regional Differentiation in Spain (2004)**
Employment with Bachelor's Degree (in working population)
Source: INE, IVIE, SABI

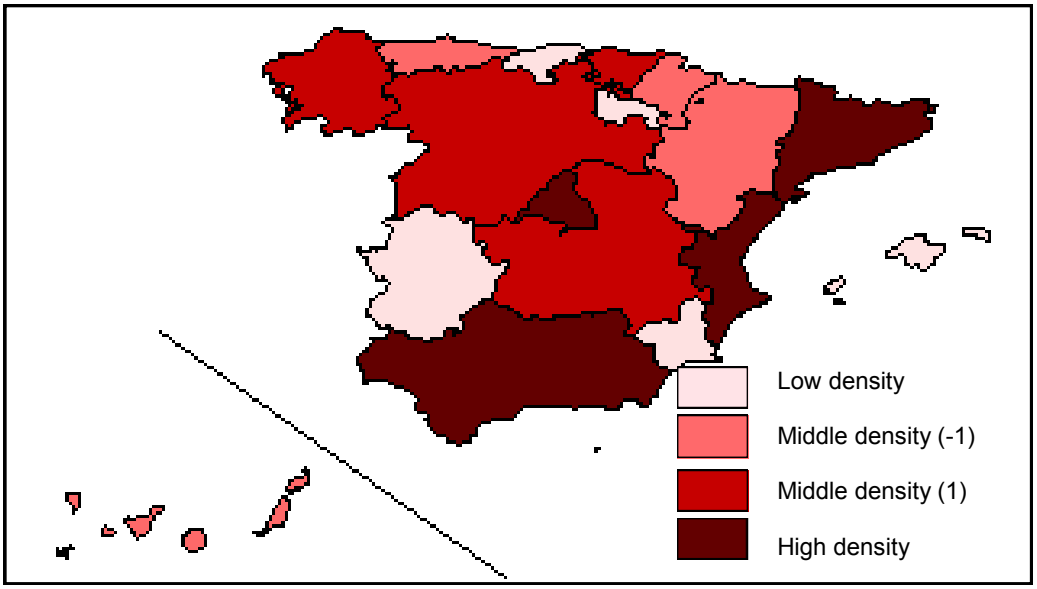

Fig. 6 c - **Relationship between Talent and Regional Differentiation in Spain (2004)**
Industry Value Added (gross)
Source: INE, IVIE, SABI

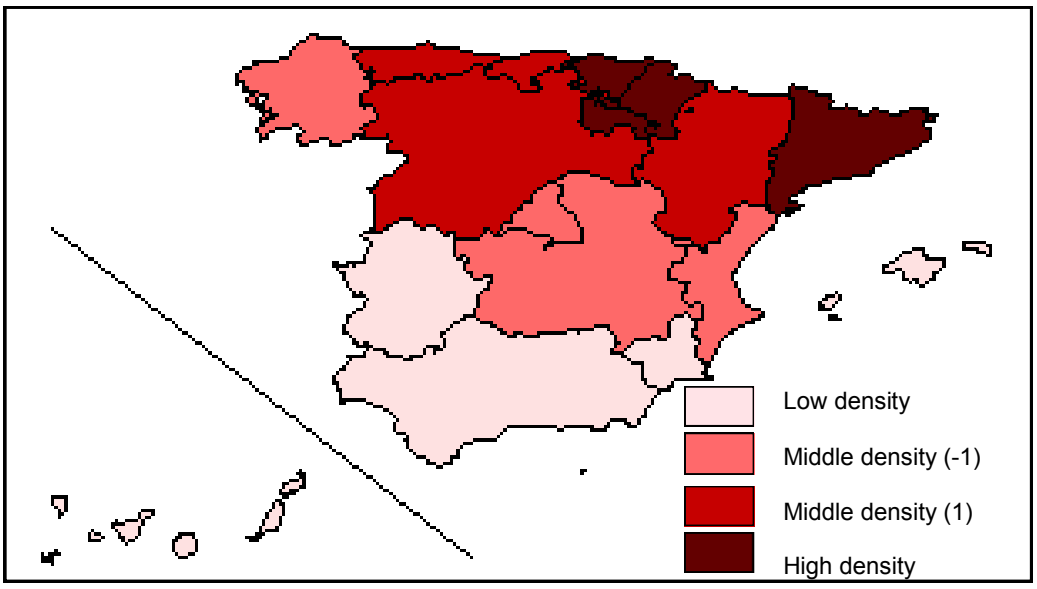

Fig. 6 d - **Relationship between Talent and Regional Differentiation in Spain (2004)**
Industry Value Added (per capita)
Source: INE, IVIE, SABI

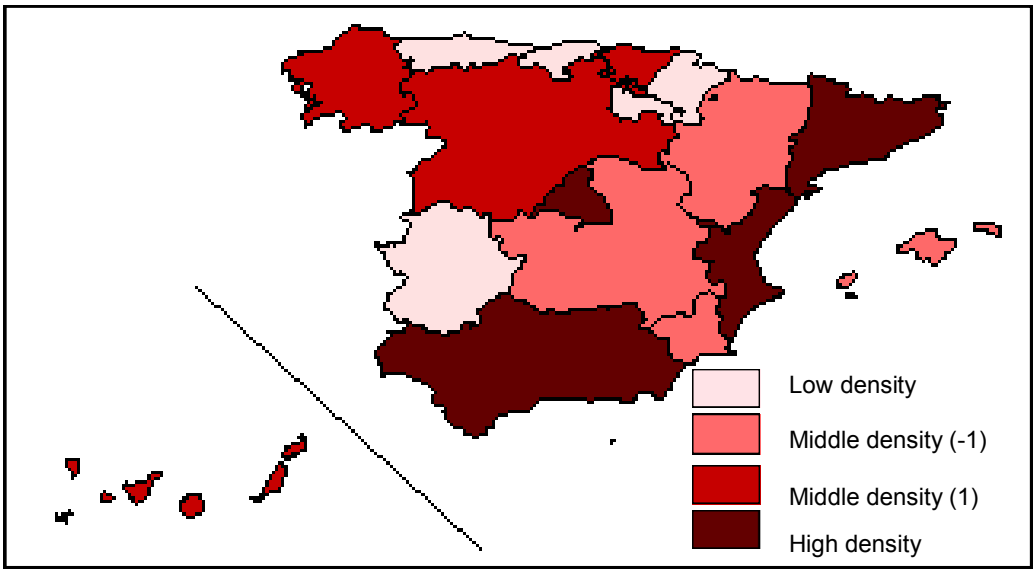

Fig. 6 e - **Relationship between Talent and Regional Differentiation in Spain (2004)**
Service Value Added (gross)
Source: INE, IVIE, SABI

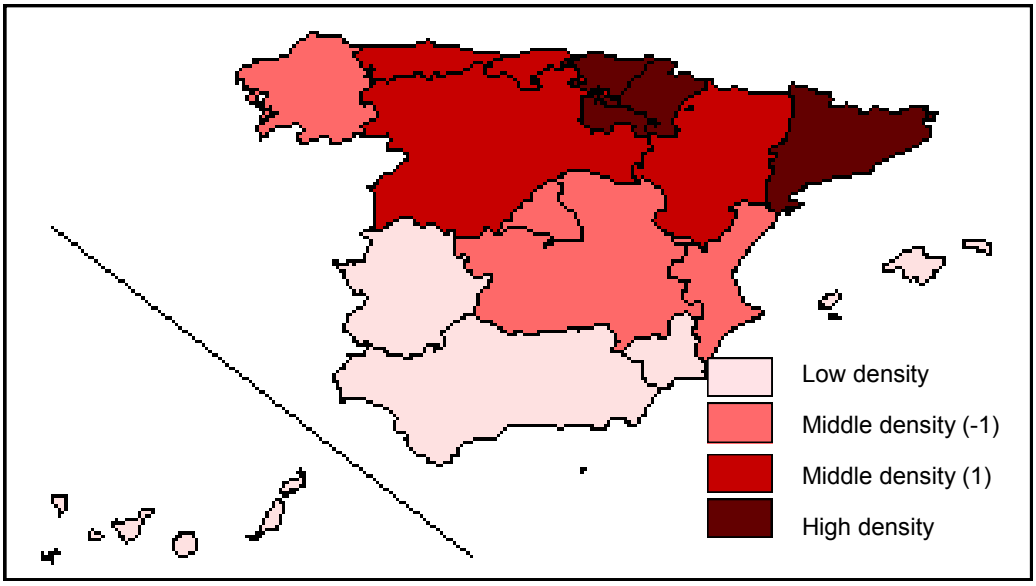

Fig. 6 f - **Relationship between Talent and Regional Differentiation in Spain (2004)**
Service Value Added (per capita)
Source: INE, IVIE, SABI

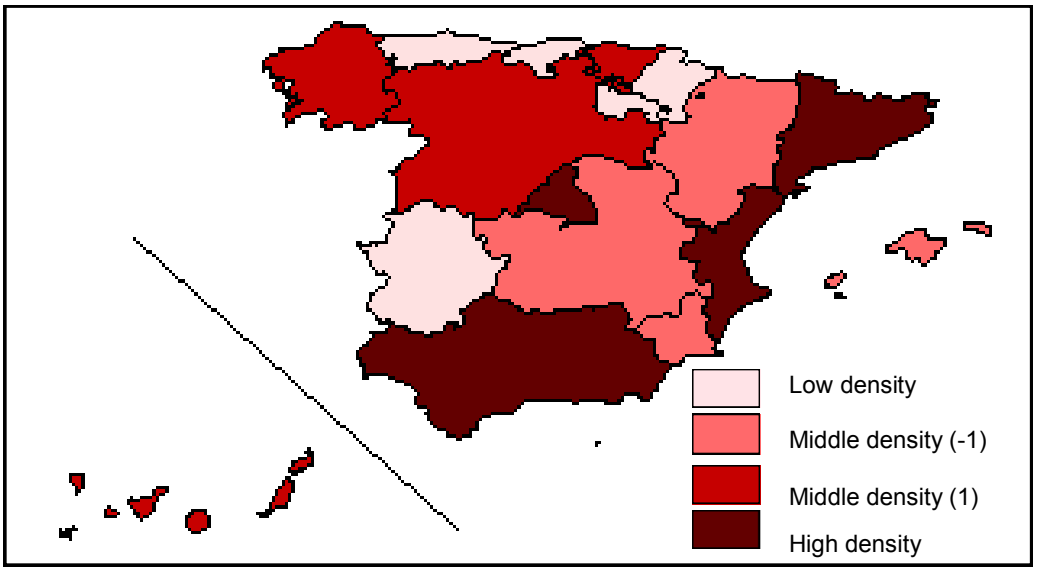

Fig. 6 g - **Relationship between Talent and Regional Differentiation in Spain (2004)**
GDP (gross)
Source: INE, IVIE, SABI

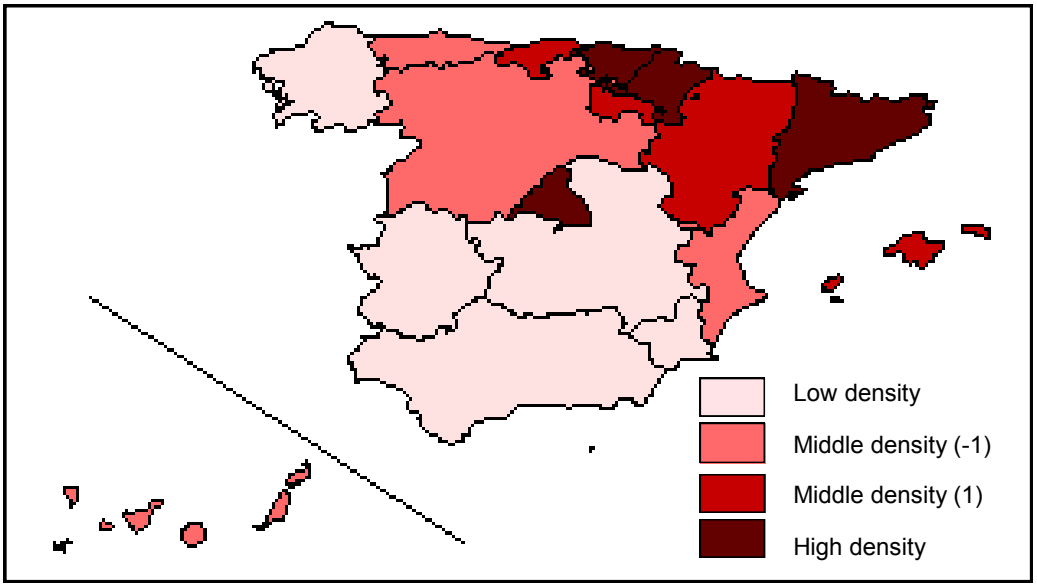

Fig. 6 h - **Relationship between Talent and Regional Differentiation in Spain (2004)**
GDP (per capita)
Source: INE, IVIE, SABI

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SPATIAL MODELLING OF URBAN GROWTH AND URBAN INFLUENCE: APPROACH OF REGIONAL DEVELOPMENT IN DEVELOPING ECONOMY (INDIA)

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Abstract: Urbanization and regional development are closely associated. Allocation of higher and lower order facilities and specialization of business influence urban growth which diffuses its benefits to the surrounding countryside. Subsequently, socio-economic development of the region comes into being. The continuous increase of urban size can not be sustained rather declining growth will certainly set in long run. Optimum level of its growth depends on the capacity of an urban centre to provide required facilities to the people in fair manner. Hierarchical growth of urban centres in association with location of civic amenities induces regional development in hierarchical dimension which is the common problem in developing economy. Subsequently, few of the urban centres are having large number of facilities while others are lacking corresponding to their population size. Formulation of pragmatic planning model is the rescue of wiping out such problems. It is an attempt to analyze the hierarchical growth of urban centres associated with their functional potentiality and diffusion of urban developmental impulses to the surrounding rural part. Further, it proposes a model for developing economy like India to solve the problem of regional variations of development. Besides, it examines the adequacy and inadequacy of facilities in the urban centres and puts forward planning recommendations, so that a balanced regional development would be achieved by not leaving any rural part out of the zone of functional influence of urban centre.

Key Words: *urban growth, regional development, urban influence, functional weightage.*

Introduction

India is predominantly a rural country where most of the people lives in villages, hamlets or a small group of huts (Verma 2006). It is noticeable that, India is experiencing rapid rate of population growth and urbanization. In 2001, it recorded 27.78 per cent urbanization which was much lower than the world average 47 per cent, Asian average 38 per cent, but little higher than Bangladesh i.e., 25 per cent and Sri Lanka i.e., 23 per cent (United Nations 2001). The process of urbanization is a complex system which comprises a set of interdependent entities, objectives, activities, infrastructure and land (Tiwari et al. 1986) and however it is the testimony of socio-economic and cultural development of a region or human group (Ali et al. 2008). In India, the process is the consequences of industrialization (Bhagat 2002). Therefore, it is equipped with the potentialities of development of the non-agricultural sectors (Ali et al. 2007). Urban growth is occurred due to the movement of people from- rural area to towns, smaller towns to bigger towns or cities and peripheral village to towns. Such a movement is generated due to the pull factors which attract immigrants towards urban centres and push factors which cause outmigration (Ahmad et al.,2006). Urban centres with location of seats of government,

education, medical, financial and industrial units radiate growth impulses outward and subsequently bring significant economic change in the region (Mandal 2000). Besides, they provide a variety of highly centralized services for the surrounding rural part, like, marketing of agricultural products, supply of fertilizers, engineering goods, agricultural implements which are important for regional development (Hoselitz 1971). In due course of time, specialization of business is generated in the urban centres and later, the fruits of its benefits diffused to the countryside (Lampard 1955). Therefore, the proper growth and development of urban centres is imperative for regional economic progress (Hoselitz 1971).

Urban centres do not grow in isolation, rather in response to changing situation (Thakur 2002). Urban growth is the out come of concentration of population in response to the availability of diverse amenities and facilities in the urban centre. Subsequently, urban population is found distributed among the settlements of varying sizes from smaller towns to giant cities (Pascione 2001) as per their functional importance. Small towns might have been villages but with time due to the increasing agglomeration economies they gradually become urban centres by virtue of their nodality, function and services – local as well as central (Verma 2006). In its evolving pattern, small and intermediate towns grow slowly as compared to large cities in early phase of urbanization, but in latter phase, small towns grow as the consequence of congestion and crowding in large and intermediate towns. Therefore, growth of towns follows the cycle of urbanization from the phases of smaller town, intermediate town and primate city (Geyer and Kontuly 1993). It is worthy to mention that continuous increase of urban size can not be sustained. The decline in growth rate will certainly set in with increasing size of urban centres in long run (Mills and Becker 1986). However, their natural growth should be allowed in order to reap the benefits of their growth momentum. But the optimality of urban size is elusive and finally finds its own in due course of time (Bhagat 2005). The optimum level of its growth depends upon the capacity of the urban centre in providing all required facilities to the people in fair manner. High capacity enhances the level of optimum while huge inflow of migrants than the capacity causes over burden on the civic finances for providing basic amenities. Such a stage of over-urbanization gives rise to all evils in urban centre, i.e., housing problem, water scarcity, lack of medical facility, unemployment, increasing poverty and suicide, spread of slums and squatters, increase of beggars and pavement dwellers, delinquency, snatching, kidnapping, traffic congestion and overcrowding, atmospheric pollution and so on. These problems are the outcome of continuum process of urbanization mainly seen in very few big cities of India (Verma 2006, Mandal 2000). Such a situation is the reflection of optimum growth of an urban centre and thereafter declination of its growth begins.

The need of mitigation of such an undesirable urban phenomena led to come up of urban planning. It is usually formulated with an objective to attain the beauty of urban environment and making it more attractive for convenient living (Abercrombie 1945) and to encompass well-being as well as welfare of the people (Stamp 1941). It is surprising that, the tradition of urban planning in India is as old as the Indus Valley Civilization, Mohenjodaro and Harappa (Possehl 1979).

Urbanization Scenario in Asian-African Countries

The 20th century is remarkable from the standpoint of human settlements. There is the unabated concentration of population in urban places of Asia and African countries. Europe experienced rapid urbanization in the 19th century and in the early 20th century. By 1995, Africa and Asia were at highly comparable levels of urbanization, with about 35 per cent of their population being classified urban. Yet, both continents stood for high concentrations of world's population, most notably in Asia, which accounted for 60.4 per cent and 46.3 per cent

respectively, of the world's total and urban population. By 2030, about 55 per cent of the world's urban population will be in Asia. What is also interesting is about 16 per cent will be in Africa, about equal to Europe and North America combined.

Asia and Africa will account for a heavy 86 per cent of all increases in the world's urban population in the next four decades. Africa's urban population will increase from the current 414 million to over 1.2 billion by 2050, while Asia will increase from 1.9 billion to 3.3 billion. Over the next four decades through 2050, India will add another 497 million to its urban population; China 341 million; Nigeria 200 million; the United States 103 million; and Indonesia 92 million. The unprecedented rise in urban populations will pose new challenges, including shortages of food, jobs, housing, energy, infrastructure and a deterioration of the urban environment (United Nations Report 2012).

With free trade and globalization, along with the death of distance, prices of traded products have got almost equalized across the world. Thus, globalization has added further focus to the importance of the city level efficiency. The rapid economic growth of Asia in the last half century must be among the most spectacular periods of development in recorded human history. A common feature of Asian economic strategy has been the heavy concentration of economic activity in and around coastal regions. In Japan, infrastructure investment was concentrated in the Tokkaido region- the Tokyo-Nagoya-Osaka Corridor. More than 60 per cent of its urban population got concentrated in this region by 1970. In Republic of Korea, there was the development of urban infrastructure and transport in the Seoul-Pusan regions consequently by the mid of 1970s about 70 per cent of the Republic of Korean urban population resided here. Similar strategy was adopted for the development of Taipei-Kaohsing in Taiwan Province of China. The similar process of urban development and urbanization was followed by Singapore and "Hong Kong, China" as city states, JABOTABEK (the Jakarta region) in Indonesia, Bangkok in Thailand, Kuala Lumpur and environs in Malaysia, and finally in the coastal regions of China. As a result, a mega urban corridor stretching from Tokyo to Sydney through Seoul, Taipei, Shanghai, Hong Kong (China), Kuala Lumpur, Singapore and Jakarta has emerged (Mohan 2007). The Bangkok Metropolitan Area encompasses total area of 7, 761 km^2 with total population of 10 million. By 2020, population is projected to grow to 30 and 100 million in Bangkok Metropolitan Area and Jakarta Metropolitan Region respectively (Yuen 2009). These countries achieved great economies of scale in the provision of urban infrastructure and services through the agglomeration variety of economic activities.

Objectives

Following basic objectives have been taken to pursue the present research work:

- to analyze the spatial distribution of population and socio-economic facilities,
- to make a hierarchical arrangement of urban centres,
- to delineate the zone of influence of urban centres,
- to establish the laws governing how urban centre grows and how their sphere of influence is increasing, and
- to make suggestive remarks for the proper growth and development of urban centres.

Hypotheses

Following general hypotheses have been formulated to infer the facts of urban growth and regional development:

- population concentration is directly proportional to the functional importance of town,
- functional importance of town is the factor of its spatial expansion,
- higher order town with higher functional importance encompasses larger surrounding area under its influence.

Data Base and Methodology

To accomplish the above objectives as well as to ascertain the laws through testing above hypotheses, secondary information has been collected from different sources published by government. The data have been analyzed using different advanced statistical techniques to deduce and generalize the facts. To work out the ranking of towns on the basis of functional importance, it is necessary to assign a certain weight to all the facilities under study.

For this purpose, mean population threshold of all the facilities has been estimated as the population-function ratio which can be expressed as:

$$mT = P/Nf$$

Where, mT = mean population threshold, P = total population, and Nf = total number of facility.

Functional weightage of facility has been estimated with following equation:

$$WFi = mTi / mT1$$

Where, WFi = estimated weightage of function 'i', mTi = mean population threshold of ith function, and mT1 = lowest mean population threshold.

Functional importance of urban centre has been estimated with the equation as:

$$CI = \sum_{i=1}^{n} (Fui \times Whi)$$

Where, CI = centrality index or functional importance of a town, Fui = number of functional units of function 'i', and Whi = weightage of function 'i'.

Concentration ratio of facilities in different size group of towns has been examined using Gini's method of Coefficient of Concentration (Mahmood, 2002) which is as follows:

$$Gi = \frac{1}{10{,}000} \sum_{i-1}^{N} (x_i.y_i+1) - (x_i+1.y_i)$$

Where, x_i = the cumulative percentage distribution of attribute x,
y_i = the cumulative percentage distribution of attribute y,
N = the number of observations, and Gi = Gini's Coefficient Ratio

Scale of Gi Ratio:

Gi = Zero, is uniform distribution, and Gi = 1.0, is highest concentration.

Arithmetic equation of population projection is expressed as follows:

$$PP = P_1 + (r \times t)$$
$$r = (P_2 - P_1) / 10$$

Where, PP = projected population, P_1 = population of base year, P_2 = succeeding year of base year, r = annual growth rate of population (i.e. P_1 and P_2) and t = time interval between the base year and the year of which projected population would be estimated.

The zone of influence of each town of hierarchical order has been delineated using modified quantitative technique devised by V.L.S. Prakash Rao (Lokhande and Pawar 2004) which is as follows:

$$S.I. = TCA/C$$
$$R = \sqrt{TCA/C}$$

Where, S.I. = Sphere of Influence of central place (sq. km.), TC = Total Centrality score of central place, A = Total area (sq. km) of the study region, C = Total centrality score of all central places, and R = Radius of circle indicating the sphere of influence (km.)

The causal relationship between dependent and independent variables has been examined using Karl Pearson's Technique of Correlation of Coefficient. In order to test the hypotheses and find out the level of significance of their correlation student's 't' test has been adopted.

To examine the adequacy or inadequacy of socio-economic facilities in relation to the existing population, following method of Relative Level of Urban Functional Ratio has been adopted.

$$R_{ij} = \frac{P_s}{P_t} \times \frac{F_t}{F_s}$$

Where, R_{ij} = relative level of urban function between 'a' town and study area, P_s = urban population of study area, P_t = population of the town, F_t = functional importance of the town, F_s = total urban functional importance of the study area. The ratio of function in a town more than 01 refers to the adequacy, while ratio less than 01 refers to the inadequacy of function in the town.

Logical Approach of the Study

The main thrust of the paper is to raise some ground realities related to the functional hierarchy of urban centres, their differential influence over surrounding countryside and regional disparities of socio-economic development which are the characteristic feature of developing economy like India. Such issues are the traditional and meaningless in developed economy where new economic policies like Export Processing Zone (EPZ), Special Economic Zone (SEZ), Exclusive Economic Zone (EEZ), e-Commerce and Advance Trading are practicing in full swing for the great achievement of urban growth, urban planning, enhancing employment level and consequent regional development. Though, India and other developing countries have adopted such policies but small size urban centres are still suffering from the lack of developmental facilities. Subsequently, their little radius of functional influence could not encompass the larger surrounding area of rural part. Therefore, the only solution to wipe out the regional inequalities of socio-economic development is to grow the small order of urban centres up to their full extreme potentiality so that they may radiate their developmental influence over the surrounding countryside. Such model is still imperative for the regional planning for socio-economic development in the developing economy.

