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The Coastal City of Jijel in Algeria between Imbalance and Dysfunction

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Abstarct

The increasing distortion between the head and the body of the urban network is one of the most striking phenomena of the contemporary Algerian city. The hypertrophic character of the urban structures of the Jijel space (Algeria) is reinforced by the creation of administrative units and manifests itself in an excessive concentration of political-administrative, economic and cultural forces in the capitals of the Wilaya to the detriment of the small and medium-sized centers. The dysfunction of the urban framework, essentially characterized by a poor distribution of commercial activities and population in the Wilaya of Jijel, leads to a hypertrophic city on the one hand and a macro regional micro system on the other. This work, attempts to scientifically diagnose this coastal micro regional space in order to locate its strengths and weaknesses and consequently its hypertrophy, imbalance and dysfunctionality, by resorting to a multi criteria model in a systemic background.

Key words: Dysfunction, Jijel, Hypertrophy, Multi criteria, Rank-size

INTRODUCTION

The comparison of the city to a living organism has long been used in urban planning to describe certain morphological analogies. Eco theories have been developed based on the striking analogies between the functioning of the human body and the urban body (Berezowska-Azzag, Ewa, 2013). This gives rise to the idea of recognizing the pathologies of the city such as congestion, crisis, macrocephaly and urban hypertrophy (Rancayolo, 1997). According to Brunet et al. (1993), urban hypertrophy corresponds to "*a situation in which a city is overdeveloped in relation to the population of other cities and becomes egocentric*."

Most studies on urban hypertrophy in developing countries show that this condition is due to an imbalance between observed demographic growth and economic growth (Medrag & Farhi, 2009). This phenomenon has been described by Paul Bairoch (1985) as "*a historically unprecedented phenomenon, the drama of which is that the number of urban residents is increasing rapidly without increasing agricultural productivity, resulting in suburbanization or urban hypertrophy*."

In Algeria, urban hypertrophy affects the main cities in the coastal Wayas[1]. Algerian cities show a contrasting picture between the highest urban growth rate (73.73%) and economic deficits characterized by low annual GDP (Gross Domestic Product) growth rates (-5.10%) in 2020 according to the World Forecast, World Bank 06/2022. The hypertrophic nature of this phenomenon is exacerbated by the merger of administrative units.

Jijel, one of the Algerian coastal cities, is experiencing a strong demographic saturation. After Jijel was named the capital of Wilaya in 1974, its political function was doubled by a consequent economic function. The projects launched under the National Spatial Policy 2030 did not succeed due to the lack of an urban policy for this Wilaya. At the micro regional level, more than 6,000 projects registered in the framework of local development were implemented mainly in the capital of the Wilaya and two medium-sized cities, marginalizing the mountain towns with low population concentration. This situation is due to the under-equipped and devitalized urban centers.

1 Pursuant to Article 1 of Low N°.90-84 of April 7, 1990 of the Algerian Republic, the Wilaya is a public territorial entity with legal personality and financial autonomy. It constitutes an administrative district of the State. It is created by law. It has a territory, a name and a capital. The Daïra is a subdivision of the Wilay.

On both a demographic and functional level, Jijel suffered from the same imbalance between the Wilaya capital and the mountain towns. The macrocephaly of the micro regional system of Jijel is reflected in the concentration of commercial activities and the served population. This imbalance forces to question the parameters that support the urban hypertrophy of the city of Jijel and that allow to understand the mechanisms that contribute to contain the macrocephaly of the micro regional system. The demographic imbalance, combined with a functional imbalance characterized by the poor distribution of the served population and the poor distribution of commercial activity, are they among the causes that cause this urban disease? The main objective of this work is to show in a scientific way the urban hypertrophy of the city of Jijel and the macrocephaly of its micro regional system. At the same time, this study should help decision makers to analyze the functional problem of the Jijel area in order to better manage the development of the local urban system at the level of the Wilaya of Jijel.

CASE STUDY PRESENTATION

The Wilaya of Jijel is a part of the Algerian coastline. It is located about 350 km east of the capital Algiers, at the end of a cliff, the Jijelian Corniche. (Fig.1.b)

Law N°.84-09 of February 4, 1984, increases the number of daïras to eleven (11) and the number of municipalities to twenty-eight (28). (Fig. 1.c). This port city, with an average size of 736,201 inhabitants on 12/31/2016 (according to the 2017 Budget Planning Directorate), covers an area of 2398 km^2,characterized by extremely diverse natural and geographical data: a strategic geographical location, a 120 km coastline, agricultural potential, forests and mountains that make up 80% of the natural park.