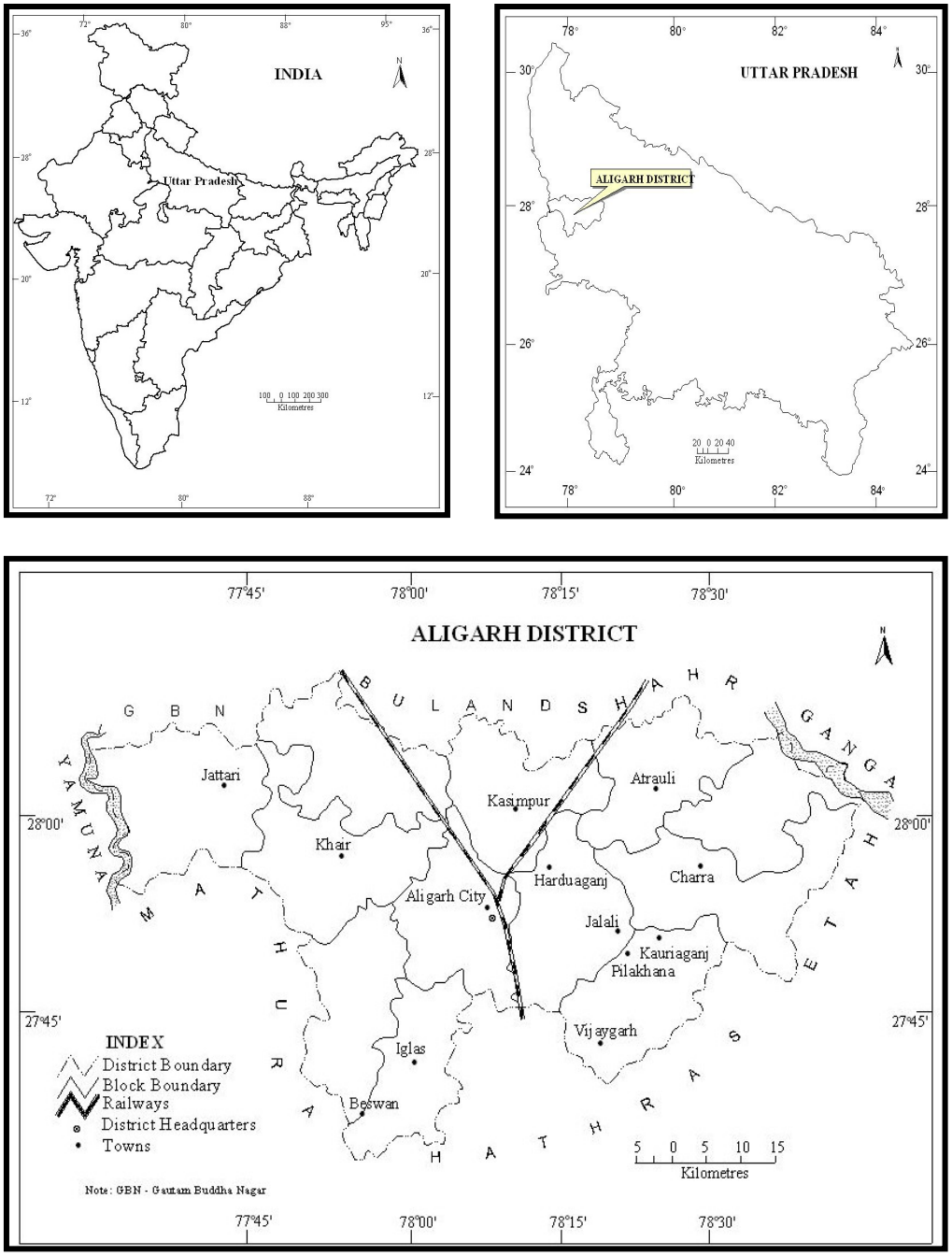

Fig. 1 - **Position of Urban Centres in Aligarh district, 2012.**

Area of Study

Aligarh district (Fig. 1) has been taken as the universe of present study located in the western part of Uttar Pradesh state of India. It lies within 27^0 34' N to 28^0 11' N latitudes and 77^0 29' E to 78^0 38' E longitudes. The fusion of historical and geographical elements in Aligarh district has given it a distinct personality. After British occupation in 1804, the district was formed. Introduction of railway line in March 1863 from Tundla to Aligarh has played an important role in the progress and prosperity of the district (Nevill 1926). The focal point of Aligarh district is Aligarh city from where communication arteries radiate to every corner of the district.

The district has a total area of 3 670 sq. km. with a total population of 2 992 286 persons having 71 per cent rural and 29 per cent urban population (Census of India 2001). From the administrative view point, the district has been divided into 05 Tehsils namely Atrauli, Gabhana, Khair, Koil and Iglas comprising 1 212 villages.

A Glance of Spatio-temporal Growth of Urban Population and Area

Growth of urban centres is closely linked with the political apparatus and considers political activity as the prime variable in the rise of cities (Mumford 1961). But the growth of urban centres in term of population and area is related with the different aspect of human life, such as economic development, technological advancement, political stability, cultural growth, social awareness and ecological setting. Therefore, no single or autonomous factor neither creates nor accelerates the growth of the existing urban centre. It is worthy to mention that the analysis of growth of urban population and area may assist to comprehend the spatio-temporal changes of rural-agrarian economy into urban-industrial one.

Table 1 reveals that Jattari town has recorded highest annual growth (i.e., 6.11 per cent) of urban population during 1991 over 1981. Jattari is followed by Iglas (5.17 per cent), Aligarh city (4.97 per cent). However, lowest annual growth has been recorded in Jalali town (1.23 per cent). But during the decade 1991-2001, highest annual growth has been recorded in Charra town i.e., 5.61 per cent leaving behind Jattari (2.79 per cent). Iglas and Aligarh remain in same position as in last decade with the annual growth of urban population 4.97 per cent and 3.92 per cent respectively. Further, it is evident from the same table (Table. 1) that almost all the towns of study area has been recorded to decline their annual growth rate of population during 1991-2001 from the decade 1981-1991 except Charra (i.e., 5.02 per cent in 1981-91 to 5.61 per cent in 1991-2001) and Pilakhana (i.e., 2.03 per cent in 1981-91 to 3.17 per cent in 1991-2001). In case of annual growth rate of urban area during 1981-91, only three towns i.e., Jalali, Harduaganj and Aligarh have registered their growth with 0.27 per cent, 0.42 per cent and 0.28 per cent respectively. However, during 1991-2001, most of the towns have registered a significant annual growth of urban area. Atrauli town has recorded highest growth rate i.e., 112.04 per cent followed by Beswan (14.5 per cent) and Kauriaganj (4.4 per cent). Among the 13 towns as identified by the Census of India, Khair, Kasimpur, Pilakhana, Iglas and Vijaygarh could not achieve any spatial expansion in both decades. It is again emerged out from the analysis that Atrauli shows a decline of annual growth of urban population in final decade (1991 -2001) from that of previous decade (1981-91), but recorded a splendid annual growth of urban area during 1991-2001 from that in last decade.

Mean Population Threshold (MPT) and Functional Weightage of Facilities

Socio-economic facilities are the prerequisite of socio-economic transformation of society from traditional to modern life. The provision of adequacy of such facilities is important

Table 1

Growth of Urban Population and Area, Aligarh District, 1981-2001

Town	Annual Growth of Population (%)		Annual Growth of Area (%)	
	1981-1991	1991-2001	1981-1991	1991-2001
1.Khair	4.05	2.17	0	0
2.Kasimpur	1.60	1.54	0	0
3.Jalali	1.23	1.22	0.27	0
4.Charra	5.02	5.61	0	2.77
5.Jattari	6.11	2.79	0	2.86
6.Harduaganj	2.90	1.96	0.42	2.0
7.Kauriaganj	3.33	1.97	0	4.40
8.Pilakhana	2.03	3.17	0	0
9.Iglas	5.17	4.97	0	0
10.Beswan	2.35	0.9	0	14.5
11.Vijaygarh	3.13	2.5	0	0
12.Atrauli	2.86	2.45	0	112.04
13.Aligarh	4.97	3.92	0.28	1.87

Source: Population is based on data obtained from Census of India, 2001, Directorate of Census Operations, Uttar Pradesh.

for socio-economic development (Sharma, 1972). Generally, people have a tendency to concentrate in and around the points where different types of facilities are available. In the present analysis, in order to find out the relative difference of functional importance of each facility under study, their Mean Population Threshold (MPT) has been estimated. MPT is simply the average population served by each facility (Maithini 1986). Six broad types of facilities, i.e., education, health, communication, administration, finance and recreation, which are the essential requirements of human well-being and welfare, have been taken under study.

Table 2 exhibits the mean population threshold of all 28 facilities and their relative importance in the study area. Functional importance of each facility has been estimated by assigning an arbitrary weightage value of 01 to the facility having lowest MPT. The functional importance of other facility has been estimated by dividing their MPT by the lowest MPT in the list. Therefore, facilities comprising higher MPT have functionally higher importance and vice-versa. In another word, higher important facilities are fewer in number (rarely available) while it is reverse to the lesser important facilities. Among the education facilities i.e., medical college and university, are having highest MPT (i.e., 3,737,661 and 1,868,831 respectively) as well as functional importance (i.e., 31,675.09 and 15,837.55 respectively) even among all the facilities in the district (Table 2). Primary school with MPT 1,727 has scored functional importance of 14.64 while family welfare centre and sub-centre with MPT 10,649, telephone connection with MPT 118 and agricultural credit societies with MPT 32,787 have scored functional importance of 90.24, 1.00 and 277.85 respectively.

Distribution of Population and Facilities

The analysis of spatio-temporal dynamism of phenomena is the main thrust of geographical

Table 2

Mean Population Threshold and Functional Weightage of Urban Facilities, Aligarh District, 2012

Categories of Facilities	Name of the Facility	Number of facility	MPT	Functional Weightage
1) Educational Institutes	Primary Schools	2164	1 727	14.64
	Middle/Junior Schools	895	4 176	35.40
	Secondary/Matriculation	203	18 412	156.04
	Senior Secondary Schools	337	11 091	93.99
	Adult Literacy Centre	50	74 753	633.50
	Degree Colleges (Science, Arts and Commerce)	11	339 787	2 879.55
	University	2	1 868 831	15 837.55
	Medical Colleges	1	3 737 661	31 675.09
	Engineering Colleges	8	467 208	3 959.39
2) Recreational Facilities	Stadium	3	1 245 887	10 558.36
	Cinemas	20	186 883	1 583.76
	Public Library	3	1 245 887	10 558.36
	Reading Rooms	3	1 245 887	10 558.36
3) Health Facilities	Allopathic Hospitals	18	207 648	1 759.73
	Ayurvedic Hospitals	25	149 506	1 267.00
	Unani Hospitals	3	1 245 887	10 558.36
	Homeopathic Hospitals	15	249 177	2 111.67
	Family Welfare Centres/ Sub-centres	351	10 649	90.24
	Primary Health Centres	48	77 868	659.90
4) Financial and Commercial Institutes	Nationalized Banks	129	28 974	245.54
	Non-Nationalized Banks	29	128 885	1 092.26
	Agricultural Credit Societies	114	32 787	277.85
5) Communication and Administrative Facilities	Post Offices	372	10 047	85.15
	Post and Telegraph Offices	9	415 296	3 519.46
	PCOs	826	4 525	38.35
	Telephone Connections	31695	118	1.00
	Police Stations	27	138 432	1 173.15
6)Cold Storage	Cold Storage	59	63 350	536.87

Source: Calculation is based on data obtained from Sankhikiya Patrika (Statistical Bulletin), Aligarh District, 2012.

Note: MPT= Mean population threshold, PCOs= Public call offices.

research. Likewise diverse physical, cultural, social and economic aspects, the distribution of population and facilities is not uniform across the region. But over the earth's surface, the nature of distribution of both population and facilities happens together, as both are

interdependent to each other. People requires different facilities to sustain their socio-economic life as well as to fulfill needs and desires, while proper functioning of facilities depends on the size and purchasing power of patrons. Therefore, higher important facilities which are fewer in number available only in bigger size towns, while lower important facilities are available in both bigger as well as smaller size towns.

Table 3 reveals the distribution of 13 urban centres or towns in five categories according to their population size. Table 3 also indicates the total urban population and composite score of functional importance (total importance of all facilities in a town) in each size category. Aligarh is the biggest town in Aligarh district (study area) with its total projected population 983,220 persons in 2011 (79.41 per cent of total urban population in the district) and Composite Functional Score (CFS) of 340,497.39 (66.71 per cent of total urban functional importance), comes under the category of Class I towns in India. However, Atrauli (55,725) is also single found in Class II town in the district having 04.50 per cent urban population and 11.10 per cent (CFS 56,656.22) urban functional importance. In the district, Class III towns (i.e., Jattari, Khair and Charra), Class IV towns (i.e., Kasimpur, Jalali, Harduaganj, Kauriaganj, Pilakhana and Iglas) and Class V towns (i.e., Beswan and Vijaygarh) accommodate 7.63 per cent, 7.36 per cent and 1.10 per cent of total urban population of the district respectively, but they scored 8.62 per cent, 11.71 per cent and 1.85 per cent of urban functional importance respectively (Table 3 and Fig. 2). Table 3 further reveals the relative ratio of advantage of population and functional importance. Such an analysis is significant to estimate the probability of extension of a town in future. People flows towards the centre where there are ample opportunities of education, employment, medical, etc. as socio-economic pull factors. Therefore, a town having more functions but lesser population has more prospect of further growth. In this view, it may be argued that a town with ratio of advantage more than 01 or unity is supposed to have more functional importance in proportion to its existing population size, subsequently has an advantage of further expansion by attracting and accommodating more people. In contrary, towns with ratio less than 01 have lesser probability to be expanded. In the study area, Class I town i.e., Aligarh has scored the ratio of 0.84 (i.e., <1), while Class II town i.e., Atrauli has scored highest ratio of 2.47 followed by Class V towns (1.69), Class IV towns (1.59) and Class III towns (1.13) (Table 3). It may be inferred that Aligarh urban centre has lesser probability of its further growth than the smaller size towns in the district. However, Atrauli has better prospect of its further growth in terms of both population and area consequent upon in-migration of people from surrounding rural part.

Again, irregular distribution of population and facilities among the size class of town has been analyzed based on the Gini's Coefficient of Concentration Method. The ratio of concentration of population in different size class of towns has been examined, where Gini's ratio of 0.79 ascertains that large number of urban population is disproportionately concentrated at few number of bigger size towns in the district, while large number of smaller size towns accommodates proportionally fewer population. However, Gini's value of 0.66 reveals that likewise population, facilities are also disproportionately concentrated in fewer bigger size towns while large number of smaller size towns is lacking of it. It is clear that the Gini's value of 0.57 determines unequal distribution of facilities in relation to the proportional distribution of population among size group of towns. In other words, both population and facilities are not concentrated in uniform proportion in different size of towns. It may be inferred that, higher concentration of facilities in a town leads to higher concentration of population. Therefore, the growth of towns in terms of availability of socio-economic facilities is subjected to the increase of population in that town as both are complementary to each other. It is emerged out from the above analysis that a town having higher availability of socio-economic facilities must have an excellent potentiality of inward pulling of people as well as the prospect of its further growth.

Table 3

Distribution of Population and Facilities among Classes of Town, Aligarh District, 2012

Class of Town	Population Size	Name of the Towns	Total Population (P)	Composite Functio-nal Score (CFS)	% Popula-tion	% of CFS	Ratio of Ad-vantage
I	100 000 and Above	Aligarh	983 220	340 497.39	79.41	66.71	0.84
II	50 000 to 99 999	Atrauli	55 725	56 656.22	4.50	11.10	2.47
III	20 000 to 49 999	Jattari, Khair and Charra	94 444	44 005.47	7.63	8.62	1.13
IV	10 000 to 19 999	Kasimpur, Jalali, Harduaganj, Kauriaganj, Pilakhana and Iglas	91 127	59 778.72	7.36	11.71	1.59
V	5 000 to 9 999	Beswan and Vijaygarh	13 583	9 454.81	1.10	1.85	1.69

Source: Computed from Table 4

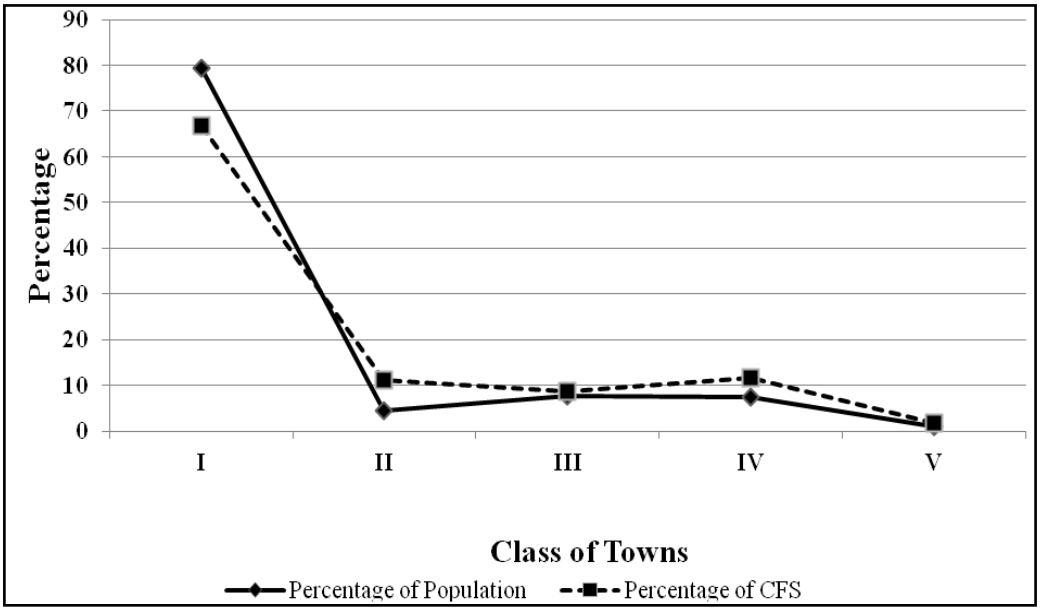

Fig. 2 - **Percentage Distribution of Population and Function among Size Class of Towns, Aligarh District, 2012**

Source: Based on authors' computation

Functional Importance of Urban Centres and their Hierarchy

Functional importance is the sum of all the pulling factors available in a town. Therefore, higher functional importance having variety of both higher and lower order facilities exerts a greater pulling effect that attracts people towards an urban centre. Thus, a smaller town turns into a bigger urban centre progressively. Functional importance is the qualitative identity of a town, as it refers to the pulling gravity of later. Since the functional importance varies across town, their size of population and area also vary positively. Therefore, within a defined region, hierarchy of urban centres is emerged out in which towns are differing from each other in terms of their pulling gravity. Different terms used for the city indicate some hierarchical and functional variations among them (Thakur 1994). From this philosophical essence, it may be argued that a town having higher advantage of pulling factor has an equal advantage of more people to be in- migrated as well as accommodated in future. While in contrary, a town having lesser advantage of pulling factor has lesser possibility of being attracted by people to be in-migrated and accommodated there.

It is revealed that Aligarh city with functional importance 340,497.39 stood at highest position accounting total population 9,83,220 persons and 40.43 sq.km area (Table 4). Aligarh city is enjoying the status of district headquarter and have all the socio-economic facilities including a university, medical college etc. It is followed by the towns like, Atrauli with functional importance 56,656.22, Iglas with functional importance 29,520.91, Khair with functional importance 19,729.13. However, Pilahkana town having functional importance 435.05 stood at lowest position with population and area 13,280 persons and 12.62 sq.km. respectively.

Table 4

Score of Functional Importance of Towns, their Population, Area and Sphere of Influence, Aligarh District, 2012

Town	Functional Importance	Population (P)	Area (sq. km.)	Relative Ratio of Function	Radius of Influence (R) in km.	Sphere of Influence (SI) in sq. km.
1.Khair	19 729.13	36 144	15.45	1.32	9.01	81.20
2.Kasimpur	10 133.28	11 876	09.0	2.07	6.46	41.70
3.Jalali	4 220.12	19 708	17.62	0.52	4.17	17.37
4.Charra	15 500.34	35 962	11.39	1.05	7.99	63.79
5.Jattari	8 776.00	22 338	7.50	0.95	6.01	36.12
6.Harduaganj	11 099.31	14 066	15.40	1.91	6.76	45.68
7.Kauriaganj	4 370.05	12 870	7.0	0.82	4.24	17.98
8.Pilakhana	435.05	13 280	12.62	0.08	1.34	1.79
9.Iglas	29 520.91	19 325	3.0	3.71	11.02	121.49
10.Beswan	4 791.51	5 973	13.50	1.95	4.44	19.72
11.Vijaygarh	4 663.30	7 610	17.47	1.49	4.38	19.19
12.Atrauli	56 656.22	55 725	16.72	2.47	15.27	233.17
13.Aligarh	340 497.39	983 220	40.43	0.84	37.43	1 401.32

Source: Calculation is based on data obtained from Sankhikiya Patrika (Statistical Bulletin), Aligarh District, 2012. Population is based on data obtained from Census of India, 2001, Directorate of Census Operations, Uttar Pradesh.

Note: Projected population is calculated over the period of 2001.

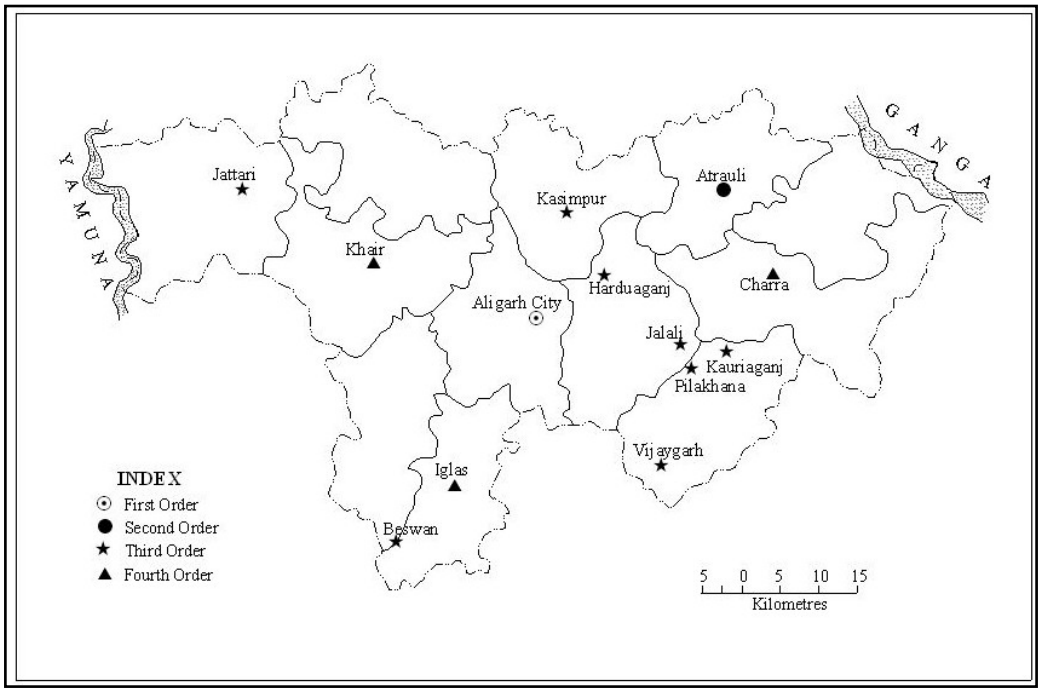

Fig. 3 - **Hierarchical Order of Urban Centres in Aligarh District, 2012**
Source: Based on Table 5

Table 5

Hierarchy of Urban Centres, Aligarh District, 2012

Order of Hierarchy	Range of Functional Importance	Number of Towns	Name of the Towns
First Order	More than 91 740.38	01	Aligarh
Second Order	91 740.38-52 479.41	01	Atrauli
Third Order	52 479.41-13 218.44	03	Khair, Charra and Iglas
Fourth Order	Less than 13 218.44	08	Jalali, Kauriaganj, Kasimpur, Pilakhana, Jattari, Harduaganj, Vijaygarh and Beswan

Source: Computed from Table 4

Therefore, it is revealed that the relative difference of functional importance exists among the towns in the study area. Such a relative difference is the cause of emergence of functional hierarchy of urban centres (Nagia and Ahluwalia 2003).

Table 5 and Figure 3 reveal the hierarchical arrangement of urban centres into four orders starting from the first order or the highest order with highest functional importance to fourth order or the lowest order with lowest functional importance. Aligarh urban centre is the only one

to come under the first order of functional hierarchy. Only one town i.e., Atrauli with functional importance ranging from 91,740.38 to 52,479.41 has been recognized under second order of hierarchy. However, three towns i.e., Iglas, Khair and Charra with functional score varying from 52,479.41 to 13,218.44 fall in third order of hierarchy. Rest eight towns i.e., Jalali, Kauriaganj, Pilakhana, Beswan, Jattari, Harduaganj, Kasimpur and Vijaygarh with functional score less than 13,218.44 are comprised under fourth order or lowest order of functional hierarchy of towns in the Aligarh district (Fig. 3).

Zone of Influence of Urban Centre

Each city forms the centre of a larger area and dominates over certain area which is actually the city's sphere of influence (Murphy 1974). Urban centres do not function in isolation, rather they provide goods and services to the area lying beyond the urban boundary. People from the surrounding area commute a town to avail the required facilities. But, people visit towns from a certain distance. The distance, which patrons willing to travel, depends on the importance of facility so that it should be the economy of the distance (Pawar and Lokhande 2001, Yasenovskiy and Hodgson 2007). Therefore, both importance of facility and the distance traveled by the patrons are positively related. Again, a town having large number and higher order of facilities is being visited by patrons from longer distance. In other words, a town with higher functional importance exerts an influence upon larger area of its surrounding (Lokhande and Pawar 2004). Such, an area surrounding the urban centre reveals the complexity of interaction and interdependence between town and surrounding rural area that is popularly known as functional region (Glasson 1978). It may be inferred that a town having higher functional importance covers larger zone of influence and vice-versa.

In the analysis by adopting V.L.S.Prakash Rao's modified method, the zone of influence of each urban centre has been delineated. Table 4 exhibits that Aligarh city exerts its influence up to 37.43 km and covers the area of 1,401.32 sq. km. It is followed by Atrauli town with its radius of influence 15.27 km. and sphere of influence 233.17 sq. km., Iglas with its radius 11.02 km. and sphere of influence 121.49 sq. km. However, Pilakhana has been identified at bottom position in its functional influence with radius of 1.34 km. and sphere of influence of 1.79 sq. Km (Table 4).

Figure 4 depicts the circular form of sphere of influence of urban centres at different hierarchical order. Higher order centres with higher functional importance encompasses larger dependent area within which dependent area of lower order centres come under. Aligarh city being a largest order urban centre in the district radiates its influence up to the highest distance from the centre with radius of influence 37.43 km. Its influence reaches even outside the district boundary, i.e., northern, southern, south-eastern and south-western part and encompasses almost all the lower order urban centres including their dependent area (Fig. 4). It supports the philosophy that all lower order centres by providing lower order functions create rather smaller sphere of influence, but the inhabitants from such a sphere commute higher order centres to avail further higher order functions. Aligarh city is followed by Atrauli and Iglas urban centres with radius of influence 15.27 km. and 11.02 km. respectively. There is an overlapping of spheres of influence of Atrauli, Kasimpur, Harduaganj, Charra, Jalali, Kauriaganj and Pilakhana in east-central part of the district. It may be argued that this part of the district is sufficiently served by the closely located urban centres led to higher socio-economic development. Moreover, this part gets benefits of nearness of Aligarh city - the biggest urban as well as service centre. Pilakhana – lowest order centre with radius of influence 1.34 km. comes under the zone of influence of Kauriaganj which also comes under the zone made by Jalali, though both are fourth or lowest order urban centres (Fig. 4). The same figure further depicts that the

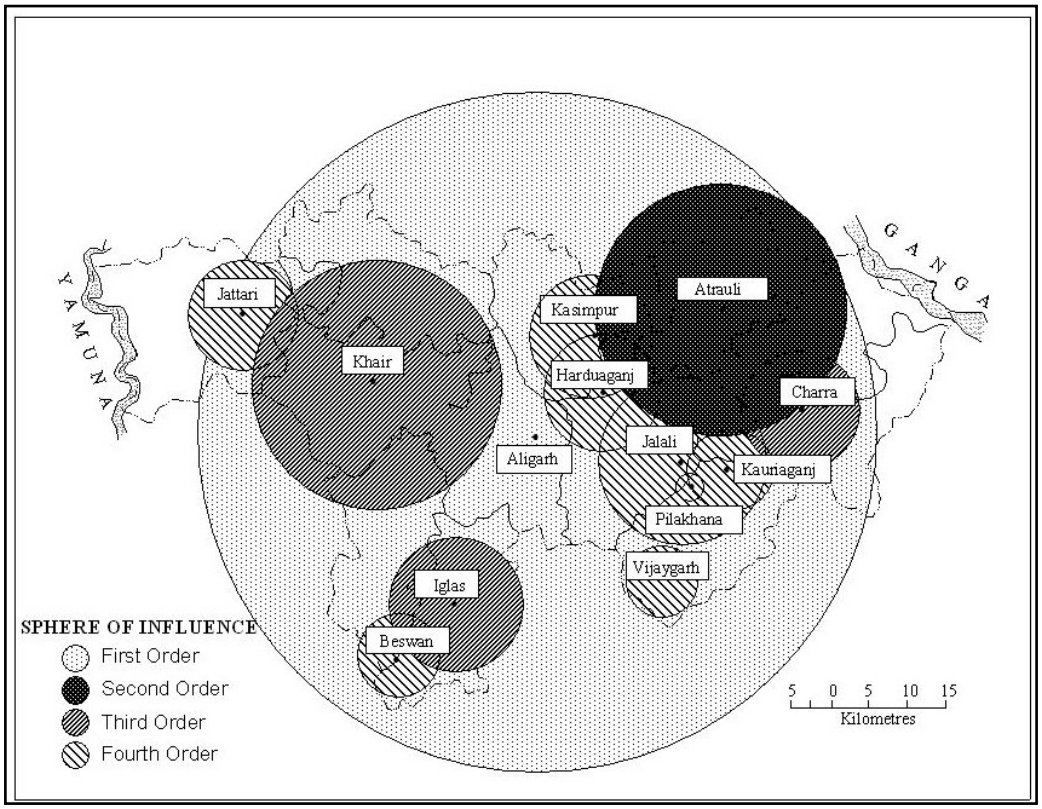

Fig. 4 - **Sphere of Influence of Urban Centres of Aligarh District, 2012**
(Based on modified method of V.L.S. Prakas Rao). Source: Based on Table 4.

extreme eastern and western part of the district do not comes under the sphere of influence of any urban centre. Such information is crucial for urban planning purpose in order to attain socio-economic change in these areas.

Test of Hypotheses and Laws of Urban Growth

In the present deductive approach of research, aforesaid general hypotheses have been formulated to be tested in particular area (Aligarh district) to establish the general laws of urban growth. Going through the quantitative analysis (Correlation Coefficient and 't' test) taking functional importance and population of urban centres as independent and dependent variables respectively, it is resulted that both are positively correlated with high degree of coefficient i.e., r = 0.992. Their calculated 't' value of 26.56 higher than the tabulated 't' value of 3.11 at 11 degree of freedom reveals correlation is significant at 1 per cent level and assures that the hypothesis, 'population concentration is directly proportional to the functional importance of town' is accepted and it becomes a law of urban growth. It may be ascertained that higher functional importance of towns attracts large number of people to be concentrated which in turn leads to urban growth. Again, both higher functional importance as well as larger population together causes the spatial extension of urban centre. To investigate its ground reality, both functional importance and population as independent variables have been

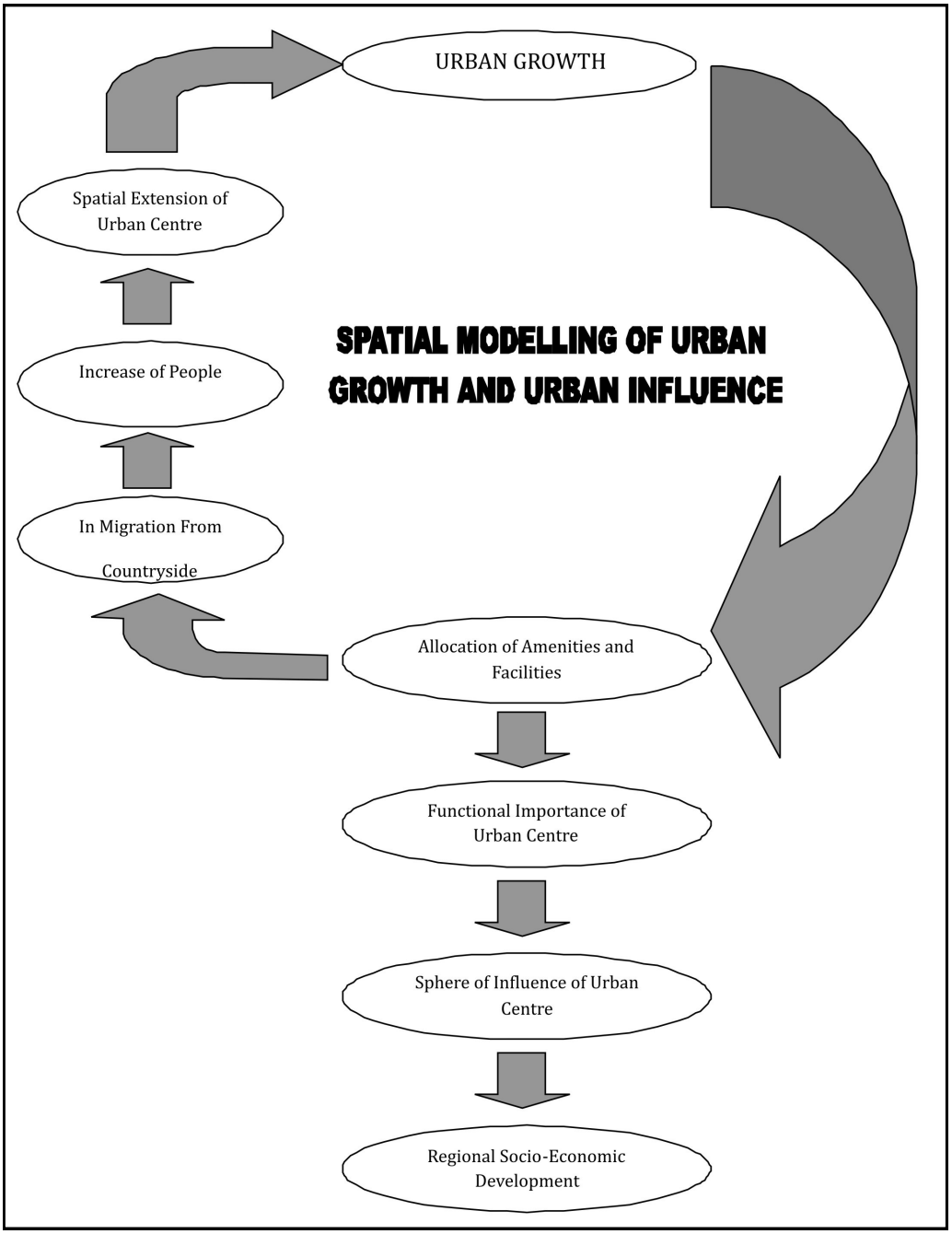

Fig.5 - **Spatial Modelling of Urban Growth and Influence**

correlated with urban area (sq. km.) as dependent variable. Their resultant r = 0.857 (functional importance vs. area) and r = 0.871 (population vs. area) significant at 1 per cent level at 11 degree of freedom accepts the hypothesis, 'functional importance of town has positive impact on its spatial extension' and 'population size is the function of area extension of urban centre' which further turned into the laws of urban growth. Another investigation has been done to test the causal relationship of functional importance of towns with their sphere of influence. It is observed that, functional importance as independent variable and sphere of influence of urban centre as dependent variable are positively correlated at higher degree of coefficient (r = 0.995) which is significant at 1 per cent level at 11 degree of freedom. It accepts the hypothesis, 'higher order towns with higher functional importance radiate influence over larger area' and again it turned into the law of urban growth. It may be argued that, proper balanced regional development would be attained only when no any part of countryside would remain out of the radius of functional influence of any urban centre. From the above quantitative examination, a spatial model of urban growth is emerged out as follows:

The model (Fig. 5) simply reveals how does an urban centre grow progressively into a bigger one and how much it is significant in regional socio-economic development. It comes to be true from the figure that the allocation of amenities and facilities primarily in a small size urban centre enhances its capability to attract people who in-migrate from countryside to have better opportunities of socio-economic advancement. Subsequently, more people are concentrated there leading to an increase of population size which is the catalytic effect of spatial extension of that urban centre. All these factors collectively resulted into an urban centre to grow progressively. It is important that, whenever a town turned into bigger one, it requires more facilities to be allocated to fulfill human needs and maintains better level of living which further attracts more people to in-migrate. But such a growth process continues till the urbanization finds its optimum level. Figure 5 further depicts that with the increase of allocation of facilities, the functional importance of town increases, subsequently the radius of influence as well as sphere of influence increases progressively. Therefore, such process results into the socio-economic interface of the region.

Functional Level Analysis and Planning Recommendation

In the analysis of functional gap or functional level, the resultant relative ratio of 1.0 is meant for the balancing level of population in accordance to the existing facilities, however above or below of it refers to the urban centre is served adequately or inadequately respectively. Such an analysis has two objectives, i.e., first, to recommend for the additional facilities in inadequately served urban centres to reach at the standard level of population–function ratio (ratio of 1), and second, to identify the existing functional potentiality of urban centre to attract more migrants as well as possibility of its further growth. It is clear from the Table 4 that, among the inadequately served urban centres with relative ratio less than 1, i.e., Jalali (0.52), Kauriaganj (0.82), Pilakhana (0.08) and Aligarh city (0.84), Pilakhana has recorded least ratio of population and function. It reveals that the existing amenities and facilities are not sufficient for the present population size leading to larger stress of overburden of population on civic amenities and facilities. Pilakhana is followed by Jalali where also existing facilities does not correspond to the population size. Therefore, allocation of facilities must be made to raise its ratio at standard level of 1 from 0.52 which may widen its sphere of influence. Subsequently, socio-economic development of larger surrounding area would be achieved as a consequence. Kauriaganj and Aligarh urban centres are marginally below the standard ratio of 1, therefore only few facilities may be provided there.

The analysis of relative ratio of functional level in Table 4 further reveals that Iglas with ratio

3.71 has highest potentiality to attract much more population till the ratio adjusted to 1, therefore possibility of fast growth. It is followed by Atrauli (2.47) which has bright possibility of further growth. Rest urban centres, i.e., Beswan (1.95), Khair (1.32), Harduaganj (1.91), Kasimpur (2.07), Vijaygarh (1.49), Jattari (0.95) and Charra (1.05) have potentiality of their growth by attracting people from surrounding area. Such an analysis of functional level of each facility of all the urban centres is more pragmatic as well as more specific for planning purposes, though not covered under the present study.

Keeping in view the goal of urban as well as regional socio-economic development in order to achieve some sort of human well-being, planning recommendations have been made as follows:

- Urban growth should be concrete in nature and should be accompanied by economic development of an area.
- The number of residents in an urban centre and facilities available for them must maintain equilibrium.
- The distribution of facilities should be in such a manner that their location may ensure easy accessibility in and around the areas of urbanization.
- To maintain the standard level of living, different types of higher as well as lower order facilities should be allocated in Pilakhana as it is one of the fourth order centres with least sphere of influence. In order to reap the regional socio-economic development, allocation of facilities is rather much imperative to enlarge its radius of influence.
- To encompass the eastern and western part of the district under the zone of urban functional influence (Fig. 4), more facilities especially of higher order should be allocated in Atrauli, Charra and Jattari towns. Consequently, the functional importance of these towns will sufficiently be increased and patrons from surrounding parts can easily avail developmental facilities. Such an approach may enable towns to achieve balanced regional development as a consequence of urban growth.
- Another significant planning approach should be made to connect all the urban centres by efficient transportation facility and finally, they should be connected with Aligarh city- the biggest order urban centre in the study area.
- Besides, a comprehensive planning policy should be taken to promote urban growth to such an extent that the functional importance of each centres of all hierarchical order may radiate into all corner of rural. Therefore, a significant influence can change their living standard and quality of life in the district.

Conclusion

Going through the above quantitative analysis, it is evident that the urban centres grow in hierarchical manner which are of different sizes. The distribution of both population and facilities are complementary to each other and they are highly concentrated in bigger size urban centres. Centres having large number of facilities as well as higher functional importance induce pulling effect and become a centre with greater chance of further growth by attracting and accommodating more people from surrounding area. Quantitatively, it is proved that towns grow (in terms of area and population) as a consequence of the availability of facilities of varying importance. Since a town grows, it is evident, its sphere of influence also increases progressively which leads to regional socio-economic development. Therefore, in order to accomplish the dual objectives of making an urban centre more beautiful as well as convenient for living, and not to leave any rural part out of the urban functional influence as well as to

achieve balanced regional socio-economic development in the study area, aforementioned planning recommendations should be adopted and implemented. In addition, detailed field study at household level in each urban centre should be conducted to evaluate the existing level of living and quality of life of inhabitants, transportation and communication facility, level of pollution, drainage pattern and other civic amenities and facilities. Such a pragmatic study is imperative for city planning formulation and policy making to enhance quality of life as well as level of living and human well-being as well as welfare.

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MANAGEMENT ELEMENTS OF THE EMERGENT METROPOLITAN AREAS IN A TRANSITION COUNTRY. ROMANIA, AS CASE STUDY

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Abstract: Complex processes, specific to the countries in transition, have had major impacts on restructuring the territorial management systems. The removal of restrictions of limiting urban expansion, imposed by the totalitarian regime, has allowed the rapid expansion of cities, beyond administrative boundaries, since 1989. The concept of emerging metropolitan area is explained by the multitude of problems posed by the sketching of these areas and especially by their functioning. Synthesizing, there are presented some managerial experiences considered inchoate, of some emerging Romanian metropolitan areas, with an emphasis on Bucharest's metropolitan area. The conclusions of these descriptive analysis show the complexity of the problems that can occur during the process of building of the metropolitan areas under the circumstances of lack of an inter-municipal cooperation culture. Integrated management takes into account two realities: firstly, that the management of emerging metropolitan areas is trans-scalar, achieving the partial mergence of the management types (including the collegiate one), and secondly, that insuring a multi-level governance without implementing a polycentric intra-metropolitan development policy, is not sufficient.

Key Words: *emergent metropolitan area, managerial experiences, consensus management, metropolitan governance.*

Introduction

The main objective of this study is to demonstrate the difficulties related to the management of the areas tightly connected to cities in case of the states in the transition process from an excessively centralised economy to the market economy. These spaces are in a structural-functional disorder phase, with numerous distortions generated by delays within the institutional construction, as well as the lack of a culture of inter-communal cooperation. The management model of these areas specific to societies in transition, which suddenly changed their political and socio-economic regime, may complete the general management models of the metropolitan areas in a lineal change.

When a culture of inter-communal cooperation lacks, the attitude of each decision factor at local level becomes a break in sustaining the genesis' processes of some coherent metropolitan areas, where the benefits of collaboration are reciprocal. The concrete situation of unsound cooperation within new metropolitan areas of Romania and the experience in promoting the dialogue between the representatives of local communities and of the city, determined us to propose to manage these areas by means of a type of integrated collaboration management, where consensus is the fundamental principle. This type of management may win the reciprocal trust of those who manage each community from the

metropolitan areas and leaves free space to the display of enterprise spirit (Harvey 1989) in the unfolding of economic, social, cultural activities etc.

A literature synthesis

The metropolitan area represented an important study subject for the sciences of territorial development during the last decades. The term of emergent metropolitan area was used by Elliot and Perry (1965), who contradicted classical theories regarding the role of the processes of population concentration in the development of new cities and showed that these processes were secondary, reported to the economic processes. Researches demonstrated contradictory processes of structuring/destructuring of metropolitan areas, which took more and more sophisticated spatial shapes. Historical incursion within the metropolitan apparition and development shows a tight connection between this and the dynamics of the production system (Scott 1982). The transition to the fordist economy, where large metropolitan areas were functioning as key elements of mass production towards the post-fordist economy, meant the industry's transfer outside these and the transition to a new type of economy, characterised by a large flexibility. The new cognitive-cultural economy encouraged processes of locational convergence (Scott 2008). Despite the fact distance seems to have disappeared (Hall 1999), digital revolution and telecommunications revolution re-evaluate the importance of geographical proximity in localising the actors who produce knowledge. The effects are visible in the new forms of urbanisation which are registered by such a diverse world at planetary scale, as the urban world.

For the economies in transition from centralised systems to the market economy, it seems that some of the development stages are known by American and West-European economies as skipped or crossed with a very high speed. The impact of the new economy facilitates the almost instantaneous transition from the mass industrial production, extensive, to the new types of activities dominated by the superior tertiary (finances-banks, insurances, IT, research and higher education), by means of which the creative capacities of the employees are valorised. Unlike advanced states, the new types of economic activities revitalize less the town centres and more the suburbs, and especially their metropolitan space, in the countries with an emergent economy (Ianoş 2004).

Starting from the case of large cities from Romania, which did not know the classical process of suburbanisation (Nicolae 2002), and being declared closed towns for a few decades, and where economic-social and cultural relationships were dictated from the centre, the accelerated urbanisation around them determined a chaotic expansion of built space (residential, commercial, logistics, IT, productive activities). We are in the phase of structuring some emergent metropolitan areas, areas that the central and local power try to manage (Ianoş et al. 2008).

Few studies were written about emergent metropolitan areas of this type. Examples are the studies on some European metropolitan peripheries, published in Beitrage zur Regionalen Geographie (editors: Burdack et al. 2005). There where elements appear in connection to the reconstruction and redefining process of some metropolitan areas around some capitals from Central and Eastern Europe (Berlin, Budapest and Moscow). By analysing the population, economy and restructuring processes, the studies in this volume show the diversity of the suburbs' dynamics of some large cities from this part of Europe. But none of these cities knew excessive interdictions, in the communist period, as Bucharest or the other large cities of Romania suffered.

The more and more accentuated dynamics of the processes from the urban-rural interface led to a multiplication of preoccupations, both of the researchers and of the decision factors, all of them being preoccupied by a re-thinking of the institutional mechanisms, able to coordinate the functional restructuring of the space around big cities (Brenner N. 2003, 2004). Due to the deficit recorded within work power, raw material and agro-nutritional products, the towns contour a space around them, which provides resources in exchange of services, qualitatively superior to those from the local systems.

In the complex context offered by the present genetic processes of metropolitan areas, the concept of their territorial management must be understood as a continuum of the management types practiced at all organizing and functioning levels. The strategic component of the integrated territorial management has in view the spatial projecting of the interaction between the metropolis and the sustaining area, so that maximum of social-economic benefits for human communities should be accomplished, in the conditions of durable development of those areas (Ianoş et al. 2009, Peptenatu et al. 2010, Ogwueleka 2009, Szigethy 2007, Makhelouf 2009, Braghină et al. 2010, Stam et al. 2008). The defining and implementation of integrated territorial management depend on the way the institutional structures cooperate, on the decision factors' professional performance and responsibility, on the cooperation culture from the main administrative units level, and on the partnership established between territorial structures from different hierarchy levels. The integrated management of metropolitan areas represents a multiscale type of decisional interactions, which are guided by operational objectives established by communities, all of them being subordinated to a strategic objective.

In opposition to this type of management, urban governance represents a process of actors, social groups, institutions' coordination, which regards the creation of synergies at different scales, in order to reach some short and medium terms objectives. Each of these actors establish their own objectives, often in doubtful fragmented environments, whereas territorial governance follows the reaching of some collective goals, established without dispute. This process distinguishes itself by the capacity of integrating local interests (belonging to organizations, institutions, social and cultural groups etc) with regional, national or supranational interests, interacting with other specific forms of governing (Hong and Chao-lin 2002).

The approach of territories management frequently appears in the specialised literature, in the context of the analysis of the concepts of governance and governing. Governance, a term used since Antiquity, met multiple connotations along the years. Revitalised in political and social sciences at the beginning of the '90s, the concept of governance is defined as an actor in the governing process, synonym to that of government (Johnston et al. 2000). Recent studies (Pierre 2000, Kjær 2004) refer to two different approaches: on the one hand, the term of governance refers to the organisation type, by the involvement of a series of institutions and actors in the political field, and governing represents one of the many components of governance. In the second case, the term underlines the relationship between these organisations, where governance refers to a particular form of coordination, namely the passing from a hierarchic structuring to the creation / development of networks and partnerships.

Rhodes (1997) considers governance as an inter-organised system of auto-organising and brings in discussion four main traits: interdependence between organisations, the overtaking of the limit between the public, private and voluntary sector; the continuous interaction between the members of a network; confidence and fairness; a certain degree of autonomy towards the state.

Metropolises, regarded as coordination centres and joints of the interaction networks with a large range, have existed since pre-industrial period, and more obvious in the industrial period. In different times, metropolises adapted their coordination functions depending on the needs of economies and on the technological possibilities (Bourdeau-Lepage, Huriot 2003).

Business services, in general, and advanced services, in particular, have been more associated to central areas of towns. Since in the XIXth century and most part of the XXth century the biggest towns as London, New York and Paris confronted a population and production activities' deconcentration, and professional activities of production stayed localised in the business centres' districts. Metropolitan systems have suffered major changes since 1960, by the deconcentration of production services, not only from central areas towards new developing metropolitan regions, but even from traditional economic nuclei towards intrametropolitan suburbs. Following the first two deconcentration waves which affected population and production activities, specialists recognized a third new wave (Cervero 1989), as well as a new suburbanisation (Stanback 1991).

Metropolization is generally considered to be a double process (Veltz 1996, Stroper 1997, Scott 2001, Bassand 2004). The first process is mainly at world level and it underlines a metropolization process in the economic context of generalised competition. The couple globalisation-metropolization will finally act as an engine behind the important transformations of the modern world. The second process refers to the urbanisation internal structuring process. This process controls the propagation of urbanisation process, leading to the coming out of new territorial specialisations and new centralities. The metropolization process also contains a paradox, with a double movement of population and activities concentration in larger cities. At the same time, it contains an opposed movement, characterised by a population and activities deconcentration. These two phases correspond to two metropolization processes, the first being marked by a general concentration, and the second by a deconcentration in the interior of metropolitan area, with a dissipation from the centre towards suburbs.

In such a conceptual framework, discussing about the structuring and functioning of **emergent metropolitan areas**, in the transition states, implies fundamenting some management and governance models, adapted to new conditions. The disappearance of the forces of excessive centralisation and the existence of a free market do not represent sufficient conditions to rebuild the relationships urban-rural on a new base. There are other elements, extremely strong, which washout the efforts of real implementation of some management structures able to manage the metropolization processes. From among these, the most important are those which regard: the excessively autonomous behaviour of the decision factors, the lack of an interlocal cooperation culture, the only accidental formation of partnerships, the hegemony tendencies of the big city compared to administrations from the level of rural localities or small towns.

Democracy adds other disturbing elements in the field of interlocal cooperation: the mayors' affiliation to different parties and the sacrifice of community interests in favour of party interests, if the initiatives start from another political area. All these aspects make the management of metropolitan areas be extremely difficult, by processes of free association of main administrative entities. However, the intervention by normative acts, which oblige local communities to a cooperation with the central town, seems outdated and hard to "digest" at local level. That is the reason why it is necessary to re-think cooperation by a collaborative planning, in which all participants at the process of managing a metropolitan area should be considered equal, communicate rationally and freely so that they could find solutions to all interlocal conflicts (Healey 2006). The participation of several actors to taking decisions

ensures much legitimacy for these decisions. For the implementing and performance of an integrated collaboration management, an important role would be held by re-discussing the concept of "associative pluralism", according to which it is important to assess the conditions in which a multitude of actors can achieve a consensus in the process of territorial management (Habermas J., quoted by Beaumont and Nicholls 2008).

It is obvious that in such a complicated context of managing emergent metropolitan areas in the transition countries, the experiences registered in the developed countries related to local governing, collaboration planning, in the conditions of a participative democracy are very useful. The instauration of such a democracy supposes a certain culture formed in time, or under the pressure of the speed of present changes local communities can take into consideration the actors' pluralism, in order to get an intelligent consensus in starting and implementing some projects. This must admit different opinions and respect the conflict as essential components of the governing process (Melo and Baiocchi 2006).

As metropolitan areas have got specific structures and problems, there are no cvasiuniversal governing models, but only good practices with an indicative character. Like in other processes of territorial development, problems' solving must be based on essential principles of space ethics, able to allow the development of its perennial values (Ianoş et al. 2010). At the same time, each state adopts those governing models which it considers to answer best to the problems the urban and rural communities from such an area confront. These models must take into account the special characteristics of each metropolitan area, of the space in which it is inserted, as well as the relationships with political and administrative organisms of the respective state. Moreover, it must take into account that problems which appear in these areas do not have the same character (Foulkes 2008).

The analysis of spatial transformations related to productive reorganizations emphasized that in the last three decades, two elements with spatial impact imposed: one structure – the district, and one process – metropolization. Nicole May (1999) defines the notion of district as a generic term, which expresses different forms of spatial organization of production (commercial districts, industrial districts, localised technological systems districts, innovative environment, technological parks etc). The author tries to individualise the working mechanisms in case of districts, in order to see in what extent these can contribute to the correct and deep understanding of metropolization processes' phenomena.

As regards the metropolization process, Di Ciommo (2001) defines its three dimensions: the demographic tendencies of the agglomeration process, the structure and functionality of economic activities, as well as the institutional-political organization of metropolitan governing. Quoting the analyses done by Bakouche and Damette (1993), the author appreciates them as an efficient instrument in defining the metropolization process. A metropolis/ big city, according to them, is characterised by a large concentration of tertiary activities, specialised commerce, research centres and a high level of services development.

Regarded from the spatial planning point of view (Bassand 1996, Wust et al. 2005), the metropolization of a region is reduced to preferential development of one or two major centres, as well as at the expansion of other towns from the urban network. These metropolitan centres develop cumulative processes, which generate demographic and economic growth, leading to the development of the respective agglomeration. The concentration of technical infrastructures (not always performant), and the excessive growth of resources consuming, inclusively non-regenerative or hardly regenerative (Eriksson 1986) resources constitute real threats for the quality of the urban environment. The severe degradation of natural components make the

urban ecosystem and the ecosystem associated to this in metropolitan development does not have the capacity of rectifying the basic structures (Pernia 1992).

Jalowiecki (2000) considers the European metropolization process as a process of some towns' catching up the management functions of post-industrial economies, considered at supranational scale. The author enunciates several characteristics of metropolitan towns, and classifies European metropolises in several categories: centres of political decisions, centres specialised in economies' management, capital flows' management, technopoles, cultural and sports centres.

Krätke (2007) considers economic development of European territories as a development's economic potential and innovation capacities' metropolization process. Starting from this, metropolitan regions and urban agglomerations function as engines of the European economy, like integration joints on Europe's world market. The metropolization process is analysed especially referring to the concentration of intensive activities of knowledge economy in the European urban and regional system. A special attention is given to different excellence sectors and to the development paths of European urban agglomerations, by means of the knowledge-based economy, which prevails in metropolitan regions. Metropolization may be also regarded as a selective process (Bourdeau-Lepage 2003), typical for big cities, by which these are better integrated in national or supranational economies.

The dynamics of economic activities from metropolitan areas accentuates itself once again that some administrative structures are organized and are coordinating complex processes which take place in the interface urban-rural. According to METREX (Network of European Metropolitan Regions and Areas), at European level there are approximately 120 metropolitan areas and regions, each of them benefitting from a certain organization structure that is more or less functional.

Methodology

By definition, the metropolitan area represents a large system of a special complexity, where not only structures are dynamic, but also the field's forces where they develop and complicate. This territorial reality must be managed, and the communities' interest from a metropolitan area must integrate/ include, in a multiscale manner, other communities' interests.

The fundamental work method is that of demonstrating how the experience gathered in building the management systems of emergent metropolitan areas in Romania may lead to the elaboration of a model with extrapolation power for the countries in transition from centralism to market economy.

The defining of the methodology for the integrated collaboration management of metropolitan emergent areas is based on a type of complex management which supposes a multiscale cooperation of communities. It is about integrating several government levels, starting from elementary to metropolitan. The implication of different types of spaces needs an integrated approach for a balanced development and for the interest of all communities.

Integrated collaboration management is based on the knowledge of strategic objectives, as well as the knowledge of decision factors' competences in the field of territorial development, from the basic structures to the structures situated at levels superior to metropolitan areas. Consequently, integrated management is a „compromise" between territorial management of administrative units included in the metropolitan areas, or to which parts of these areas they

belong to.

Synthetically, the analysis' methodology is based on:

- The description of incipient experiences regarding management, within some emergent metropolitan areas from Romania. This means finding the basic structures which interact in an emergent metropolitan area. Each of these structures has got an individual management system, which takes more or less into account the influences coming from the insertion environment.
- The establishing of the relationships between the institutional constructions of management. The metropolitan area has got its own management system, which in the conditions of inexistence of a structure recognized by law, becomes a type of "consensus management" that can be accepted on variable periods of time, without the guarantee of its persistence.
- The analysis of the decisional flows circulation, taking into account the existence of public and private actors, emergent economies and civil society, on the one hand, as well as of the territorial and sectorial management, on the other hand.
- The individualization of some steps, characteristic for an integrated management in the process of building and functioning of the emergent metropolitan areas.

The tracking of the management model has got an inductive character, starting from the real processes taking place at the level of emergent metropolitan areas. The academic interest is to find the way by which this type of management can be improved, so that it could lead to the spatial defining of the emergent metropolitan areas, and then to their consolidation. In this case, it is important for the management to develop at the same time with the evolution of the real metropolization process and to contain elements of prediction regarding the future structural-functional configuration.

Within the methodological approach, the starting idea is that generally two management systems of metropolitan areas can be considered: one based on exerting the governing by hierarchized decision levels, and the second by polycentric structures. The integrated management implies the cohabitation of the two management structures, ensuring the governing process a maximal efficiency, at the level of metropolitan areas. Moreover, this is situated in the category of a strict management, but opened to a consensus management, which allows dialogue, ensuring the decisions taken at the level of metropolitan areas an increased adapting and flexibility capacity. The proposed collaboration/consensus management is defined as that type of temporary management in which decisions are taken by consensus, and their legitimacy may ensure a pluralist participation to the act of governing.

Management Experiences of Administering Emergent Metropolitan Areas in Romania

In transition states, like Romania, the management systems of metropolitan areas find themselves in a slow construction process, as there are no local experiences which could be disseminated at national or regional level. In this respect, the metropolization process is in front of the coming out of its control mechanisms, frequently resulting in conflictual phenomena and non-cooperation attitudes. The paradox is that metropolization as a process becomes more and more accelerated and it respects the increase of the intensity and of the structure of territorial cooperation flows around big cities, and the regulations regarding the spatial insertion are fragmentarily adopted, depending on the strictly local and momentary needs of elementary administrative unit. The unitary regulation vision lacks or it exists only in academic environments and less in the decision factors' environment. The attempt of cooperation

between the territorial decision factors that manage fragments of these metropolitan areas, is more and more consistent, having in view the multiplying of the phenomena of flows' blocking, the difficulty to raise work power stability, the chaotic residential development, the environment issues etc.

In these conditions, the decisions taken at national level are not always encouraging for establishing the metropolitan areas. As an example, by Law 350/2001, the coming out of the metropolitan areas is based exclusively on the local communities' agreement to associate or not the big city nearby. This does not forecast elements able to avoid abuses, generated by the oscillatory and non-constructive option of local decision-makers, which endangers the accomplishing of common objectives for the entire metropolitan area. Even if the local government wants it or not, the process itself of constituting such areas is unfolding, as big cities need an intense cooperation with their insertion environment.

The analyses done upon metropolitan areas from the European Union highlighted the accentuated development, once these territorial structures were set up, following the multiplication of competitiveness advantages created by the association of several administrative units, around some big polarization centres.

A few remarks on emergent metropolitan areas in Romania

After the year 1995 and especially after the year 2000, when legislation was explicit/ precise in the field of accomplishing the public-private partnerships, pilot studies regarding the establishment of metropolitan areas began. These studies were financed either from central funds (Oradea, Bacău) or from proper funds, especially in the case of municipalities (Bucharest, Iaşi, Timişoara, Ploieşti).

Today, in Romania there are five metropolitan areas organised according to legislation in force (Constanța, Iaşi, Oradea, Craiova şi Braşov), and other seven projects of metropolitan areas (Bucureşti, Bacău, Tg. Mureş, Timişoara, Cluj, Ploieşti, Piteşti) (Fig.1).

From the analysis of the way these metropolitan areas were constituted, three main models result (Luncan 2010):

a) the partnership model of local authorities, based on cooperation protocol, accepted and approved by the involved local Councils (of the main town and of small towns and rural communes), with the involvement or not of district council (the superior administrative unit). This type of protocol is centred on the elaboration of the establishment plan of the constituted metropolitan area territory. The fundamental institutional construction is the Council of mayors of all administrative units. With such structures, or close structures, the metropolitan areas Constanța, Craiova and Oradea are functioning.

b) the partnership model of local authorities, based on an organisational form outside local authorities (usually a development agency). The functioning is based on the existence of an administration Council, formed of public and private sector representatives from the metropolitan area. The metropolitan areas Iaşi and Braşov have got such a structure.

c) the partnership model on a contract basis, implies modifying the administrative limits by partial or total agglomeration of basic administrative units, by law. Such examples do not exist in Romania yet, but there are to be considered in case of the capital's metropolitan area (Bucharest), as there are several bills in this respect.

The five constituted metropolitan areas established relatively different objectives. Some of them, for example, limited to general objectives, like the alignment at European economic and social standards, the installing of a market climate, aligned to international competitive procedures and the growth of the economic-social cohesion (the metropolitan area Oradea), others defined their objectives explicitly, in a list of 7 or 9 objectives, as it is the case of the metropolitan areas Constanța and, respectively, Iaşi. The distinction between the objectives of

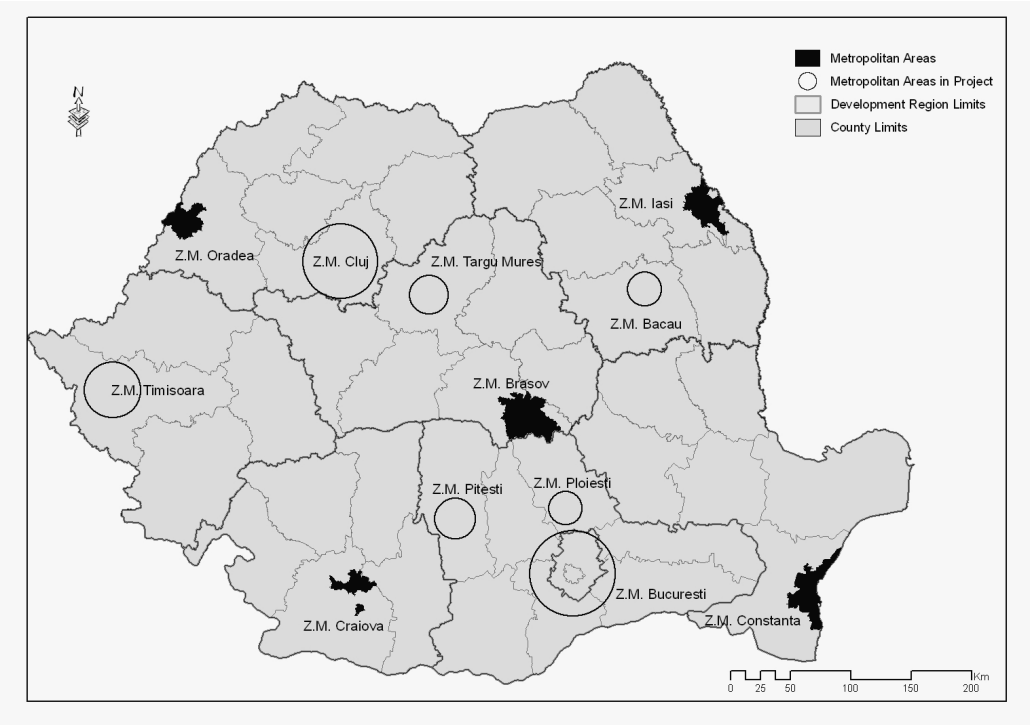


Fig.1 - **Existing or Projected Metropolitan Areas in Romania**

the two metropolitan areas is very interesting and demonstrates the difference in terms of vision between the two managing teams (Table 1).

A simple analysis of these objectives leads to the idea that in the case of the metropolitan area Constanța, the objectives are formulated to solve some current problems that the communities are confronted to at present. In the case of the metropolitan area Iasi, the objectives envisage perspective goals, trying to target preoccupations towards future. Thus, elements of competitiveness, technological transfer, creative industry promoting, environment quality ensuring etc are meant to prove the present partnership of communities around big city wants to transform this space into an attractive space, at international level. This vision is not retrieved in the case of the Constanța metropolitan area .

The three examples show the big differences existent between the management teams, which do not have the necessary experience and they do not appeal to specialists in order to clearly define the strategic objectives of each of the metropolitan area's formation.

The emergent metropolitan area of Bucharest, as case study

Although the first studies that try defining the metropolitan area Bucharest began in 1994, the local communities did not succeed up to now to find common elements in order to apply the specialists' recommendations. Though, having in view the explosive development of Romania's capital and its spatial impact, it is considered that we are facing a typical situation of

Table 1

Strategic Objectives Settled in Two Metropolitan Areas of Cities with Over 300,000 Inhabitants

Strategic objectives	
Constanța	**Iaşi**
Improvement and development of transport, telecommunications and energy infrastructures	Increase of economic competitiveness by creating and developing some structures of supporting business
Development, modernising and improvement of public services	Technological transfer and promoting new, creative industries
Integrated economic development	Developing territorial connectivity by ensuring accessibility, improvement of mobility to and from the growth pole and of fluidization of the traffic inside it
The tourism and tertiary sector development	Improvement of social services by creating, rehabilitating and modernising the afferent infrastructure
Development of new residential areas, according to European standards	Exploiting the cultural-historical and natural patrimony/ heritage
Development of human resources, increase of the occupying rate and control of the social exclusion and unbalance	Ensuring the environment protection and quality with the purpose of increasing the life standard of inhabitants and enhancing the investment's attractiveness
Efficient and integrated managing of the potential the area disposes of	Promoting territorial cohesion and solving some common interest problems by creating and developing partnership structures between public and private cross-border/ transnational/ interregional entities
Elimination of disparities between localities	
Attracting new investments and increasing the access to resources	

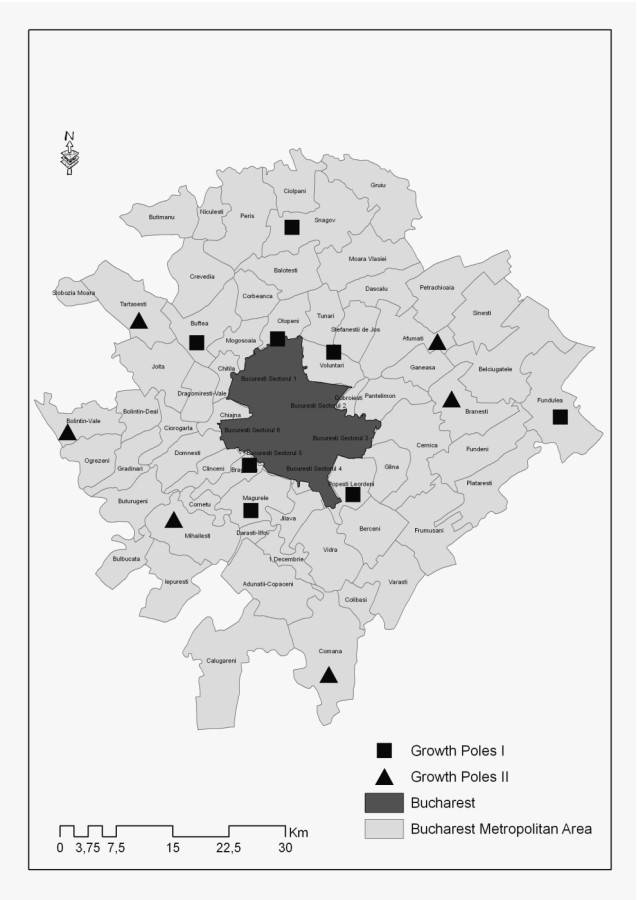
auto-emergence of a metropolitan area. The metropolization process exists, it amplifies, waiting only to be confirmed by the local authorities.

Alike big cities of the world, Bucharest concentrates an important population volume (over 2 million inhabitants) and economic-social, cultural and political-administrative activities.

Projected in the physical space, these components create a large variety of local forms, which enframe more or less into normal rules of distribution and inter-connection and make some particular structures appear. Multinucleation is the most visible process, by the contouring of

some knots with very dynamic internal structures (Otopeni, Buftea, Voluntari), tightly connected to the city (Erickson 1986). Here, flows station/ stop in order to transform, to be consumed or redistributed, supposing the permanence of some very varied entrances, as volume and type.

In order to continuously pulse energy (especially informational energy) for ensuring the quality of some internal relationships which should lead to the decrease of gaps which separates it from the European capitals, Bucharest must benefit of a supporting space, a "breathing space". Naturally, during its historical evolution, it created such a supporting space, by processes of auto-organization and permanent rebalance of the exchanges complementary to side/ adjacent area. The current characteristics of this space, if we would not take Bucharest into account, do not betray its structure influences. On the contrary, it seems to be a space with a chaotic structure, especially agrarian and with a human capital strongly affected by aging and analphabetism / illiteracy phenomena (Fig 2).



But this space does not have to contour itself chaotically, to block, despite its resistance to change, the flows required by the metropolis, but on the contrary, this space must be flexible, it must receive and react rapidly to the modifications the economical-social and urban restructuring require. In this respect, the contouring of a metropolitan area centred upon Bucharest, able to function as a whole, is considered to be a primary need.

Fig.2 - **Bucharest Metropolitan Area**

As a result of its particular evolution, especially in the period 1950-1990, Bucharest has a present structure of sustaining the space which cannot be considered a metropolitan area, but the signs of contouring, under the economy's pressure, demographic growth and improvement of cooperation between administrative units are obvious. In this last remark, the policies of organising the metropolitan space must benefit from a proper institutional framework and resources oriented towards the instauration of a space which is typical for non-discriminating cooperation between all component localities and between these localities and Bucharest.

The dynamics of the metropolitan space from Bucharest should have behind a series of

processes typical for urbanisation, as suburbanisation, periurbanisation and the clear contouring of the influence area. Or, it is well known in this case we refer to a pseudo-suburbanisation, as it was not about a real mass migration of the population with high incomes from the core of city to the adjacent area, so that a real suburban area is created. The demographic growth and the economic development of the communes nearby capital based on their ”protection role” within the existence of a close town (as Bucharest was, during the totalitarian regime), respectively on decentralisation, delocation processes, and coming out of some industrial activities. Their industrial functions and the accommodation functions of the migratory population coming from different areas of the country were distinctive for the majority of the settlements nearby capital.

If suburbanisation was not characterised by specific features until 1990, after this year a real process of localising services and individualising some qualitative residential spaces nearby town occur. This tendency will continue in parallel with the intensifying of the interaction between the town and the nearby localities (Erdeli et al. 2000).

At the same time as the atypical suburbanisation, we can speak about a periurbanisation process, not extremely intense, but relatively well structured. The periurbanisation process was extremely attenuated, due to centralised economy, which provided the capital with resources coming from all the country’s regions, passing by the state fund. This fact made Bucharest attract especially human resources from the periurban area, but not to contribute to its structuring. The consequence was depopulation, rustication, aging and growth of the analphabetism degree within this area (especially in the western, southern and eastern counties).

As a consequence of this anomaly, it seems rather pretentious to discuss now about a metropolitan area, if we take into account the present situation, but it is extremely necessary to contour and develop in perspective such a space, specific for the big city.

The policies of organising metropolitan space must benefit of a proper institutional framework and resources oriented towards installing a typical non-discriminatory cooperation space between all component localities and between these localities and Bucharest.

Synthetically, following the comparative analyses with other metropolitan areas, compared to the generating town, to the natural, human and economic resources these spaces possess, we consider atypical at least 6 characteristics (Ianoş 2004):

1*) The increase of population in the suburban space not by the population movement from the proper town, but due to immigration from large distance.* The population distribution from the metropolitan area reveals higher densities in the suburban areal and very low densities in the peripheral spaces with more reduced accessibility. These densities were strongly influenced by the urban development strategies promoted along the last half of the century. At the end of the last century’s `60s and the beginning of the `70s, besides the pro-natality policy promoted by the former regime, there was decided to be forbidden by law the population coming from other parts of the country, regarding the settlement in the towns with over 100,000 inhabitants. The effect was encouraging for the localities next to Bucharest, as the population from the areas with demographic potential in excess settled in the suburban area, but developed their activity in town.

2)*The intense depopulation of the periurban area,* by the migration rural-urban, accentuated by the extensive development of the capital's industry. These are characterised by a very high weight of the population over 60 (over 30% or even over 40%).

3) *The predominantly agrarian character of the metropolitan area's economy.* If previous to the agrarian reform in 1991, Bucharest could function isolated from its agrarian basin, by directly feeding itself from the centralised state fund (constituted by the contribution of numerous agrarian enterprises all over the country, following this event when „the earth returned" in the property of villagers), we assist at the coming out and consolidation of the network of relationships between Bucharest and its surrounding area. At present, the high weight of subsistence agrarian activities, due to reduced surfaces and the lack of a management which could lead agriculture towards urban market, is surprising.

4) *The sudden dis-industrialization of Bucharest industry and the slow development of the tertialization process.* Concomitantly with this process, de-industrialization was extremely strong, as numerous enterprises diminished their industrial production, they were completely restructured or they were simply closed. The result was the reducing of weight of the population employed in industry, at the capital level, from almost 50% before 1990, to approximately 30% (Cepoiu 2009). Proportionally, tertiary activities developed, and they gradually delocalised in the suburban area, on the main communication roads. After the year 2002, the superior tertiary, especially services for enterprises, finances and banks, insurances, telecommunications and information services, recorded an ascendant evolution, giving back the city functions similar to big European capitals.

5) *The excessive administrative fragmentation at the counties and development region level.* The past and present administrative organising was extremely unstable, which did not allow the consolidation of some structures that could subsequently adopt attitudes of reciprocal cooperation between the components. At present, this area is fragmented, and it is under the territorial jurisdiction of 5 counties: the Ilfov county entirely, a large part of the counties Giurgiu and Călăraşi, as well as one commune from each of the counties Ialomița and Dâmbovița. In such a situation, it is very hard to establish a unitary and lasting cooperation between Bucharest municipality and these territorial entities, each of them with their local or regional interests.

6) *The family life standard is among the lowest from the country, despite the fact we refer to the space of the capital.* The atypic element of this area comes also from the fact that, even if it contoured around the busiest Romanian urban agglomeration, the metropolitan area is mostly characterised by a very low family life standard. This indicator was calculated taking into account the number of doctors for 1.000 inhabitants, the weight of population that graduated high school out of the total of population, the number of subscriptions for the line telephony, the habitable surface per inhabitant, the infantile mortality, the net/neat migration and the number of illiterate people per 100 inhabitants. However, it is explicable how a capital generated around itself chronic under-development, individualising a real economic and social-cultural desert.

This negative effect explains why for a long period of time, around the capital did not exist any town at less than 50 km. Although very recently there were declared several towns (in the last 8 years, suburban localities have become towns), still these do not have a marking role in the diffusion of the characteristics of an urban life in the territory.

Model of Integrated Collaborative Management in the Emergent Metropolitan Areas

Having in view the dynamic and incipient experiences of managing emergent areas from Romania, but also the characteristics of the metropolization process widely presented in the case of Bucharest, we can individualise an integrated management model of them.

This model starts from the idea of adopting a coherent strategy, which could lead to policies with direct effects in the harmonization of the relationships metropolis – metropolitan space. For this, the following issues must be considered:

a) efficient exploitation of the existing legislative framework for promoting some partnership relationships between big cities and their metropolitan space. In this context, it stands out the Law regarding local budgets and the law regarding regional development, both of them with concrete possibilities of sustaining / supporting the consolidation of cooperation between the two distinct territorial entities: the metropolis and the metropolitan area itself. If the first law creates, by the direct allocation to the local budget of a volume resulted from taxes and contributions, ensuring a part of the development resources, the second law can facilitate interregional cooperation with beneficent effects for much larger spaces. The institutional framework established for the implementing of the regional development policy may constitute a brake/ barrier in the cooperation between the metropolitan space and the capital, in some situations. For example, the region Bucharest limits to the town itself and the Ilfov county, which represents only a part of the metropolitan space. In these conditions, the expansion of cooperation at the level of the entire metropolitan space implies an interregional cooperation, which finally may be more productive, in the situation of some resources and interests which exceed the supralocal and regional framework. However, the actors and factors responsible for applying the regional development policy within this space must be aware that only by the increase of the capital's attractiveness and its supporting space, these may become competitive, at national and international level, in attracting investors, who, in their turn, will induce development in regional spaces globally.

b) the improvement of legislative framework by supporting some bills, which could replenish the impact force upon the consolidation of emergent metropolitan areas. In this respect, proposals detach, as they can be taken into account by the law giver, related to the direct access to advantageous credits, in the conditions of economic abandoning of some metropolitan spaces, development of small and medium-sized enterprises, improvement of regional development laws and under-privileged areas etc.

c) proposing new laws, among which those regarding local development, the limits of interlocal and interregional cooperation, the agriculture and small and medium-sized enterprises' revitalising could detach.

First and foremost, the organization of metropolitan space supposes that, instead of chaotic cooperation between metropolis and its supporting space, a flexible system of relationships to be built, for the benefit of both entities and which could better exploit the metropolises' trumps, at national, regional and continental scale.

In emphasizing the metropolitan emergence process in Romania, the new policies promoted at national and European level regarding polycentric development are considered. By government decision, there were established, outside the capital, 7 national growth poles, as well as 12 urban growth poles (the Government Decisions 998 and 1948 from the year 2008) (Fig.3). The

national selected poles have all the chances to contour the viable metropolitan areas, which could support metropolises in their affirmation, both at national and European level.

In building the management system that can ensure efficiency to the metropolitan governance, one must start from the way local and sectorial territorial governances interact. In the concrete

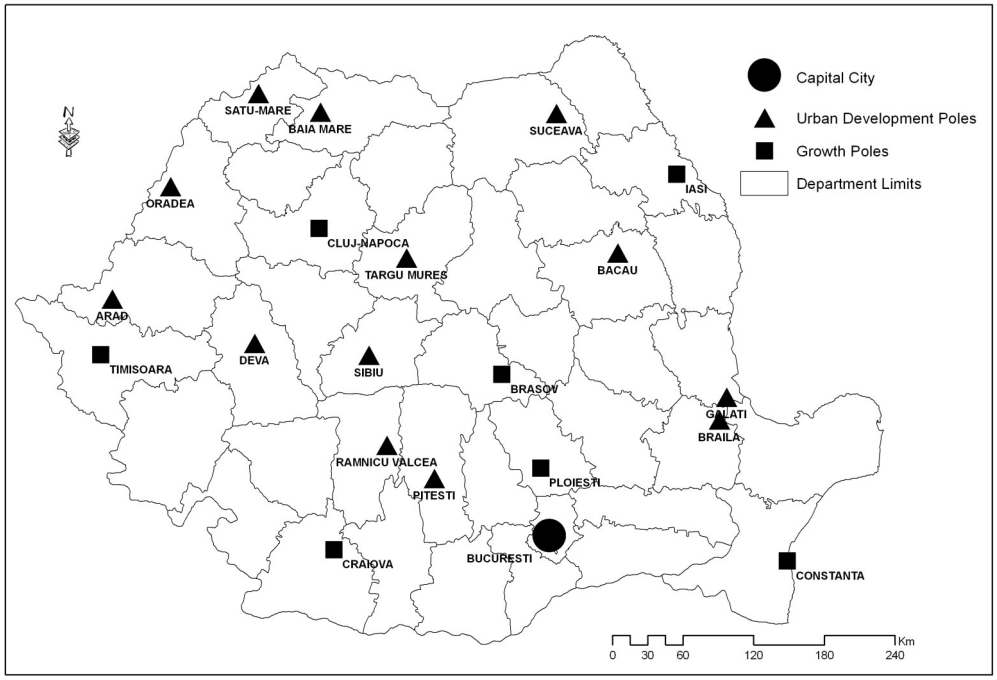


Fig.3 - **Development Poles Network, According 998/2008 Government Decision**

case of emergent metropolitan areas, metropolitan governance tends towards performance if it has in view the supporting elements and the network of relationships between them. As it results from Fig.4, the main generic components of an emergent metropolitan governance are represented by the state, metropolis and urban and rural communities, emergent economy and the maturing of civil society (Knieling 2009).

In case of the conditions of emergent metropolitan areas, the state has got an important role, as it may offer some facilities prior to these spaces and it may support the accomplishing of some public-private partnerships, which can contribute to the sustaining of emergent economic branches. State may also interfere in sustaining the cooperation relationships between metropolis and urban and rural communities from the metropolitan area, by adopting a flexible legislation in the field. According to the legislation in force, the 7 national growth poles will attract approximately 50% from the funds allocated to Romania by the EU, and the other 12, approximately 20% (the Government Decision nr. 998/2008).

It is obvious that the important role is that of metropolis and local communities (urban and rural), which take part, by voluntary association, to the carrying out of an attractive metropolitan

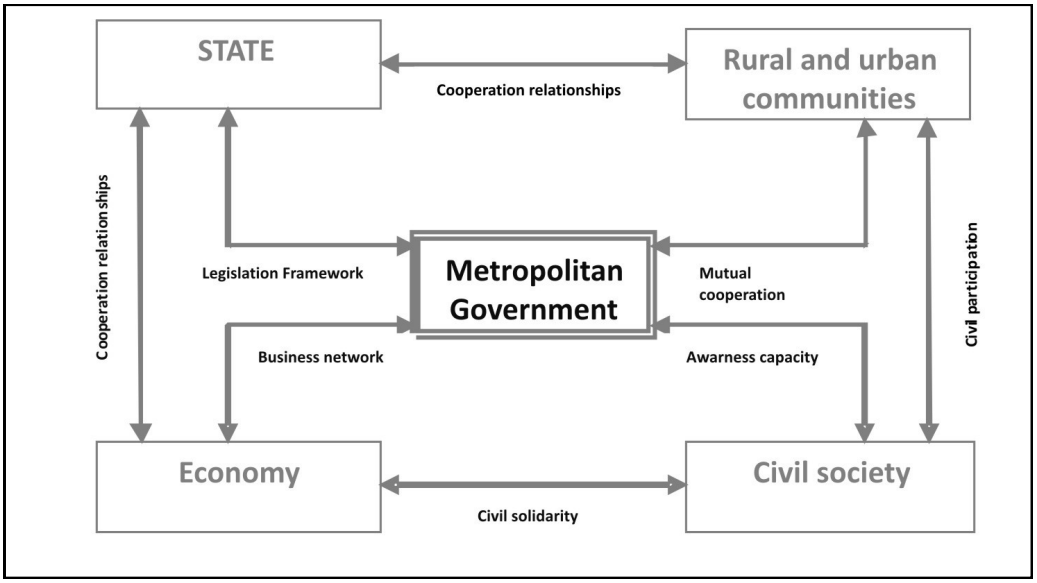


Fig.4 - **Premises for the Emergent Metropolitan Integrated Management**
(Knieling 2009, modified)

area, characterised by a certain coherence and economic-social solidarity. The persistence of these intercommunal cooperation relationships is essential in the perspective of accomplishing an efficient governing at metropolitan level. Moreover, the conscious concern of all communitary actors for the projects' accomplishing becomes a necessity in the governance permanence, despite the potentially different option of some local leaders.

The success of the metropolitan governing depends in a large extent on the economic growth. Or, an emergent economy, characterised by branches which multiply initial investments and have got effects generalised at the level of metropolitan area cannot but sustain a certain type of metropolitan governance. Economic growth takes place by the relaunch of the public-private type partnerships, by creating and sustaining some economic actors' networks, able to exploit the strong points which arise from the establishing of such a cooperation space.

Civil society is important within all this structure, bringing more consistency in the favour of social-economic, cultural but also mental cohesion. The actions of civil society envisage the attraction of economic actors in the field of civic solidarity, people and local decision factors' awareness for the advantages of a direct cooperation for everybody's use. The promoting of the participative democracy, in total respect regarding community and space, fundamentally contributes to the implementing of the durable metropolitan development policies.

Governing in the emergent metropolitan areas implies more than a success model exactly transposed from developed countries to a transition country. Such a governing has got its own evolution, being correlated step by step with other processes related to: economic restructuring and transformation, democratization of relationships between human communities, instauration of a certain respect towards ecological limits of space, changing of mentality towards the act of governing etc.

The importance of an efficient management of the relationship between big cities and subordinated space is underlined by the numerous studies showing that the most competitive regions have got the most competitive towns, too. Once the metropolitan integration process is emphasized, it becomes more and more obvious a governing system by which the transfer of responsibilities between communities is assumed and supported. This transfer is accompanied by a decentralisation towards the inferior decision levels specific to each metropolitan area. The analogy is based on the studies regarding European integration launched by some authors, which sustain the necessity of this transfer between the states and EU organisms (Pollack 1994, Hooghe and Marks 2002).

The effects determined by metropolitan increase upon space are obvious: the changing of the way of using the lands, the reducing of forest surfaces and natural habitats by the aggression of residential, industrial and service oriented constructions, the increase of the traffic and the impossibility to promote a policy of sustainable development. Solving these problems imply the instauration of some instruments of spatial management, as Urban Growth Boundaries (UGB), by means of which it is tried to control the sprawl process by systematizing growth (Carlson and Dierwechter 2007)

For an efficient governing in the emergent metropolitan areas, it is necessary to build a management system which can combine the management centred on hierarchized decisional levels (Chiriac 2009) with territorial management by polycentric structures. Taking into account the particularity of emergent metropolitan areas, the emphasizing of the type of management on hierarchized levels (multi-level) may discourage the participation into cooperation. From this point of view, there are already signals regarding the metropolitan area Iasi, where, by the statute, it was established that the President of Metropolitan Council is the metropolis' mayor.

The new mayors elected in some communes analyse the possibility of contesting the total subordination of the metropolitan area's decisional mechanism, to the metropolis' mayor. Due to this aspect, finding a cooperation solution at the level of metropolitan area by an integrated management, of consensus type, including polycetricity elements, seems the most credible.

Starting from these premises and taking into account other countries' experience in elaborating an intrametropolitan cooperation policy and its implementation, we consider that the integrated management system of emergent metropolitan areas must be centred upon an independent institutional construction. This management system has got different characteristics in relation to constitution stages of emergent metropolitan areas. Up to a point, this can be identified, inclusively in already built metropolitan areas (which face big disfunctionalities in the process of decisions implementing), with the following steps:

a) Establishing **confidence between dialogue partners**. This supposes that, at the initiative of a group of mayors, among which the metropolis' mayor may be the main engine, one or several meetings are established. There is to be discussed the necessity of such a preoccupation, to be established a cooperation strategy and to be expressed the agreement regarding the institutional construction which is to be achieved;

b) Accepting the general cooperation strategy and establishing the policies in this respect. In these conditions, a **Charter of metropolitan cooperation** will be elaborated, including institutional structures and the instruments of creating the cooperation and functioning framework of metropolitan areas. After its approval, the next steps will be the following ;

c) Instituting the **Metropolitan Cooperation Council**. This represents an extremely important step, establishing the existence of a semi-official territorial structure. Having in view its competences, this Council will focus its entire cooperation activity at the level of metropolitan space;

d) Building the **Metropolitan Cooperation Agency**. Taking into account the metropolitan space heterogeneousness, the multitude of component communes and the big discrepancy between the capital and other local communities, this task will be extremely difficult. With diplomacy and reciprocal understanding, starting from the idea of the respect towards the smallest local communities, beneficent compromises can be done, satisfactory for all partners;

e) Establishing the **Metropolitan Cooperation Fund**. The limited resources at local level and the serious problems each of these communities confront with will constitute restrictive elements in ensuring a proper volume;

f) Elaborating a **Metropolitan Cooperation Programme** on short, medium and long term. The Metropolitan Cooperation Agency will be responsible for preparing this programme, which will have to prove a strong enterprise spirit, too;

g) **Implementation of the Metropolitan Cooperation Programme.** The selection of the great interest projects for as many local communities as possible will be taken into account, so that local communities directly notice the advantages of such a new approach of partnership relationships; moreover, flexibility in the implementing process is a condition of its accomplishment compliant to the rapid changes that appear at city level.

h) **Monitoring the Metropolitan Cooperation Programme.** The attentive supervision of the way in which financial funds and different types resources are used, constitutes an important task that ensures the partners' protection and confidence;

i) **The annual evaluation** of the Metropolitan Cooperation Programme efficiency. Every year, a report will be drafted, report that the Metropolitan Cooperation Council will bring into the attention of all local communities' representatives who will appreciate, the activity of this cooperation coordination organism;

j) Proposals regarding **the improvement of the Metropolitan Cooperation Council's activity**. Following the periodical analyses, the experience of other similar organisms of territorial coordination of the activities of economic-social development, this council may decide its reorganisation, inclusively the improvement of institutional framework.

The track of these steps must lead to an efficient integrated management of the emergent metropolitan areas. In this respect, the main characteristics of the management model result from a compromise between all management systems regarding spaces that are totally or partially enframe in metropolitan areas (Fig.5). In the lump, local management, rural and urban communities management, the management of the associations between them, as well as metropolis' management are enframed in the metropolitan management system.

In this vision, local management, the management of rural, urban communities, of the associations between them, as well as city management integrate in a system of metropolitan collaboration management. Partially, in the metropolitan area, management systems characteristic for counties and development regions are identified. Practically, at the level of the emergent metropolitan area, the management system includes local actors, interested in

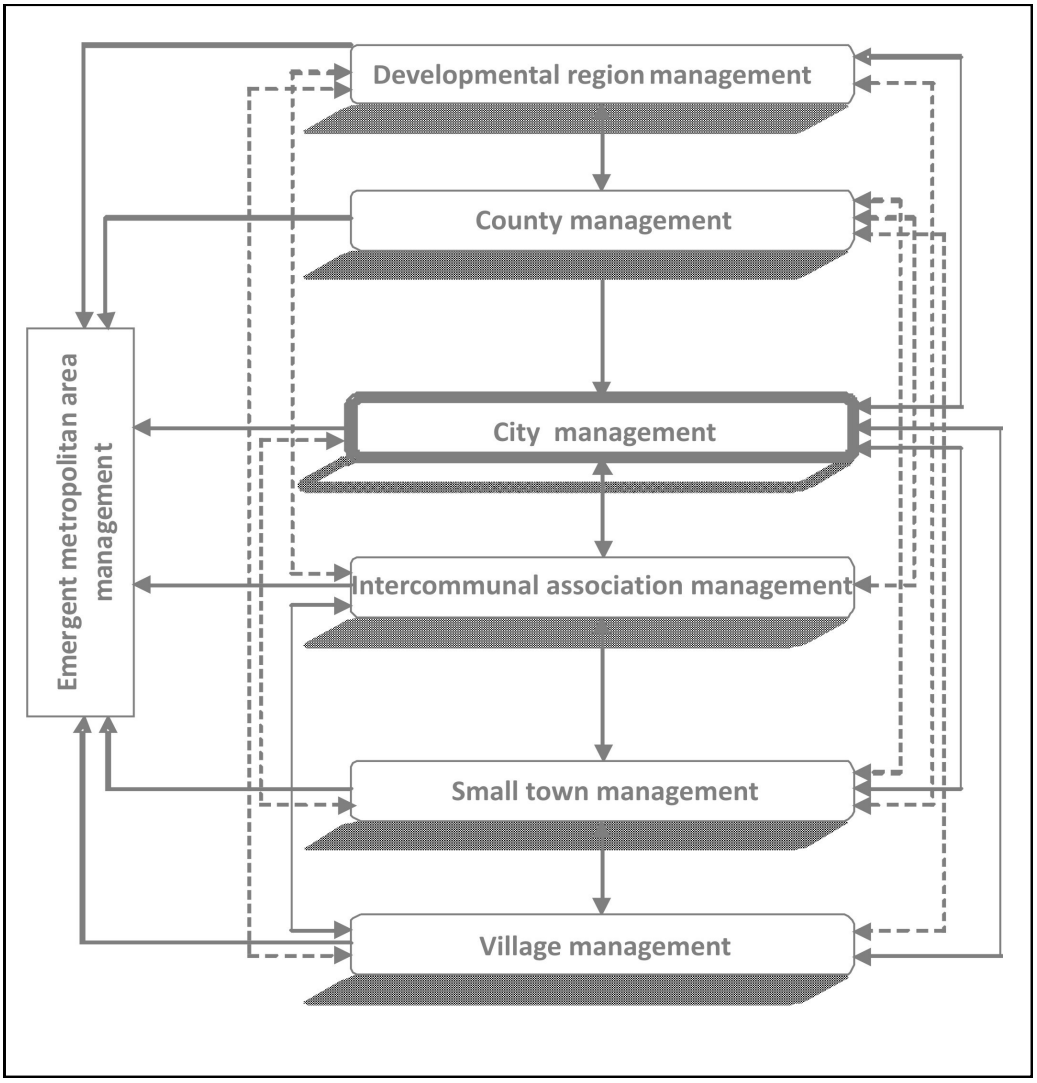


Fig. 5 - **General Configuration of the Emergent Metropolitan Areas Management**

obtaining advantages for their communities, following these cooperations. Their projects must be correlated to big programmes promoted at national, regional and county level. In relation to the size of the metropolitan area, some counties may be integrally included in these metropolitan areas (it is the case of Ilfov county, which may be entirely part of the metropolitan area Bucharest).

Conclusions

Emergent metropolitan areas, depending on each city's concrete conditions, need a specific management, especially in the case they have not met any classical phenomena of suburbanisation. Periurbanisation was almost exclusively based on the territorial effects of an

extensive industrial development. Demographic growth and the concentration of activities which consume work power, mainly unqualified, explains why in the relationships of the city with the periurban space, the migratory flows and those of providing market with agricultural products were dominant.

The analysis upon the management systems of emergent metropolitan areas from the transition countries, where Romania is taken as a case study, shows the difficulties encountered by the restructuring process of the cooperation relationships between local communities at the level of such a territorial system. The economic boom registered between 2003 and 2008 determined a lot of problems connected to the territorial development in the interface between the city and the adjacent space. As it is the case of several cities of the world, this economic development led to an increase of the fragmentation and heterogeneousness in the metropolitan space. New economic activities, chaotically placed in metropolitan areas, produced a functional mispronunciation with the neighbourhood areas (Kanai and Ortega-Alcazar 2009).

The transition from a centralized system to a market economy does not imply only changes in the economic system, but also in social, cultural, moral and ethic systems. This is the reason why implementing management systems at the level of the crossroads of some multi-level decision systems, with an impact on trans-scale organisation of space, seems to be too early, as there is a lack of the cooperation culture between the territorial decision entities. It is considered that simple management systems are not completely matured yet, and they cannot think of the management of some supralocal spaces.

However, the metropolization process is a real phenomenon and it contours functional spaces around metropolises. This reality leads to the contouring of some structures able to ensure the harmonization of the local communities with the metropolis' interests. The remaining behind of the construction of such a structure and of the implementing of a performant management system, able to ensure the coherent development of the two territorial entities, is already reflected in the new chaotic structures from the urban sprawl, in the blockages of physical infrastructures, in the degradation of environment quality

The big enemies of the process of managing emergent metropolitan areas are the speed of changes with spatial impact, the lack of initiative of local decision factors, the increase and decrease of the real estate market, the political polarization that excludes inter-communal cooperation and the impact of interest groups.

The proposed management model for the emergent metropolitan areas starts from accepting a type of collaboration management, based on consensus and able to ensure space management during the consolidation period of these metropolitan areas. In this respect, it is important to combine multilevel management with the management of polycentrism-based development, to integrate the management on main administrative structures with sectorial management promoted on types of activities. For a good governing of emergent metropolitan areas, it is necessary to involve, on one hand, the state, which would adopt a legislation in favour of the public-private partnership, and on the other hand the civil society, whose role in this early stage is essential.

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ANALYSIS OF MICRO LEVEL DISPARITIES IN URBAN FACILITY-UTILITY SERVICES: A STUDY ON BARASAT CITY, WEST BENGAL, INDIA

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Abstract: The regional disparity is a challenging issue to the urban planners, policy makers, academicians, bureaucrats and technocrats in the developing countries. In India, wide range of socio-economic disparities are commonly evident even in Class-I cities. Such an undesirable phenomena reflects on the spatial variation of quality of life, level of living as well as well-being and welfare of the inhabitants. Moreover, it is against the constitutional law of equity and social justice. The present study is based on the empirical observation focused on ward-wise variation of availability of and accessibility to socio-economic and utility services in Barasat city of West Bengal. On the basis of 'Cronbach's Alpha' and 'Principal Component Analysis', entire set of data have been arranged into six factors of which first three factors have been considered to examine the dimension of socio-economic disparities and level of development in the city.

Key Words: *disparity, utility services, Cronbach's Alpha, principal component analysis*

Introduction

The development of socio-economic infrastructure and urban facility-utility facilities indicate the quality of life of the people of a particular area. The availability of all socio-economic infrastructures is solely not meant for the development until and unless it is adequately available corresponding to the population size and extent of area. Such an adequacy should ensure the accessibility to socio-economic infrastructure by the people. But, unfair political practices, physiographic characteristics and socio-cultural dogma have resulted into the unequal and irrational distribution of infrastructure in the region leading to the emergence of regional disparities. Regional disparity comes into being when any state fails to an extent to meet up with the distribution of developmental fruits equitably to all corners of the region. An unchecked and uncontrolled process of growth leading to the regional disparities may result in economic, social and cultural problems (Hungaragi 2008). The coexistence of developed and underdeveloped regions in a country or state leads to misallocation and underutilization of resources with untapped potential of some areas. Such disparities are not conducive to regional development (Kumar 2009). It is a characteristic phenomenon of developing economy. The poor countries of the world are characterized by large and growing regional disparities while rich countries are generally characterized by small and diminishing gaps in development (Williamson 1965).

Inequalities at the level of development have been an integral feature of the history of India's economic development. The magnitude of regional disparity became wide during the British colonial period, which for their own business interest developed few port areas leaving other

parts of India most backward. After independence in 1947, a considerable emphasis was given to eliminate this problem. In the Third Five Year Plan (1961-'66) a separate chapter was devoted to balance regional development (Chapter IX). Policies for the development of backward areas, at the centre and state levels, identification of backward areas and indicators of development for different sector etc., all the efforts were made based on Pandey Committee, Chakraborty Committee and National Council for Development of Backward Areas (NCDBA) recommendation right from the Third Five Year Plan (Kumar, 2009). Despite different efforts being undertaken, India still has been experiencing a wide inter as well as intra regional disparities both at macro and micro level in socio-economic and cultural development.

Several studies on the examination of magnitude of regional inequality have been made inbroad and India as well.

Different scholars like Mathur (1983) and Dadibhavi (1998) tried to access the regional disparities in socio-economic development using per capita income as a measure of development. Rao (1985) analysed the extent of inter-state disparities in development measured on the basis of per capita state domestic product. A group of scholars like Rao (1984), Rao and Babu (1996), Soen et al. (1997), Mallikarjun (2000), Hassan (2007) and Paul (2012) attempted to focus on the leading factors of regional disparities of different socio-economic development by adopting Principal Component Analysis and Composite Index techniques. Sao Suman (2007), Paul and Dasgupta (2008), Rahaman and Salauddin (2009) and Deepika Varshney et al. (2010) tries to find out the nature of and determinants of disparities of urban utility-facility services in intra ward variation of urban centres.

A review of the studies on the issue of regional disparities reveals that most of the studies are based on broad area and restrained from the study at smallest unit like ward level in the city. Hence, the paper is an attempt to examine the spatial distribution of facility-utility services and inter-ward disparities in levels of socio-economic development of Burdwan city.

Study Area

Barasat Municipality was born on 1st April 1869 but up to 1882 it did not have any independent existence. Like other offices it was controlled by Magistrate Office; during that time there was no Chairman of the municipality, Magistrate was the Controller of municipality. Later on after 1882 Barasat Municipality had got its own formation as an autonomous body and became local government. Barasat Association, a citizens organization, had helped Barasat Municipality by donating land for the construction of municipal building. Total Barasat municipal area was divided in to 30 Wards. Previously, there were 4 Wards and after that 18 Wards under Barasat Municipality. Later on after amalgamating surrounding Panchayat within Barasat Municipality in 1995, at present Barasat Municipality has 30 Wards.

Barasat town is the district headquarter of North 24 Parganas district and junction corridor of North Bengal and Bangladesh. The growth of population of this town is very high that is 3.5% per year. As per 2001 census the population of this town was 231,521 and now it is 275,000 (approx) and the projected population by the year 2025 it will be 525,000. The total municipal area of Barasat covers 34.50 sq. km. Barasat town it well connected with roads to Kolkata, North Bengal, Bangladesh and other towns of West Bengal. The two National Highways (NH 34 & NH 35) and one State Highway (SH 2) run through Barasat town; Barasat is also well connected by railway with Sealdah, Bongaon and Basirhat.

At present one railway over bridge (ROB) is under construction for easy traffic way within

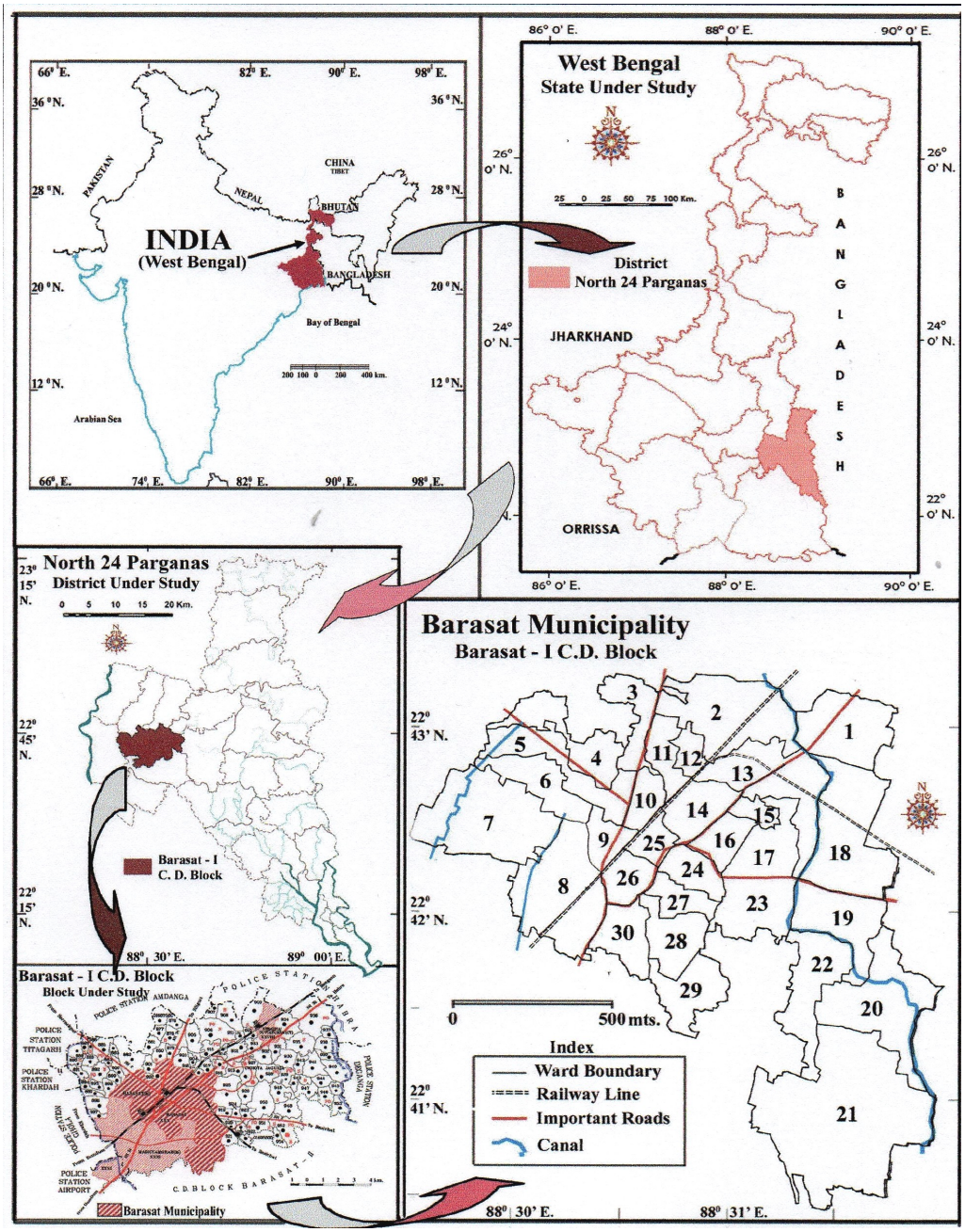

Fig.1 - **Locational Map of the Study Area**

Barasat town. The railway company has decided to develop Barasat station as a super model station, for which work has already started. There is a proposal of new bypass way along Barasat to Roychowk which connects North 24 Parganas district with South 24 Parganas district. Also the proposals of development and widening of National Highways are in existence.

Along with these development works Barasat Municipality has also taken the responsibility of development of various types of works within this town like slum development works, municipal infrastructure development works etc. and many other proposals have been submitted or about to be submitted for various govt. grants for infrastructural and social developments of Barasat municipal area. One of such type of proposal scheme is development of drainage net work ithin Barasat municipal area under JNNURM Programme.

The main objectives of this study are follows:

- To analyse the spatial distribution of socio-economic facilities for the people at micro level,
- To identify the leading factors of socio-economic disparities and
- To examine the magnitude of inter-ward disparities of the levels of socio-economic development in Barasat city.

Materials and Methods

The study is based on the primary data collected through the intensive field survey in several wards of Barasat Municipality.

The primary information is supplemented with secondary data whenever needed. To estimate a quantitative weight of a variable (i.e. number of primary school per 1000 population) total population of each ward as per Census of India, 2001 has been projected to 2010 during field investigation.

Sample design and data collection

In order to access the unequal resource distribution leading to the variation in development among core area, intermediate area and peripheral part of the city, the samples have been selected from each part of the wards. All thirty wards have been selected for purposive sampling. The information regarding number of selected socio-economic and facility-utility services has been collected non-partially, i.e. total number of concerned facility was ensured through field investigation. The entire field survey was conducted during March-June, 2010 and collected data have been analysed.

Adoption of statistical techniques

For the purpose of the present study both qualitative and quantitative methods have been adopted. However, in quantitative analysis both simple and standard statistical techniques have been used to infer the facts.

- Availability of infrastructure facility per unit population has been estimated in terms of actual number of facility per 1000 of projected population in 2010.
- Population for 2010 has been projected using simple arithmetic progression techniques.
- Accessibility of each facility in terms of nature of distribution per unit area has been measured using Mathur's method of ***Mean Spacing*** which is as follows:

$$D = 1.0746 \sqrt{A/N}$$

Where, D denotes theoretical distance between the facilities in a hexagonal pattern of area, A denotes area of the ward and N denotes the number of facility at that ward.

- In order to prove the internal reliability of the model used, the author has gone through ***Cronbach's Alpha Test of Reliability***. Applying this test specifies whether the items pertaining to each dimension are internally consistent and whether they can be used to measure the same construct or dimension of service quality.
- Levels of development have been estimated after constructing a composite index based on selected physical indicators.

Certain weights have been assigned to each indicator based on their value judgment to arrive at a meaningful and comparable composite index of development. For this purpose, ***Factor Analysis*** has been used to derive the factor loading or coefficient of each variable.

The factor loading of each variable has been multiplied by the corresponding standardized value to obtain their factor score.

Finally, the factor score of each variable has been added together to estimate the index of development of each unit of study or sampled ward of the city.

The statistical model which has been used may be expressed as:

$$P_1 = \Sigma\, a_{j1}\, X\, Z_j \text{ or } P1 = a_{11}.\, Z_1 + a_{21}.Z_2\, a_{11}.+ \ldots\ldots\ldots\, a_{n1}.\, Z_n$$

where, P_1 denotes composite index of development of a unit study as first factor denotes the factor loading of the j^{th} variable and 1 indicate the factor number, i.e. first factor – vector of factor loadings. Z_j denotes standardized value of the j^{th} variable, which is expressed as:

$$Z_j = \frac{X_j - X_m}{\delta_j}$$

where, X_j denotes original value of j^{th} variable, Xm denotes the mean of of j^{th} variable and δ_j denotes the standard deviation of of j^{th} variable.

Findings and Analysis

Availability of and accessibility to urban facilities in Barasat City

The problem of unequal distribution of facilities across the region is a common phenomenon in India. Such a problem leads to emergence of regional disparities in socio-economic development. The present study is an attempt to highlight the unequal distribution of socio-economic facilities through the analysis of availability per unit of population and per unit of areal extension (mean spacing) of the different wards of the study area.

Education Facility is one of the significant determinants of social well-being, welfare as well as human development. Among the educational facilities, highest coefficient of variability of 388.96 has been accounted for colleges in Barasat city (Annexure-Table 2). However, among

the education facilities, least coefficient of variation, i.e. C.V. = 100 has been computed in the distribution of school.

Highest availability of schools (X1) i.e. 4.38 followed by colleges (X2), i.e.0.17 per 1000 of population have been found in ward no. 24 and 25 respectively (Table no. 1.1). While lowest availability of 0.10 (X1) followed by 0.11 (X2) in ward no. 5 and 9 respectively. However, in area perspective analysis also, a similar figure is depicted in the distribution of school. Highest and lowest mean spacing of 0.95 km. and 0.12 km. has been recorded in ward no. 21 and 24 respectively (Annexure - Table 1). It reveals that in ward no. 24, schools are much closely spaced ensuring its better accessibility to the inhabitants than in other wards, while the inverse figure is found in ward no. 21. The colleges are located as far as 0.63 km. apart from each other in ward no. 9 while as near as 0.46 km in ward no. 25. Further, Annexure table 2 reveals that the highest availability of college facility per 1000 population has been recorded in ward no. 9 (0.11) and ward no. 25 (0.17) while twenty eight wards are not having this facility. It comes out from the above assessment that better availability and accessibility of education facilities have been recorded in ward no. 24 and 25 (core part).

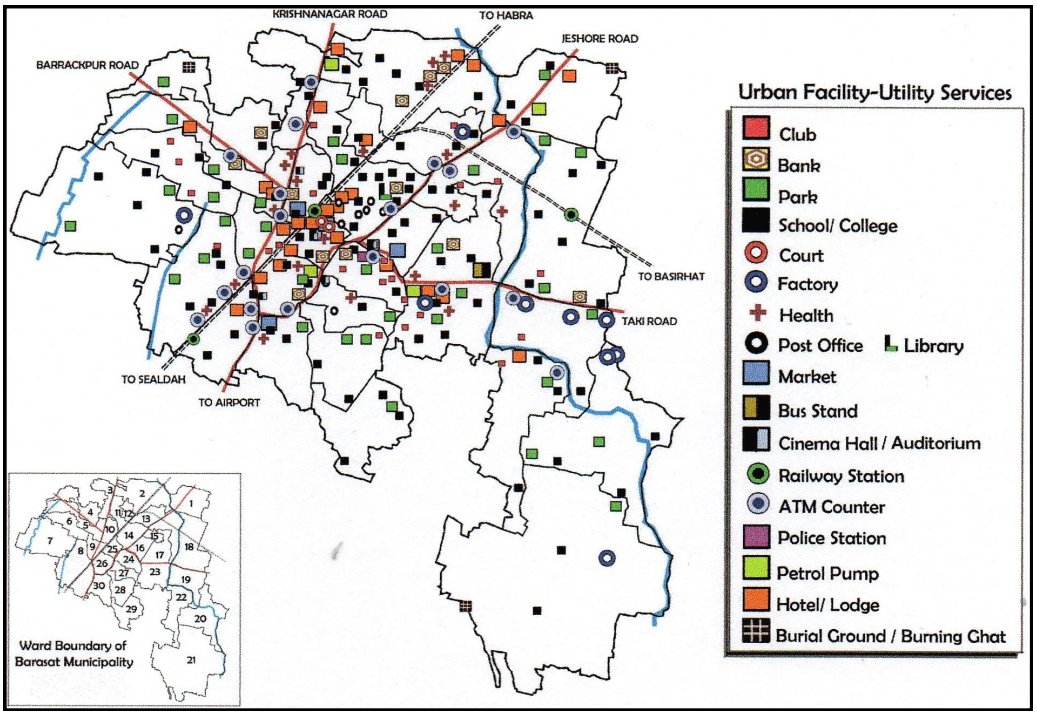

Fig.2 - **Distribution of Different Urban Facility-Utility Services in Barasat Municipality**

Health Facility. The provision of availability and accessibility to health services can ensure better health condition of the inhabitants. It is another important indicator of human development. Among three selected health facilities, i.e. hospital (X3) and nursing home (X4), the availability of nursing homes (X4) per unit of population is much consistent (C.V. = 143.64).). Out of 30 wards in Barasat Municipality, 3 (10 %) are having hospital facility and fourteen (47 %) are having nursing home facility. Ward no. 24 and 26 are better off in

availability of (X3 and X4) health facilities. However the analysis of mean spacing reveals better accessibility to health facility found in ward no. 10 (0.48 km.) for X3 and ward no. 24 (0.30 km.) for X4. It is evident from the analysis that, accessibility to health facility is better and it is more number in the core area of Barasat Municipality.

Financial Facility. This is an important indicator of economic development. The analysis reveals disparity in the availability of and accessibility to banking facility to the people of Barasat Municipality. Among 30 wards, banking facility (X5) is available in 14 wards (47 %). In case of availability per 1000 of population, ward no. 2 (2.94) is in better position followed by ward no. 25 (0.85), while in case of accessibility least mean spacing is found in ward no. 24 (0.20 km) since banks are located centrally. In case of availability of Factory (X6) and ATM counters (X7), it has been found that the central position of Barasat city which has Barasat Rail Station is having highest concentration of such facilities. It is evident from the above analysis that central portion of city is having good financial facility than other wards.

Another financial indicator for socio-economic development is market (X8). Besides the place of selling and purchasing of goods, it is the meeting place of people who exchange their social, cultural and political ideas leading to socio-cultural transformation of the society. Table 2 of annexure reveals high degree of variability (C.V. = 272.22) in its availability among the 30 wards of Barasat Municipality. Among the wards, ward no. 16 has been recorded to be in a better position of market availability of 0.16 per 1000 population. However, Table no. 4 reveals that accessibility of market is much better in ward no. 25, where markets are located at an average spacing of as lowest as 0.46 km. as against 0.87 km. mean spacing in ward no. 30.

Communication and Transport Facility. Rail Station and Bus Stand were taken into accounts in this group. Actually, rail station is a crucial pull factor for the concentration of population in the urban area. The presence of rail station within the vicinity minimizes the time as well as it helps to connect the area with other parts of the district. Three rail stations have been located in the Barasat Municipality at ward no. 8, 14 and 18. Least mean spacing has been found in ward no. 14 (0.64 km.). Barasat town it well connected with roads to Kolkata, North Bengal, Bangladesh and other towns of West Bengal. The two National Highways (NH 34 & NH 35) and one State Highway (SH 2) run through Barasat town, Barasat is also well connected by railway with Sealdah, Bongaon and Basirhat. Chanpadali Bus terminal or Titumir Central Bus Terminal is the main bus terminal in Barasat which provides with services to Kolkata and other parts of the district as well as the part of the state located in ward no. 17.

Other Facilities. Police station, library, cinema hall, park, hotel and lodge, petrol pump and burial ground and burning ghat etc. are the very important facilities for the urban people. Park (C.V. =102.04) followed by hotels (C.V. =180.98) are showing least amount of variability among other facilities (Annexure-Table 2). In case of accessibility, ward no. 11 (0.35 km.) and ward no. 25 (0.16 km.) are having the least mean spacing in public urinals (X14) and hotels (X17) respectively.

Reliability statistics

In order to prove the internal reliability of the model used, the author has gone through Cronbach's Alpha Test of Reliability. Applying this test specifies whether the items pertaining to each dimension are internally consistent and whether they can be used to measure the same construct or dimension of service quality. According to Nunnaly (1978) Cronbach's Alpha should be 0.700 or above. But in some of the studies, 0.600 also considered acceptable (Gerrard et al. 2006, Kenova and Jonasson 2006). Table no. 1 indicates that the some of the

Cronbach's Alpha values of accuracy were (.666 for X_6, .661 for X_{10} and .614 for X_{18}) less than 0.700. Therefore, these items were eliminated from the factor analysis. However, if Cronbach's Alpha value of all items were acceptable, it means that the present data are suitable for factor analysis.

Table 1

Reliability Statistics Using Cronbach's Alpha

Description of Variables	Cronbach's Alpha	Description of Variables	Cronbach's Alpha
No. of Schools/ '000 Population (X_1)	.786	No. of Library/ '000 Population (X_{11})	.755
No. of Colleges/ '000 Population (X_2)	.725	No. of Railway Stations/ '000 Population (X_{12})	.856
No. of Hospitals/ '000 Population (X_3)	.775	No. of Bus Stand/ '000 Population (X_{13})	.761
No. of Nursing Homes / '000 Population (X_4)	.703	No. of Parks/ '000 Population (X_{14})	.750
No. of Banks/ '000 Population (X_5)	.822	No. of Cinema hall, Auditorium / '000 Population (X_{15})	.713
No. of Factories/ '000 Population (X_6)	.666	No. of Petrol Pump / '000 Population (X_{16})	.730
No. of ATM Counters / '000 Population (X_7)	.740	No. of Hotel, Lodges/ '000 Population (X_{17})	.888
No. of Markets/ '000 Population (X_8)	.728	No. of Burial Grounds/ '000 Population (X_{18})	.614
No. of Police Stations / '000 Population (X_9)	.759	No. of Clubs / '000 Population (X_{19})	.765
No. of Courts/ '000 Population (X_{10})	.661		

Source: Computed by the Author

Levels of socio-economic development

An unequal and irrational distribution of facilities in urban centres without considering the size of the population and extent of area cause regional disparities in terms of socio-economic development. It is the characteristic of developing economy.

Development is a multi-faceted phenomenon which a society or a region achieves. As a spatial phenomenon, development of a region is explained in two ways, firstly as the state of change in the distribution of parameters between given points of time, and secondly, the state of their existing distribution. The state of imbalance of development inspires regional planners for formulating the diagnostic plan to achieve balanced regional development.

In the analysis, the development index of each ward has been estimated as a composite of factor score of each variable with factor coefficient more than 0.50. Using the Principal Component Analysis, the factor coefficients have been arranged into six factors (i.e. Factor I, Factor II, Factor III, Factor IV, Factor V and Factor VI) in which first factor reveals 21.89 per cent variance, while second, third, fourth, fifth and sixth reveal 19.15 per cent, 13.32 per cent, 11.45 per cent, 9.57 per cent and 8.06 per cent respectively. Therefore, all the six factors cumulatively reveal 82.45 per cent of variance (Table 1). Among them, the first three have been taken into consideration for estimation of development, as these three factors combine to reveal 54.37 per cent variance. More than 0.5 value of factor coefficient have taken into consideration for determining the development index. Variables X_5, X_7, X_{12}, X_{13}, X_{16} and X_{17} showing factor coefficient more than 0.50 in Factor I have been multiplied by standardized

value of the respective variable to derive their factor score and finally to estimate the composite index of development (Table 1). Likewise, variables X_1, X_2 and X_8 with their factor coefficient more than 0.50 have been identified in Factor II. Again, for Factor III, X_3 and X_9 are considered as they have coefficient value of more than 0.50. But no single variable shows factor coefficient more than 0.50 in Factor IV, though variables X_{11} and X_{15} show factor coefficient more than 0.50 in Factor IV which reveals only 11.45 per cent variance and has not been included in the estimation of development index. Subsequently out of 16 variables, 14 variables are observed as significantly responsible and 12 variables have been taken to examine the spatial variation of socio-economic development in Barasat city.

Table 2

Factor Loading of Variables, Barasat City, 2010

Variables and Definitions	Component		
	Factor I	Factor II	Factor III
No. of Schools/ '000 Population (X_1)	.405	**.812**	.403
No. of Colleges/ '000 Population (X_2)	.099	**.750**	-.110
No. of Hospitals/ '000 Population (X_3)	.075	-.019	**.713**
No. of Nursing Homes / '000 Population (X_4)	.392	-.018	**.839**
No. of Banks/ '000 Population (X_5)	**.923**	.104	.035
No. of ATM Counters / '000 Population (X_7)	**.708**	.275	.107
No. of Markets/ '000 Population (X_8)	-.012	**.889**	.036
No. of Police Stations / '000 Population (X_9)	-.195	-.033	**.902**
No. of Library/ '000 Population (X_{11})	.035	.095	.009
No. of Railway Stations/ '000 Population (X_{12})	**.940**	-.134	.047
No. of Bus Stand/ '000 Population (X_{13})	**.726**	.036	-.011
No. of Parks/ '000 Population (X_{14})	-.048	-.264	.265
No. of Cinema hall, Auditorium / '000 Population (X_{15})	.079	.428	.007
No. of Petrol Pump / '000 Population (X_{16})	**.930**	-.183	.154
No. of Hotel, Lodges/ '000 Population (X_{17})	**.888**	.308	.098
No. of Clubs / '000 Population (X_{19})	.029	.082	-.146
% of Variance	21.899	19.150	13.324
Cumulative % of Variance	**21.899**	**41.048**	**54.372**

Source: Computed by the Author.
*Note. Extraction Method – Principal component analysis, Rotation Method.

Levels of development – Factor I (commercial and transport facility)

On the basis of composite development index of factor I, the sample wards have been arranged into three levels in order to study the inter-ward disparities of development in socio-economic amenities ((Annexure-Table 3a)). Out of 30 wards, 7 wards (23 %) with development index more than 1.00 fall in high level of development. These wards are located almost at the core area of the city. Due to the old built up area, these wards posses essential amenities like, education, health, communication, drinking water, marketing and easy transport facility.

Table 3

Levels of Development – Factor I, (Commercial and Transport Facility), Barasat City, 2010

Level of Development	Indices	Number of Wards	Identity of Wards
High	Above 1.00	07 (23 %)	**Ward no. 2, 25, 14, 8, 17, 23 and 18**
Medium	1.00 to – 1.00	06 (20 %)	**Ward no. 26, 3, 10, 13, 1 and 9**
Low	Below - 1.00	17 (57 %)	**Ward no. 30, 24, 5,19,27, 12, 7, 28, 21, 22, 11, 16, 4, 6, 15, 20 and 29**

Source: Computed by the Author from annexure - Table 3

Six wards (i.e. ward no. 26, 3, 10, 13, 1 and 9) with development index ranging 1.00 to – 1.00 come under medium level of development. Further, table 3 reveals that with development index less than – 1.00 seventeen wards (57 %) are under low level of development in the city. All these wards are located in buffer and peripheral parts of Barasat city. People are living in these wards with difficulties in financial facilities and transport. As a result, the quality of life and level of living of people of these areas are deteriorating gradually.

Levels of development – Factor II (education facility)

Variables X1, X2 and X8 in factor II altogether explain the levels of development of education (schools and colleges) in the city (Annexure-Table No. 3). Only 6 wards (20 %) i.e. ward no. 16, 5, 11, 22, 3 and 10 with development index more than 1.00 have been categorized under high level of development. Out of six wards in this category, three are located in the core while ward no 5 and 3 are located in the outer part.

Fifteen wards i.e. ward no 25, 29, 30, 27, 19, 9, 26, 4, 24, 7, 20, 12, 13, 14 and 1 have been found in the medium level of health development in the city. The wards under medium development have scored index ranging from 1.00 to – 1.00.

Further, a majority of wards (i.e. no of wards 9) have been found with development index of less than – 1.00 which has been considered to be under the low level of health infrastructure facility in the city. These wards are located in the city in scattered form.

Table 4

Levels of Development – Factor II (Education and Market), Barasat City, 2010

Level of Development	Indices	Number of Wards	Identity of Wards
High	Above 1.00	06 (20 %)	**Ward no. 16, 5, 11, 22, 3 and 10**
Medium	1.00 to – 1.00	15 (50 %)	**Ward no. 25, 29, 30, 27, 19, 9, 26, 4, 24, 7, 20, 12, 13, 14 and 1**
Low	Below - 1.00	09 (30 %)	**Ward no. 21, 2, 28, 23, 6, 8, 18, 15 and 17**

Source: Computed by the Author from annexure - Table 3

Levels of development – Factor III (health and administrative)

On the basis of factor III, variables X3, X4 and X8 have been marked as important factors for the development in socioeconomic condition of Barasat city. Six wards with development index

more than 1.00 (Annexure-Table No. 3) fall under higher degree of development. These are ward no. 24, 26, 10, 5, 2 and 23. Except ward no. 2 and 5, rest of the area lies in the administrative part of the city. Due to location of C.B.D. and being the district headquarter, Barasat city provides some good health facilities to the society.

Table 5

Levels of Development – Factor III, (Health and Administrative facility), Barasat City, 2010

Level of Development	Indices	Number of Wards	Identity of Wards
High	Above 1.00	06 (20 %)	**Ward no. 24, 26, 10, 5, 2 and 23**
Medium	1.00 to – 1.00	17 (57 %)	**Ward no. 13, 16, 14, 17, 8, 18, 15, 30, 1, 3, 4, 6, 7, 9, 11, 12 and 19**
Low	Below - 1.00	07 (23 %)	**Ward No. 20, 21, 22, 25, 27, 28 and 29**

Source: Computed by the Author from annexure - Table 3

Seventeen wards (i.e. ward no. 13, 16, 14, 17, 8, 18, 15, 30, 1, 3, 4, 6, 7, 9, 11, 12 and 19) with development indices ranging 1.00 to – 1.00 come under the medium level of development. Again seven wards (23 %) out of thirty wards have been foundin the low level of development index having value less than – 1.00. These wards are located basically in the outer part. It has been found that market, road and hotel are not good in number in those areas.

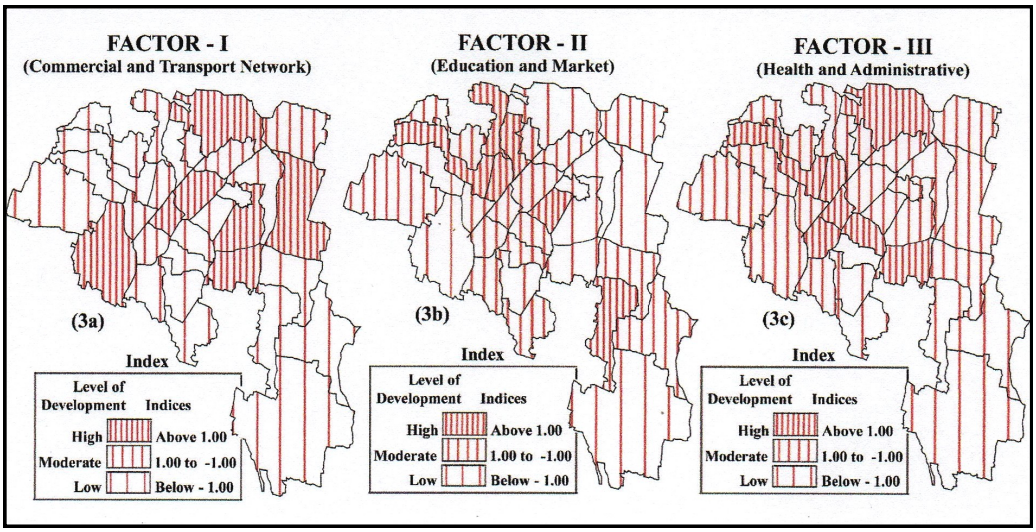

Fig. 3 - **The levels of Development for Factor - I, Factor - II, Factor - III**

Conclusion

The foregoing analysis based on the field survey infers to the inter-ward disparities in socio-economic development consequent upon the irrational as well as unequal distribution of amenities and facilities. It has come out from the study that, the peripheral area of the city is lagging behind in socio-economic amenities resulting into low level of development. The low

level of development in the wards is mainly due to the allocation of facilities without corresponding to the population size, poor condition of roads and finally negligence from the city government side to allocate resources. Another important finding from the empirical observation is that, government medical facility is very poorly available to people of Burdwan city. To wipeout this problem of existing inter-ward disparities in the level of socio-economic development from Class I Indian cities like Barasat city, a diagnostic plan should be formulated to provide and locate resources according to population size.

Subsequently, the balanced development would be achieved and social justice to the people would be ensured; consequently, human well-being and welfare should be the desired result of relentless and selfless efforts made by the people, the government and the NGOs.

ANNEXURE

Table 1

Accessibility–Mean Spacing (Per Unit Area) of Facilities, Barasat Municipality, 2010

Wards No.	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}	X_{16}	X_{17}	X_{18}	X_{19}
Ward No. 1	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00	0.85	0.85	0.85	0.60
Ward No. 2	0.46	0.00	0.00	1.03	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.03	0.51	0.00	0.00
Ward No. 3	0.43	0.00	0.00	0.00	0.00	0.00	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30
Ward No. 4	0.53	0.00	0.00	0.00	0.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.74	0.00	0.00	0.00	0.74	0.00
Ward No. 5	0.77	0.00	0.77	0.55	0.77	0.00	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.55	0.00	0.00	0.00	0.00	0.00
Ward No. 6	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67	0.00	0.00	0.00	0.00	0.39
Ward No. 7	0.57	0.00	0.00	0.00	0.80	1.14	1.14	0.00	0.00	0.00	0.00	0.00	0.00	0.80	0.00	0.00	0.00	0.00	0.00
Ward No. 8	0.35	0.00	0.00	0.85	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.85	0.00	0.49	0.00	0.00	0.00	0.00	0.85
Ward No. 9	0.36	0.63	0.00	0.00	0.00	0.00	0.44	0.00	0.00	0.00	0.63	0.00	0.00	0.44	0.00	0.00	0.36	0.00	0.00
Ward No. 10	0.24	0.00	0.48	0.34	0.34	0.48	0.00	0.48	0.00	0.00	0.48	0.00	0.00	0.48	0.00	0.00	0.20	0.00	0.00
Ward No. 11	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.00	0.00	0.35	0.00	0.28
Ward No. 12	0.21	0.00	0.00	0.00	0.55	0.00	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.55	0.00	0.39
Ward No. 13	0.33	0.00	0.00	0.54	0.94	0.94	0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.54
Ward No. 14	0.16	0.00	0.00	0.45	0.64	0.00	0.64	0.00	0.00	0.00	0.37	0.64	0.00	0.45	0.00	0.00	0.24	0.00	0.00
Ward No. 15	0.15	0.00	0.00	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ward No. 16	0.24	0.00	0.00	0.37	0.00	0.37	0.00	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.00	0.53	0.00	0.00
Ward No. 17	0.25	0.00	0.00	0.70	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.49	0.00	0.00	0.00	0.70	0.00
Ward No. 18	0.30	0.00	0.00	1.10	1.10	0.00	0.00	0.00	0.00	0.00	0.00	1.10	0.00	0.55	0.00	0.00	0.00	0.00	1.10
Ward No. 19	0.30	0.00	0.00	0.00	0.57	0.46	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.00	0.00	0.00	0.00	0.80
Ward No. 20	0.42	0.00	0.00	0.00	0.00	0.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.72	0.00	0.00	0.00	0.00	0.00
Ward No. 21	0.95	0.00	0.00	0.00	0.00	1.64	1.64	0.00	0.00	0.00	0.00	0.00	0.00	1.16	0.00	0.00	0.00	1.64	0.00
Ward No. 22	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.00	0.00	0.58	0.00	0.00
Ward No. 23	0.21	0.00	0.00	0.53	0.00	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.00	0.75	0.43	0.75	0.00
Ward No. 24	0.12	0.00	0.00	0.30	0.00	0.00	0.52	0.00	0.52	0.00	0.00	0.00	0.00	0.52	0.00	0.00	0.00	0.00	0.00
Ward No. 25	0.15	0.46	0.00	0.00	0.20	0.00	0.23	0.46	0.00	0.32	0.00	0.00	0.00	0.00	0.32	0.00	0.16	0.00	0.23
Ward No. 26	0.26	0.00	0.64	0.64	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.64	0.32	0.00	0.37
Ward No. 27	0.26	0.00	0.00	0.00	0.00	0.00	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.00	0.00	0.00	0.00	0.52
Ward No. 28	0.41	0.00	0.00	0.00	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.00
Ward No. 29	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.00	0.00	0.00	0.00	0.00
Ward No. 30	0.26	0.00	0.00	0.87	0.00	0.00	0.50	0.87	0.00	0.00	0.87	0.00	0.00	0.62	0.00	0.00	0.62	0.00	0.00

Source: Computed by the Author

ANNEXURE

Table 2

Availability of Facility (Per Unit Per '000 population), Barasat Municipality, 2010

Wards No.	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}	X_{16}	X_{17}	X_{18}	X_{19}
1	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.14	0.14	0.14	0.28
2	2.94	0.00	0.00	0.59	2.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.59	2.35	0.00	0.00
3	0.63	0.00	0.00	0.00	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.26
4	0.30	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.15	0.00
5	0.10	0.00	0.10	0.20	0.10	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00
6	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.49
7	0.29	0.00	0.00	0.00	0.14	0.07	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00
8	0.97	0.00	0.00	0.16	0.00	0.00	0.81	0.00	0.00	0.00	0.00	0.16	0.00	0.49	0.00	0.00	0.00	0.00	0.16
9	0.33	0.11	0.00	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.11	0.00	0.00	0.22	0.00	0.00	0.33	0.00	0.00
10	0.46	0.00	0.11	0.23	0.23	0.11	0.00	0.11	0.00	0.00	0.11	0.00	0.00	0.11	0.00	0.00	0.69	0.00	0.00
11	0.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.21	0.00	0.31
12	0.52	0.00	0.00	0.00	0.07	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.15
13	0.99	0.00	0.00	0.37	0.12	0.12	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.37
14	2.60	0.00	0.00	0.32	0.16	0.00	0.16	0.00	0.00	0.00	0.49	0.16	0.00	0.32	0.00	0.00	1.14	0.00	0.00
15	0.79	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.92	0.00	0.00	0.37	0.00	0.37	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.18	0.00	0.00
17	2.01	0.00	0.00	0.25	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.50	0.00	0.00	0.00	0.25	0.00
18	2.09	0.00	0.00	0.16	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.64	0.00	0.00	0.00	0.00	0.16
19	0.65	0.00	0.00	0.00	0.19	0.28	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.09
20	0.74	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00
21	0.37	0.00	0.00	0.00	0.00	0.12	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.00	0.00	0.00	0.12	0.00
22	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.23	0.00	0.00
23	3.79	0.00	0.00	0.58	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.87	0.00	0.29	0.87	0.29	0.00
24	4.38	0.00	0.00	0.77	0.00	0.00	0.26	0.00	0.26	0.00	0.00	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.00
25	1.51	0.17	0.00	0.00	0.84	0.00	0.67	0.17	0.00	0.34	0.00	0.00	0.00	0.00	0.34	0.00	1.34	0.00	0.67
26	0.97	0.00	0.16	0.16	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.65	0.00	0.48
27	0.32	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.08
28	0.24	0.00	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00
29	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.00
30	0.91	0.00	0.00	0.08	0.00	0.00	0.25	0.08	0.00	0.00	0.08	0.00	0.00	0.17	0.00	0.00	0.17	0.00	0.00
Mean	**1.07**	**0.01**	**0.01**	**0.15**	**0.21**	**0.05**	**0.14**	**0.02**	**0.01**	**0.01**	**0.03**	**0.02**	**0.01**	**0.20**	**0.02**	**0.04**	**0.28**	**0.03**	**0.15**
St. Dev.	**1.08**	**0.04**	**0.04**	**0.21**	**0.55**	**0.11**	**0.22**	**0.05**	**0.05**	**0.06**	**0.09**	**0.05**	**0.05**	**0.20**	**0.07**	**0.12**	**0.53**	**0.08**	**0.28**
C.V.	**100.4**	**388.9**	**312.9**	**143.6**	**266.2**	**195.0**	**160.4**	**272.2**	**547.7**	**547.7**	**349.1**	**305.1**	**547.7**	**102.0**	**397.3**	**308.9**	**180.9**	**243.4**	**184.2**

Source: Computed by the Author

ANNEXURE

Table 3

Factor Scoring of Variables (Factor Loading > 0.50) and Index of Development, Barasat Municipality, 2010

Wards No.	Factor - I							Factor - II				Factor - III			
	X_5	X_7	X_{12}	X_{13}	X_{16}	X_{17}	Index of Development	X_5	X_7	X_{12}	Index of Development				Index of Development
Ward No. 1	-0.35	-0.45	-0.38	-0.16	0.77	-0.23	**-0.80**	-0.42	-0.21	-0.36	**-0.98**	-0.18	-0.60	-0.19	**-0.97**
Ward No. 2	4.60	-0.45	-0.38	-0.16	4.18	3.45	**11.24**	-0.49	-0.21	-0.36	**-1.05**	-0.18	1.75	-0.19	**1.37**
Ward No. 3	-0.35	1.58	-0.38	-0.16	-0.31	-0.47	**-0.09**	-0.55	2.09	-0.36	**1.18**	-0.18	-0.60	-0.19	**-0.97**
Ward No. 4	-0.10	-0.45	-0.38	-0.16	-0.31	-0.47	**-1.86**	-0.08	-0.21	-0.36	**-0.64**	-0.18	-0.60	-0.19	**-0.97**
Ward No. 5	-0.19	0.18	-0.38	-0.16	-0.31	-0.47	**-1.32**	-0.11	-0.21	2.93	**2.62**	1.60	0.18	-0.19	**1.59**
Ward No. 6	-0.35	-0.45	-0.38	-0.16	-0.31	-0.47	**-2.12**	-0.56	-0.21	-0.36	**-1.13**	-0.18	-0.60	-0.19	**-0.97**
Ward No. 7	-0.11	-0.22	-0.38	-0.16	-0.31	-0.47	**-1.65**	-0.25	-0.21	-0.36	**-0.81**	-0.18	-0.60	-0.19	**-0.97**
Ward No. 8	-0.35	2.18	2.71	-0.16	-0.31	-0.47	**3.60**	-0.58	-0.21	-0.36	**-1.14**	-0.18	0.05	-0.19	**-0.32**
Ward No. 9	-0.35	0.27	-0.38	-0.16	-0.31	0.09	**-0.85**	-0.06	-0.21	-0.36	**-0.63**	-0.18	-0.60	-0.19	**-0.97**
Ward No. 10	0.03	-0.45	-0.38	-0.16	-0.31	0.68	**-0.58**	-0.46	-0.21	1.69	**1.02**	1.91	0.32	-0.19	**2.04**
Ward No. 11	-0.35	-0.45	-0.38	-0.16	-0.31	-0.12	**-1.77**	2.49	-0.21	-0.36	**1.92**	-0.18	-0.60	-0.19	**-0.97**
Ward No. 12	-0.23	-0.21	-0.38	-0.16	-0.31	-0.34	**-1.63**	-0.31	-0.21	-0.36	**-0.88**	-0.18	-0.60	-0.19	**-0.97**
Ward No. 13	-0.15	0.75	-0.38	-0.16	-0.31	-0.47	**-0.71**	-0.41	-0.21	-0.36	**-0.98**	-0.18	0.88	-0.19	**0.51**
Ward No. 14	-0.08	0.07	2.71	-0.16	-0.31	1.43	**3.67**	-0.33	-0.21	-0.36	**-0.90**	-0.18	0.70	-0.19	**0.32**
Ward No. 15	-0.35	-0.45	-0.38	-0.16	-0.31	-0.47	**-2.12**	-0.63	-0.21	-0.36	**-1.19**	-0.18	-0.07	-0.19	**-0.45**
Ward No. 16	-0.35	-0.45	-0.38	-0.16	-0.31	-0.16	**-1.81**	0.33	3.28	2.63	**6.24**	-0.18	0.88	-0.19	**0.50**
Ward No. 17	0.49	-0.45	-0.38	3.82	-0.31	-0.47	**2.70**	-0.73	-0.21	-0.36	**-1.30**	-0.18	0.40	-0.19	**0.03**
Ward No. 18	-0.08	-0.45	2.68	-0.16	-0.31	-0.47	**1.21**	-0.59	-0.21	-0.36	**-1.15**	-0.18	0.04	-0.19	**-0.33**
Ward No. 19	-0.04	-0.15	-0.38	-0.16	-0.31	-0.47	**-1.50**	0.70	-0.21	-0.36	**0.14**	-0.18	-0.60	-0.19	**-0.97**
Ward No. 20	-0.35	-0.45	-0.38	-0.16	-0.31	-0.47	**-2.12**	-0.28	-0.21	-0.36	**-0.85**	-0.32	-0.68	-0.28	**-1.29**
Ward No. 21	-0.35	-0.06	-0.38	-0.16	-0.31	-0.47	**-1.72**	-0.46	-0.21	-0.36	**-1.02**	-0.32	-0.68	-0.28	**-1.29**
Ward No. 22	-0.35	-0.45	-0.38	-0.16	-0.31	-0.08	**-1.73**	2.05	-0.21	-0.36	**1.48**	-0.32	-0.68	-0.28	**-1.29**
Ward No. 23	-0.35	-0.45	-0.38	-0.16	1.92	0.99	**1.57**	-0.56	-0.21	-0.36	**-1.12**	-0.18	1.73	-0.19	**1.36**
Ward No. 24	-0.35	0.38	-0.38	-0.16	-0.31	-0.47	**-1.29**	-0.21	-0.21	-0.36	**-0.77**	-0.18	2.49	4.75	**7.05**
Ward No. 25	1.06	1.72	-0.38	-0.16	-0.31	1.77	**3.71**	1.40	-0.21	-0.36	**0.84**	-0.32	-0.68	-0.28	**-1.29**
Ward No. 26	0.19	-0.45	-0.38	-0.16	0.93	0.61	**0.74**	-0.07	-0.21	-0.36	**-0.64**	2.77	0.05	-0.19	**2.62**
Ward No. 27	-0.35	0.07	-0.38	-0.16	-0.31	-0.47	**-1.60**	0.77	-0.21	-0.36	**0.20**	-0.32	-0.68	-0.28	**-1.29**
Ward No. 28	0.04	-0.45	-0.38	-0.16	-0.31	-0.47	**-1.72**	-0.53	-0.21	-0.36	**-1.09**	-0.32	-0.68	-0.28	**-1.29**
Ward No. 29	-0.35	-0.45	-0.38	-0.16	-0.31	-0.47	**-2.12**	-0.12	-0.21	1.12	**0.79**	-0.32	-0.68	-0.28	**-1.29**
Ward No. 30	-0.35	0.35	-0.38	-0.16	-0.31	-0.19	**-1.04**	1.15	-0.21	-0.36	**0.59**	-0.18	-0.27	-0.19	**-0.64**

Source: Computed by the Author

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SPATIAL ENTROPY. A SMALL TOWN PERSPECTIVE. CASE STUDY: THE TOWN OF MARGHITA

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Abstract: The concept of "spatial entropy" developed by Michael Batty (1974) was primarily used to test different hypotheses concerning the distribution and density of population in great cities like New York, London, Los Angeles. Subsequently spatial entropy was adapted in urban and regional studies, where two types of research have been outlined: - "descriptive statistics" and "MaxEnt" method (Esmer 2005). Three characteristic elements related to the three components of sustainable development (society, economy and environment) have been considered to shape the degree of entropy for the urban system Marghita, namely: population, turnover and green spaces. The determination of the entropy degree for the Marghita urban system was achieved by applying statistical physics functions on open systems, related to the three pillars of sustainable development. The three domains are represented by a series of dynamic and complex elements characterized by input and output streams, influenced by endogenous factors characteristics of urban system and exogenous factors from the higher integrator urban system.

Key Words: *spatial entropy, urban system, sustainable development, small town Marghita.*

Introduction

Society builds a different order from the natural one, by manipulating space in order to generate distinct ordered structures. Urban society converts natural space, whose behaviour is difficult to perceive in a more comprehensive space with known relationships that generate a space of certainty, in order to facilitate activities that define society, in other words, to domesticate the nature. This process is applicable to any anthropogenic development, but especially in urban areas where it is more obvious the over positioning of structural order. The society attempts to obtain a progressive optimization of its own activity, generating a rational accumulation of surpluses in terms of space resulting from the exploitation of nature, which is initially more organized. These surpluses are accumulated as structures with stability features (construction) that in principle are inseparable from the simultaneous creation of a property system (streets, parcels) and functions. Thus, a specific relationship is established between a production area and the accumulation space in terms of matter and energy (Tojo 2002).

Since the 1950s, when the General Systems Theory and Cybernetics began to be applied in social sciences, cities began to be treated formally as systems. The idea of a general system theory emerged from reflections on how distinct entities, formed by inferior elements, are organized into a coherent superior entity, in patterns and order. This was followed by a focus on how the elements interact with each other through structures that make the systems more

sustainable within their limits. Cities fit into this characterization of systems as structures that require physical and aesthetic organization. Spatial analysis appeared in the science of geography, in relation with regional science, based on a urban and regional economy synthesis.

Cities were defined as sets of components connected by sets of interactions. Archetypal structure was designed around functional activities, and the connections between them were represented by physical movement, such as traffic. Since early applications of the general systems theory, the paradigm has been changed fundamentally from a world where systems were viewed as being centrally organized, from the top down, and notions about hierarchy were predominant, to one where we now consider systems to be structured from the bottom up (Batty 2008). This change in approach has brought under discussion notions of equilibrium and dynamics (Ianoş 1994, Ianoş 2000); cities as systems are no longer seen as structures in equilibrium, although models based on equilibrium are still useful in systems modelling. Urban systems are rather in imbalance all the time, a phenomenon observed in the velocity of changes and cities volatility. Changes are discontinuous, often chaotic, changes in the structure and behaviour of people are often difficult to predict, sometimes even surprising. Urban morphologies grow organically from bottom to top, even in planned cities which rarely keep their shape over long periods of time. Elements that compose urban structures are known as actors or agents, bound together by interactions that determine behavioural processes which keep the system in equilibrium or move it to new stages. The relationships between the system elements in terms of their interactions are enriched with ideas about networks and their dynamics. Key notions about how the elements of the systems are relatively scaled to each other and to the hierarchical system, demonstrate how local actions and interactions lead to global patterns that can be expected only from bottom to top, and these patterns can be generated using bottom-top growth models .

Landsberg's definition of order and disorder in 1990 explains the apparently abnormal phenomenon, that the entropy and disorder increase simultaneously. There must be a way of maintaining, or even increasing order, or decreasing disorder even by increasing the entropy: by maximising the total possible entropy to increase in a greater rhythm than the existing one. To achieve this, it is enough to increase the area in which the phenomenon occurs. In urban terms, the order can be maintained even if entropy increases, by extending the urban surface. Cities expanding is the economical form to decrease disorder with minimal energy cost. Until the advent of the automobile, the city expansion was controlled, but the possibility offered by the car through easiest travel at distance, increased the expansion phenomenon in cities, as the territory is being more accessible. There was an significant increase of the maximum possible entropy, which has led to the illusion that maintaining order is ensured, but the question arises on where will this expansion lead and what effect it will have on the natural environment.

Methods and Data

In urban and regional analysis studies, two types of research were defined using the concept of entropy. The first type uses "descriptive statistics" and the second type uses "Maxent" method (Esmer 2005). This method was applied to determine the pattern of urban sprawl (Kumar et al. 2007, Lata et al. 2001, Li & Yeh 2004, Sudhira et al. 2004, Yeh & Li 2001, Narisra et al. 2007, Guangjin et al. 2002).

Entropic analysis as shown below was firstly defined in this way by Shannon (1948) trying to explore the mechanism of information transmission in a noisy environment, but in reality, the

formula is centred on the principles of statistical physics developed by Clausius in the 19th century, considering statistical interpretations made by Boltzmann and Gibbs related to thermodynamic entropy. The method of maximum entropisation associated with the identification of particle distribution in a physical context gives birth to the Boltzmann-Gibbs distribution as a reference point in analyzing the spatial distribution of components (Wilson 2008).

Entropy index has a degree of stability and uniformity in a system that changes from zero (maximum concentration) to one (maximum separation) (equation 1 and 2).

$$H = \sum_{i=1}^{n} P_i \log \frac{1}{P_i} = \sum \; - P_i \log P_i$$

(Betty 1976)

$$R = 1 - \frac{H}{H_{\max}} = \frac{H}{\log K} \qquad \text{(Eq. 2),}$$

Where H is the absolute entropy, P_i shows the proportion of component analysis, R denotes the relative entropy, H_{max} shows the maximum entropy (complete homogeneous distribution). If the component is concentrated in the studied region, then R = 0, and if it is homogeneously distributed, then R = 1.

It stands out more attractive properties of this function to describe the spatial distribution. If p_i = 1 and pk = 0, ∀ ≠ i and the entropy is minimal when Hmax = 0 if component is considered uniformly distributed p_i = 1 / n, ∀ i, then the entropy is maximum if Hmax = logn. Many distributions lie between these extremes and allow the construction of a series of related measures analyzed in terms of maximum entropy.

$$I = H_{\max} - H = \log n + \sum_i p_i \log p_i$$

$$= \sum_i p_i \log \frac{p_i}{1/n} = \sum_i p_i \log \frac{p_i}{q_i}$$

(Betty 1976)

This equation is widely used in the probability theory, popularized by Kullback (1959), and discussed extensively in a geographic context (Snickers and Weibull 1977, Webber 1979). A normalization of I as R_{max} = I / H is called the relative redundancy and it is a measure ranging between 0 and 1.

For entropic analysis carried out over the city of Marghita, data used were collected both from statistical sources (National Census), local statistical records (Fişa Localităţii) and planning documents such as County Development Plan, Integrated Urban Development Plan and Marghita Land Use Plan. These data were processed in order to be included in the entropy formula. Batty's method applied in the present study reflects a status parameter for Marghita. Complementary, a synthetic method was used for argumentative reasons to highlight the state of key factors which are representative for the studied area.

Small towns have special dynamics. Most relevant indicators to determine the status they had both in the local development and regional development are about the demographics,

economics and about the environmental quality.

Results and Discussion

Spatial entropy through Batty's method in a synthesized form was applied to the city of Marghita. The city is located in the north-eastern part of Bihor County (Nemeş, 2010), near the river Barcau (Petrea, 1998) and in the proximity of the Transylvania Motorway. The entropy analysis of the Marghita urban system was achieved by applying statistical physics functions on open systems, related to the three pillars of sustainable development (social, economic and environment). The three domains are represented by a series of dynamic and complex elements characterized by input and output streams influenced by endogenous factors characteristics of urban systems and exogenous factors from the higher urban integrator system.

Three characteristic elements from three components of sustainable development have been considered in shaping the entropy degree of the Marghita urban system, namely:

- *Population* - characterized by structural complexity and continuous dynamics represented by inflows (birth, immigration) and outflows (mortality, migration), primordial element of urban system generating relationships with the other components, influencing them directly through the multitude of activities;

Marghita is the main polarizing centre of the region being attractive to adjacent rural areas, due to its urban comfort that it can provide and because of the opportunity given to find a job. In fact, statistical data provided by the authorities show that between 2006 and 2007, the number of persons settling in the city of Marghita increased 7.5 times, being recorded 1101 requests for establishing the domicile in the town. Marghita is a town with a natural and migratory positive balance maintaining their population over 15,000 inhabitants.

- *Turnover* - is the catalyst of the urban system, produced under direct action of human component, favoured by local resources. Determined by endogenous factors (economic units, production...) and exogenous (investment, financial support).

Marghita has built a stable economy combining industrial or agricultural activities, trade and transport, being an important economic and socio-cultural centre, ranked as a second economic power in Bihor county, after the county seat, respectively, the municipality of Oradea (PDJ, 2007). In 2009 in Marghita a total number of 804 economic units was registered (Lista firme, 2009).

Concerning the total turnover of local economic entities, its amount was 257,801,290 lei (INS, 2009). From the chart below we can see that the fields with the highest level of financial capital running are the trade and industry sectors, accounting more than half of the total amount. The services, construction and transport area are close to the 30 million lei in terms of turnover. The transition to a mature economy is expected with an increase of the tertiary sector’s importance (e.g. the services).

- *Green areas* - qualitative component perceived by the human being also under its pressure. It is the result of inputs determined by the expansion of green space and the output generated by the consumption of space triggered by urbanization. The quality of the green space in urban areas plays an important role in determining the quality of life but also increases its attractiveness.

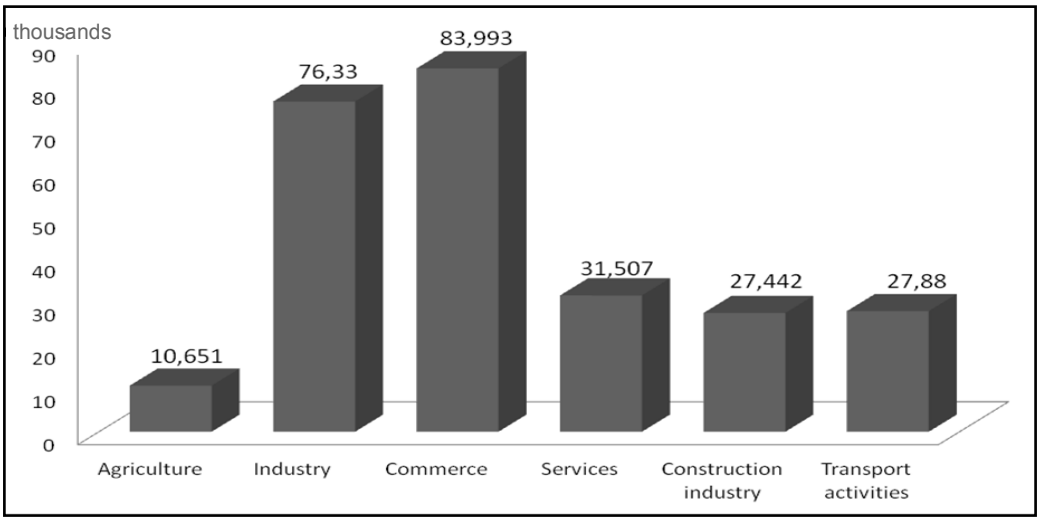

Fig.1 - **Distribution of Turnover by Activity Areas in Marghita**

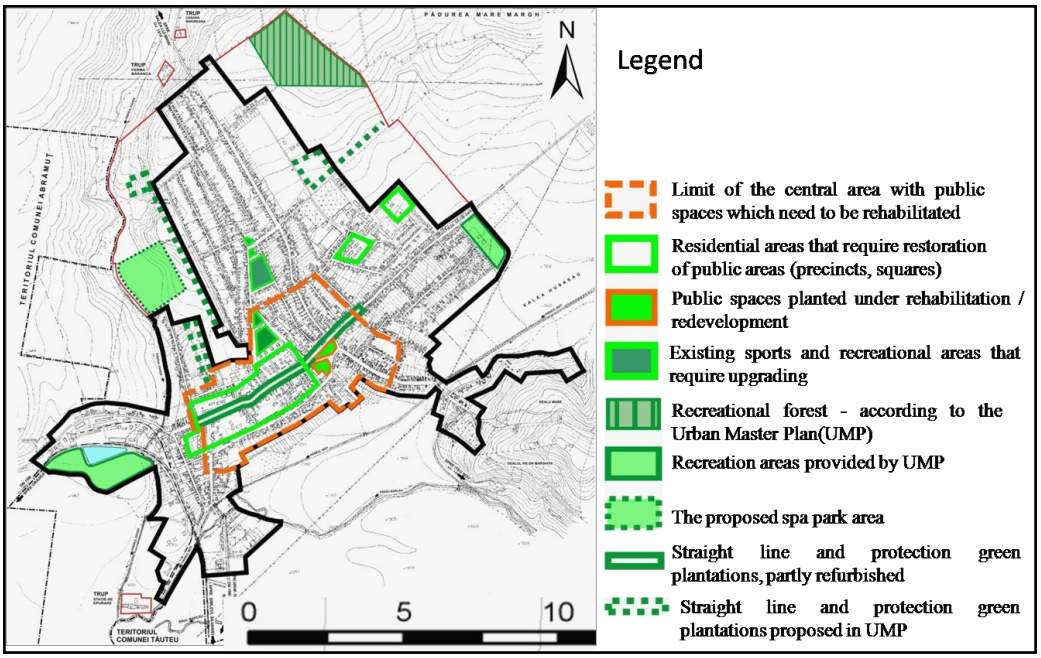

Fig.2 - **The State of Green Spaces in Urban Area of Marghita**

Thus, applying Batty's developed function for the three analysed elements, the entropy degree is 0.938 taking into account the existing population in 2009. The turnover for 2009 in Marghita was 24.57 million Ron / capita, compared to 33.02 million Ron / capita for Bihor county, the entropy of the element considered is 0.969. For analysis taking into account entropic green

spaces the determined value was 0.828. For entropic analysis taking into account the environmental element represented by green spaces the determined value was 0.828.

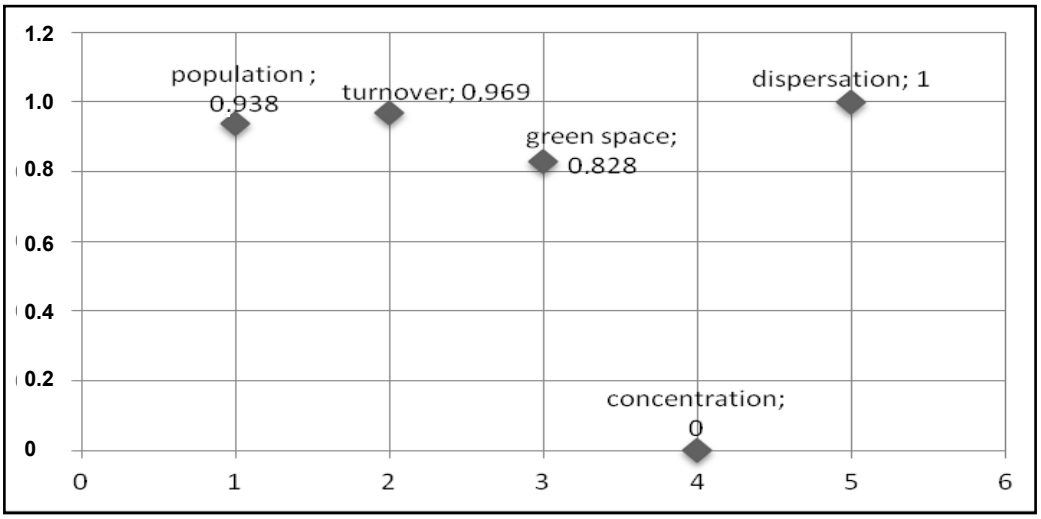

Fig. 3 - **The Entropy Degree of the Three Analyzed Elements**
Data source: PIDU 2009, INS.TEMPO 2009, PUG 2009

The three analyzed elements show a high degree of low entropy for the urban system of Marghita analyzed through the integrator system of Bihor County. The two elements, population and turnover analyzed by Batty's equation reveal the presence of a latent, inhomogeneous space, which revolves around the Marghita urban system and a flow towards the Oradea urban system. The surface of landscaped green spaces in Bihor county, generally exists in urban centres rather than in rural areas, fact that causes relatively homogeneous distribution within administrative units but it is still dispersed in Bihor County.

Entropic analysis on urban entity requires a systemic approach aiming an assessment of the general entropy at the level of that entity as unitary system based on entropic reports at the subsystems components levels (social, economic, environmental and territorial).

If, in a very general perspective, the determination of system entropy could mean finding the disorganization index of that system, in terms of sustainable urban development, the determination of the entropy of Marghita represents a process of evaluating a state parameter that characterizes the urban system.

It starts from the vision of thermodynamics related to the entropic consumption of a system expressed in relations (R1, R2):

$$F = U - T * S \quad (R1); \text{ and } \quad S = (U - F) / T \quad (R2);$$

Where: F - the free energy of the system;
U - the internal energy of the system;
T - the absolute temperature of the system;
S - the entropy;

Thus, an equivalent relation and applicable to any geographical and environmental elementary system is determined in the following form:

Pi + Pa = Pu + Pd (R3) and Pd = (Pi + Pa) - Pu (R4) (Leţos 2011);

Where:

Pi - Initial potential (inside) of a system;
Pa - Attracted potential from the external environment;
Pu - Consumed potential in a useful action;
Pd - Degraded potential which may have several components;

A complex of elements represented by material, energy and information mobilized to achieve a useful action is defined through the "potential concept".

	P_i	**Arguments**	P_a	**Arguments**	P_u	**Arguments**	P_d	**Arguments**
Economy	e^+	- commercial tradition (from oppidum to the municipality); - local natural resources,	e^+	- labour force attraction; - market for certain products	e^+	- low unemployment rate compared to national and regional averages;	e^-	- economic restructuring; - economic crisis; - scarce of natural resources
Social	e^+	- homogeneous human component; - access to utilities; - low-poverty rate;	e^+	- pupils and students attracted by the local educational institutions	e^+	- high percentage of young people, and adults;	e^-	- emphasis of social disparities; - increase of social exclusion;
Environment	e^+	- favourable natural frame; - accessibility	0		e^+	- renewable resources	e^-	- environmental pollution;
Territory	e^+	- coherent and homogeneous unit;	e^+	- polarization of the countryside;	e^+	- physical-geographical potential;	e^-	- transformation / degradation as a result of anthropic activities

Entropic analysis at the level of each subsystem is based on a matrix of conceptual status according to the R3 formula, through which appreciation for the four types of specific potential

of all components taken into account are formulated to estimate the entropic state of each component, and finally being estimated entropic state of the whole subsystem. In an intuitive form we can deduce the entropic state of Marghita urban system, that associates opposed entropic states searching an average value related to an imaginary axis of symmetry in the point 0, as a potential equilibrium area, resulting in a moderately positive general entropy state.

In another way, by using mathematical calculation, the entropy state of the entire system results from the summing of all entropy states of the four subsystems, knowing that the positive entropy value (e^+) at the systemic level is balanced or annulled from the mathematics perspective with a negative entropy value (e^-), the follow formula can be developed:

$$e^+(S1) + e^{++}(S2) + e^-(S3) + 0\ (S4) = e^+(S);\ \ (R5)\ (Leţos\ 2011)$$

Where:

e^+(- positive entropy value;
e^- - negative entropy value;
0 - null entropy value from mathematics point of view but balanced value at the system level;
S1, S2, S3, S4 - are the four subsystems components: social, economic, environmental and territory;
S - urban entity system.

Entropic state	**Major negative**	**Moderate negative**	**Equilibrium**	**Moderate positive**	**Major positive**
Entropic value	e^{++}	e^+	0	e^-	e^{--}
Marghita		x			

The result revealed the presence of a moderate positive entropy state, which shows a moderate entropic disequilibrium in the sense of accumulation at the system level in a slow rhythm but continuous of used and uncompensated materials, energy and information through a consistent consumption of this accumulation and generation of negative entropy.

The environment subsystem is the only one with negative entropic potential that cannot compensate, only partially the accumulations of positive entropy at the level of social and economic subsystems, being able to establish the equilibrium only in ambivalent relations, to determine a supportable state with the social subsystem and a viable state with the economic subsystem, without the ability to intervene and compensate precarious condition resulting from interference between social and economic both in terms of equity and quality or performance and sustainability (Leţos 2011). The entropic analysis highlights the ability of small towns to maintain coherence across regions, indicating the status-quo of the dynamics, flows (disorder of analyzed elements). Generally applied to regions and cities, this method can be adapted to smaller units as in this case. This parameter status alongside other spatial analysis play an important role in territorial management.

Conclusions

Although Marghita is a small town, its systemic complexity in the entropic analysis presents some peculiarities caused by the relations of inputs and outputs flows in the urban system. Based on Batty's spatial entropy formula, the presence of an unused, inhomogeneous space stands out and revolves around the Marghita urban system and flows toward the Oradea urban

system.

Positive entropy state generates a weak level of urban sustainability mainly caused by a complex social problem exacerbated by demographic factors and the economic crisis of recent years, in relation to a fragile economic subsystem, poorly consolidated, in a perpetual change and adaptation, still unable to perform, to resist the social pressure and to ensure a decent life for a large majority of the population.

This lack of sustainability is supplied by certain specific factors related to: poor human capital management, precarious management of urban space including green spaces, low use of renewable energy, lack of research and innovation activities, poor business opportunities, partial management of urban pollution, reduced emphasis on territorial cohesion.

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BOOK REVIEWS

Geography of Growth: Spatial Economics and Competitiveness

Raj Nallari, Breda Griffith, Shahid Yusuf,
The World Bank, Washington, D.C., 2012, 200 p.
ISBN-13: 9780821394861

Reviewed by MIRELA PARASCHIV, University of Bucharest, Romania

Urbanization represents an ongoing process that challenges both developed and developing territories to successfully manage its effects and to exploit advantages provided for future development. In this context, the book *"Geography of Growth: Spatial Economics and Competitiveness"* debates economic growth as a direct urbanization result. Discussion and data focus on territorial distribution and differentiations, and take into account classic and innovative literature, global comparisons and case studies to explain current correlations between urbanization and growth.

The eight chapters of the volume are gathered in a strong synthetic study about present urbanization features in developed and developing countries, but refer also to implications for the future.

After a short preface, the book starts directly with **c**hapter one that explains the relation between urbanization and inequality through urban concentration and agglomeration economies. Economic activity tends to concentrate in certain places. Deviations in optimal primacy and government influence in activities' localization result in negative urban environments. Solutions to reduce urban primacy include democratization, fiscal decentralization and a good national urban infrastructure. Developing countries tend to control the number of primary cities through limiting internal migration (rural-urban movement) and urbanization. Based on core-periphery models analysis, authors propose another view to obtain economic growth – governments should take advantage from spatial concentration and reinforce agglomeration economies.

Uneven growth and inclusive development complement each other through economic integration and mobility of labour and capital to fast-growing areas. The new economic geography contributes to economic research because it examines places and factors that influence the economic activity localization.

The second chapter analyses the United Nations data on urbanization, explains the data weaknesses (differences in the country-level data and the official UN data) and provides alternative measures of spatial concentration. The authors consider the agglomeration index (indicators: density, travel time, population size) as a better tool to investigate urban settlements and their environmental, social and economic impact. Comments identify also some disparities at global level, disparities resulted from cities' typology based on population size.

Chapter 3 examines the economic density in relation to urban transition and growth. Urban growth trends in developed and developing countries reveal a symbiosis between cities of different sizes. The primary city connects with other urban centres to result in a metropolitan area and secondary cities provide economic functions at regional level. Discussions concentrate on countries' typology derived from the agglomeration index conducted in the 2009 World Development Report. The economic density is differentiated territorially.

Results show that income and living standards inequality represent a concern for the first urbanization stage, like in developing countries, but it declines while urbanization generalizes. Developed countries plead for urbanization benefits through reduced rural-urban disparities. Data evidences that urbanization manifests differently in developing countries than in developed countries due to different starting points within the global context. Another topic debated is the squatter settlements that represent an important urbanization effect in developing countries. Authors argue that limitations in city size, affecting the formal housing sector, favour squatter settlements development. Economic growth in developing countries would depend on reducing policy support for primary city, modifying the context that results in squatter settlements and leaving open the internal people migration.

The fourth chapter considers urban specialization a result of economic spatial concentration in small and medium sized cities. Ongoing urbanization, specific for developing countries, maintains multiple specialized cities while urban territories in developed countries are highly specialized. Territorial specialization, economic structural change and globalization result in a new typology of cities that includes knowledge cities, creative cities, global cities, and green (eco) cities. The chapter details each urban category and it argues then in favour of living in dense and diverse urban environments.

Smart cities represent another city type generated by current urbanization features. Chapter five profiles smart cities as sources of innovation, based on the Chinese experience, and it explains the related growth policies. High-tech industries connected to research activity result in smart cities. The authors emphasize that smart cities should integrate four forms of intelligence for sustainable growth: human intelligence from knowledge networks; collective intelligence of institutions; the industrial production intelligence; and the artificial intelligence of digital networks.

The sixth chapter discusses about globalization and the influences in the creation of global urban regions. Clusters reflect the interactions between cities that develop as a result of advances in information, communication and transport technologies. Large city size, economic activity concentration, specialization, high productivity and industrial diversity represent the urban regions' characteristics. Specialized clusters support economic growth and governments try to emphasize their territorial distribution. Authors debate also the differences in starting and managing a cluster. Factors that result in innovation clusters include: urbanization; powerful education; business growth; economic growth; and good communication and transport infrastructure.

Chapter seven states five factors that foster urbanization and the economic growth. Demographic transition (reduced infant mortality, increased life expectancy, fertility decline), high-tech agriculture and industry, tertiarization, localization economies and urban innovation constitute urban environments advantages that reinforce economic growth within urbanization. The authors explain concerns related to cities that lack a good management of urban advantages. Instead, cities struggle under population growth's negative effects.

The final chapter emphasizes elements that ensure successful metropolitan regions. The criteria that have to be met include: 1. industrial activity and clusters; 2. connectedness; 3. compactness; 4. smart cities; 5. good governance; 6. sustainability; 7. resilience. Immediate growth, globalization and innovation effects, the focus on progress, quick policy implementation, inclusive and stable social and urban environment characterize powerful metropolitan regions and add arguments to the urbanization benefits.

Informative notes and literature references complete each chapter and provide a reliable support for further research. The text includes graphics and tables with data that underlies

the analysis or bring additional information to each subtopic. The volume ends with a set of annexes that reveal the country-level indicators and bring new insights to question.

The book would benefit from a revision to exclude fragments that repeat ideas within the same chapter and to add general introduction and conclusions to foster the main findings and their significance in urban environments research.

"Geography of Growth: Spatial Economics and Competitiveness" completes the reference literature and raises interest to both researchers and urban planners through its positive approach on urbanization and innovative ideas promoted in the analysis.

Evaluarea integrată a calității mediului în spaţiile rezidenţiale (Integrated assessment of environmental quality in residential areas)

Maria Pătroescu, Cristian Lojă, Laurențiu Rozylowicz, Gabriel Vânău, Mihai Niță, Iulia Pătroescu-Klötz, Annemarie Lojă
Romanian Academy Publishing House, Bucharest, 2012, 246 p.
ISBN 978-973-27-2215-2

Reviewed by HERMINA DOROBANȚU, University of Bucharest, Romania

The expansion of residential areas was made in an extremely fast way in the last years in Romania. This fact raises many problems as it leads to environmental degradation. The work *"Integrated assessment of environmental quality in residential areas"* was made in the project PN II IDEI Exploratory research projects, funded by the Executive Agency for Higher Education, Research, Development and Innovation Funding (UEFISCDI).

The book is structured in seven chapters. Chapter one shows the types of residential spaces and their characteristics, but also the factors that led to their expansion. The second chapter refers to the methods that can be used to assess the quality of the environment in the residential areas. The main feature of these methods is multidisciplinarity. In the third chapter, we take a look at the factors that allow or restrict the location of residential spaces in a certain place. The fourth chapter refers to the sources of environmental degradation, in terms of residential space. Within the research, there were applied questionnaires to learn the behaviours of the inhabitants. In the fifth chapter, the residential area is analyzed as the generator of environmental issues. In this chapter, it appears the concept of ecological footprint, a concept which is very used in the analysis of the environment, because it refers to how much land is necessary to ensure the proper functionality of a population, in terms of needs, but also in terms of the absorption of waste. In the sixth chapter are presented the issues that can appear in the indoor environment of the residential areas. For the analysis they have used questionnaires and direct measurements in some housing. In the last chapter, the authors wanted to create a link between global environmental changes and the changes that take place in residential spaces, and they propose solutions for a better living, but, in the same time, without more harm on the environment.

The information in the text is supported by tables and figures (photos, processed satellite images, maps made in GIS technique); a positive fact is that the images are in colour, which allows a better understanding of the

information presented in the pictures. These images and tables are counted at the end of the work. It would have been a plus if the pages where the tables and images appear would have been specified, in order to facilitate their finding by interested persons.

The book is completed with information about the project that conducted to this work and the different results obtained. The book also contains a 21 pages summary in English. Bibliography includes over 13 pages (scientific articles, as well as doctoral theses or books, from Romania and abroad), fact that reveals the good research that have been made; sources have been cited in the text. The language that the authors used is a relevant and scientific one, but also can be understood by anyone interested in this issue.

Although they do a case study on Bucharest and its metropolitan area, the data presented in this paper is related to the international situation and it can be applied to any residential space.

This study can be useful as a guide value for all those who wish to carry out a study about the quality of the environment in residential areas.

The Historic Uban Landscape Managing Heritage in an Urban Century

Francesco Bandarin, Ron van Oers, Ed.Wiley-Blackwell, Chichester, West Sussex, UK, 2012, 236 p.
ISBN 978-0-470-65574-0

Reviewed by FLORENTINA-CRISTINA MERCIU, University of Bucharest, Romania

The book titled *The Historic Urban Landscape Managing Heritage in an Urban Century*, published in 2012, approaches a highly-topical matter: urban heritage. The analysis of the urban space from the point of view of the heritage is a challenge meant to indicate that cities do not stand exclusively for centers of economic concentration, competitiveness and technology, but also for territories with rich and diverse cultural attractions.

The book is organized into 6 chapters where the authors conduct a complex analysis of the urban heritage, blending traditional elements (conservation) with modern elements of heritage management, focusing on the analysis of the historical urban landscape. At the same time, the cultural urban heritage is viewed as a resource whose capitalization may contribute to the economic development of the cities.

Chapter 1, “Urban Conservation: Short History of a Modern Idea”, approaches the topic of the preservation of the urban heritage. A brief historical overview of this process is presented, a process that initially involved taking steps towards the preservation of historical monuments on an individual basis. Later, when the concept of historical center of a city had been defined, viewed as “historical continuum”, or as a micro-system of a city. Urban planning studies were centered on the analysis of that concept within the geographical context where it is located, with references to the morphology of its specific urban fabric, and then yet later on the analysis focused on the means to capitalize on the historical center as a whole or as a sum of historical monuments; thus, conservation of the urban historical center also serves as a factor for the development of the modern city. In time the concept of historical center acquired new meanings, being no longer

perceived as an inert part of the city. This allows the accumulation of new functions compatible with its traditional morphology. Its aesthetical value gains increasing prominence, reinforcing that purpose and at the same time serving as the foundation for the establishment of a hierarchy as well as a dialogue between a city's old and modern forms.

In chapter II, "Urban Conservation as International Public Policy", the authors individualize the measures taken at international scale to conserve the urban heritage in the wake of World War II, which had caused large-scale heritage losses. Starting in the 1950s, various institutions were created that were actively involved in ensuring the measures to protect the cultural heritage at global scale (UNESCO, the International Council on Monuments and Sites-ICOMOS, the International Council of Museums-ICOM, the International Centre for the Study of the Preservation and Restoration of Cultural Property-ICCROM). These specialized institutions create a system of guidelines and measures related to the preservation of the urban heritage by means of various charters; these charters serve the purpose of standards that have to be strictly fulfilled by the countries that signed the respective agreements.

The wider context of the management of urban heritage is debated in the book's chapter III (entitled: "The Changing Context of Urban Heritage Managment"). The analysis on the cultural heritage assets is conducted both from the point of view of urban development and from the point of view of environmental matters: for instance the way how various processes (for instance climate changes) may influence man-made urban heritage, or the influence of economic enterprises (tourism as the main tool to capitalize on cultural attractions). These factors create a complex and dynamic context for the preservation of the urban heritage that presupposes an increase in the involvement of stakeholders, too. At the same time, in numerous parts of the world, the responsibility for the preservation actions has been relocated from national level to local level, as the economic role of the cities and regions grew stronger, and they are directly involved in establishing priorities in the process of development. Mention can also be made of the direct and indirect effects of the smart capitalization on the urban heritage as part of the programs dealing with territorial planning and integrated development. In the book authors' opinion, cultural "works" indicate a high degree of economic performance and human development, taking into account that cultural resources have a practical creative potential. At the same time, the authors consider the urban heritage to be part of the infrastructure of a city, the same as healthcare infrastructure or transport infrastructure.

In chapter four are identified by the authors the agents involved in the management of the urban heritage (governments, public service providers, private sector, international organizations, national and international non-governmental organizations). In this section of the study, the authors summarize several innovative approaches that emerged, at international level, in the field of urban planning and urban preservation, designed by specialized agencies as part of the United Nations' programs (for instance promotion of urban governance and finance, reduction of poverty). In this context it is necessary to create a regulatory framework enabling the intervention of incentive instruments so that the urban heritage would retain its cultural value, while also acting as a catalyst for socio-economic development by way of tourism and trade. In this context, an especially important role is assigned to public-private partnerships.

Expanding the toolkit for management of the urban environment is the topic of the fifth chapter of the book. The authors direct the readers' attention to the instruments linked to the management of the urban heritage (for instance regulatory systems, community engagement, technical analysis, financial tools). In the authors' view, these are instruments that may be used by means of adaptation to the local context and that may

ensure a higher degree of coherence to the planning and management of urban processes and also based on spatial and social integration and on involvement and collaboration of civil society members.

The last chapter of the book, titled "The Historic Urban landscape: Preserving Heritage in an Urban Century", summarizes the role and importance of the preservation of the historical urban heritage as lying at the crossroads of planning, architectural debate and public policy. In the past 50 years the preservation of the cultural heritage has held a central spot in the implementation of urban policies, partly as a result of the involvement of specialists in the fields of architecture and culture, among others, joined by the members of civil society. The actions launched by them brought about both positive effects and important losses. These concerted efforts have, however, been able to save only parts of world's urban heritage: most losses were caused by geo-political conflicts, speculative urban development, or the public authorities' low interest. The authors of the study suggest a harmonious combination of the theory and practice of heritage preservation within a wider framework of urban planning, the integration of heritage preservation into urban development, designing the future of a city, in the context of globalization, that would take into consideration the historical urban center; in this context, historical cities may become the driving force of economic development.

Aims and scopes

Analysis of the urban and regional condition needs to be interdisciplinary. In reality, urban researchers usually tend to belong to a discipline reflecting their training whether as sociologists, geographers, planners or any number of subjects concerned with the study of space and place. Our training very often endorses an appreciation of how other disciplines explore the city. For the journal the acknowledgement of the many disciplines that concerned with understanding cities and regions will be indicated by the different disciplinary back-grounds reflected in the papers published. Articles will be published by geographers, sociologists, planners, economists, political scientists, to mention just few of the disciplines involved in urban and regional study.

The Journal of Urban and Regional Analysis plans to be a key outlet publishing topical articles dealing with cities and regions. In later issues we plan to include sections devoted to notes and comments as well as a policy section outlining and discussing state and non-state initiatives aimed at improving cities and regions, together with the problems confronted by their implementation.

Instructions to Authors

1. The Journal of Urban and Regional Analysis seeks to redefine and revigorate the links between geography, sociology, planning, economy, political science. It aims to publish original academic research, critical studies and discussions of the highest scholar standard in the field of urban and regional development. Submitted papers will be evaluated on the basis of their creativity, academic quality and contributions to advancing understanding of the complex problems related to urban and regional development.

2. Submitted manuscripts must be original, unpublished contributions. They must not be submitted or accepted by any other publications. All articles submitted to the Journal will be available online, free of charge.

3. One electronic copy of the manuscript (sent by email in PDF format) should be submitted to either of the two Editors listed below.

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*** (1938-1941), *General Romanian Population and Settlements Census on December the 29th 1930*, I-X, ICS, Bucharest.

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