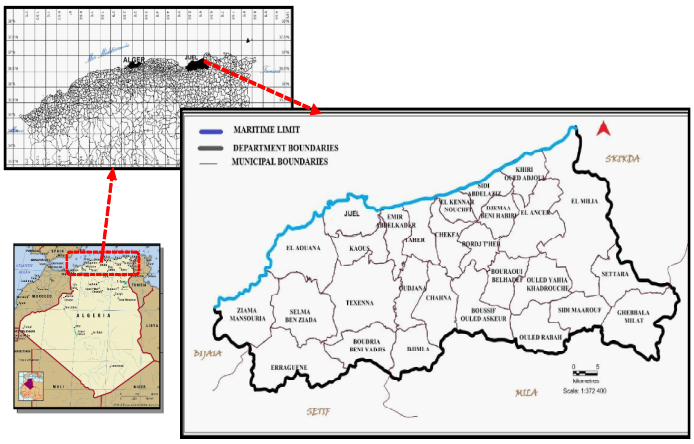


Figure 1. a) Algeria's geographical position (Source: https://www.britannica.com). b) The geographical position of the wilaya of Jijel in relation to Algiers on the Algerian coastal strip, 2021. c) Administrative division of the wilaya of Jijel 2021.

METHODOLOGY

This paper proposes to engage theoretical methods on population growth through investment, empirically, the study of the Jijelian system during the periods 1988-1998-2008 and 2016. The distribution "rank/size", known by the ZIPF law (George Klinsky Zipf 1945), on the basis of which the urban hierarchization has been analyzed, has shown that the size of cities P is distributed in a regular way as an inverse function of their rank r according to the relation $\mathbf{Pr = b.r^a}$ $\mathbf{Pr = b.r^a}$,where b and a are the parameters. This formula is translated in a bi-logarithmic scale, when the hierarchical distribution is regular, by a so-called fitting line.

The least squares method allows to determine the parameters a and b of the equation of a linear fitting function: y=ax+b. From this:

$\boldsymbol{a = \frac{covariance\,(x,y)}{variance\,(x)}}$, where $\mathbf{covariance}(x,y) = \frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})$, and variance$(x) = \frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2$

So $\boldsymbol{a = \frac{\sum_{i=1}^{n}(x_i-\bar{x})(y_i-\bar{y})}{\sum_{i=1}^{n}(x-\bar{x})^2}}$, (slope or the directional coefficient of the line)

$b = \bar{y} - a\bar{x}$ With $\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$, et $\bar{y} = \frac{\sum_{i=1}^{n} y_i}{n}$, ($\bar{x}, \bar{y}$ are the means of the x and y values).

The correlation coefficient measures the degree of linear correlation between the two variables (population and rank):

$$r = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n}(x - \bar{x})^2 \sum_{i=1}^{n}(y - \bar{y})^2}}$$

r is always between - 1 and + 1. The closer r is to 1 or - 1, the stronger the linear correlation between the two variables. When r = 1 or - 1, the linear correlation is perfect (all points are on the right). The closer r is to 0, the weaker the correlation.

When r is positive, the two variables evolve in the same direction; when r is negative, they evolve in opposite directions. The internal distribution of an urban system is empirically measured by the slope (a), which indicates by how much the size of a city (in %) decreases when its rank increases by 1%.

At the functional level, a multi-criteria approach was chosen that implements the Analytic Hierarchy Process (AHP) developed by Thomas L. Saaty in 1980. The choice of this method (AHP) is mainly due to its simplicity, its ease of understanding to solve a wide range of unstructured problems, its flexibility, and its ability to combine quantitative and qualitative criteria in the same decision framework. The application of this method consists in first establishing a hierarchical structure of the problem by classifying the urban centers and the criteria to be studied. Then, the weighting of the criteria is established for each alternative or city under study. The comparison matrix between the criteria is established in the following form:

$$A=[a_{ij}] = \begin{vmatrix} 1 & a_{12} & a_{1n} \\ \frac{1}{a_{12}} & 1 & a_{2n} \\ \frac{1}{a_{1n}} & \frac{1}{a_{2n}} & 1 \end{vmatrix}$$

The weights of the criteria are calculated using the comparison matrix A. This is done according to the following steps:

1. Add the values of each row of the comparison matrix A.

$$Si = \sum_{j}^{n} = 1a_{ij}$$

2. Calculate the total sum of the values determined in the 1st step:

Total sum=$\sum_{i}^{n} = 1S_i$

3. The weighting of the individual criteria results from the following relationship:

$$W_i = \frac{S_i}{Somme\ totale}$$

RESULTS AND DISCUSSIONS

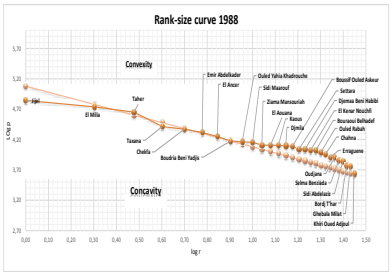
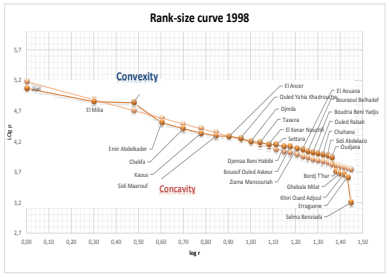
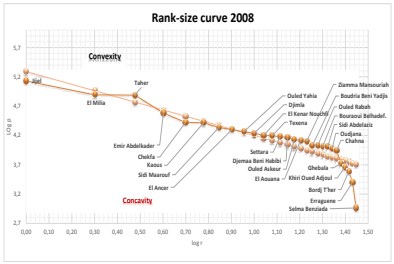
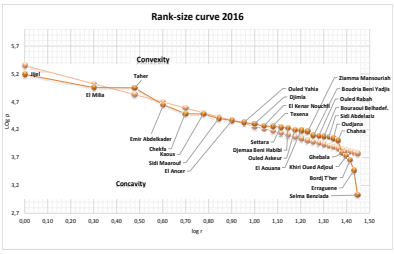
Analysis of Hierarchical Demographic Distribution

Zipf's Law (Rank-Size)

Table 1 presents the rank-size ratio analysis for the entire Jijelien urban system.

Table 1. Analysis of the evolution of the hierarchical distribution of the urban system of Jijel.

Graphical representation of the rank-size distribution	Adjustment line	Analysis			
		The primacy	The Concavity	The Convexity	The basal fraction

			Concerns cities of rank:			
	y=0,76x+5,18	**y=-x+5,082** **r^2= 0.96**	Rank 1 Rank 2	3. 6. 7. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28	4.5.8	/
	y=0,99x+5,18	**y=-x+5,171** **r^2=0.869**	Rank 1 Rank 2	3. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23	4.5.6.7	24. 25. 26. 27. 28
	y=1,09x+5,29	**y=-x+5,210** **r^2=0,816**	Rank 1 Rank 2	3. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23	4.5.6.7.8.	24. 25. 26. 27. 28
	y=1,09x+5,29	**y=-x+5,271** **r^2=0,816**	Rank 1 Rank 2	3. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23	4.5.6.7.8.	24. 25. 26. 27. 28

The lack of the mean level was characterized by two tendencies of convexity and another tendency of concavity and that for the four data of the study. This situation shows a polycentric organization. The size distribution shows the primacy of the city of Jijel since 1988 with a gap of 50500 inhabitants in 1988, 30916 inhabitants in 1998, 27352 in 2008 and 31614 inhabitants in 2016. This figure is lower than what the adjustment line would suggest. In the four periods (1988-1989-2008, 2016) it always shows a primatial trend. The second city EL Milia also has a primacy with a gap of more than 5000 inhabitants in 1988 and 3000 inhabitants in the three following periods.

The tendency of concavity shows that the cities ranked 4, 5, 6, 7, and 8 have lower populations than would be predicted by a Zipf relationship, hence the curvatures of the curves.

The tendency of convexity, the city of Taher in its third rank marks, on the one hand, its predominance over all centers in the different periods of the study, it recorded a surplus of 4807 inhabitants in 1988, 18721 inhabitants in 1998 and 23303 inhabitants in 2008, and over 26933 inhabitants in 2016.

On the other hand, in the second period of study (1998), the cities with ranks between 08 and 23 also predominate, while the cities with ranks between 09 and 23 show a tendency to predominate in all periods of study except the second period, whose numbers are higher than the adjustment line would suggest. Beginning in 1998, cities with populations less than 8,000 are below the adjustment line. These cities exhibit a break in the lower part of the curve. This lower part includes five (05) cities that suffer from a large population deficit. In contrast, the urban hierarchy in 1988 does not exhibit a break in the lower portion.

The lower break is in fact only a transition zone to another hierarchical system, that of the rural world. The presence of this break starting in the 1990s gives the appearance that the threshold of urbanity is decreasing over time, and the analysis actually shows the presence of two different hierarchical systems with thresholds for transition between the two systems.

Jijel a Primatial City

The share of the first city in the urban population is a good index for measuring primacy. (Belhedi.A, 2004) This indicator expresses the weight of the primatial city in relation to the whole urban system in the following formI1= P1/$\sum Pi$.Also, the ratio between the real population of the first city (P1) and its theoretical population (b), calculated according to the rank-size law ($Pr = b.r^a$), is written in the following form I2 = P1/b expresses overurbanization. A value > 1 expresses a primacy following the processes of polarization and metropolization (Marconi-Ebrard F, op. cit.), while a value <1 reflects rather the summit settlement of the urban system.

The demographic weight of Jijel has increased since 1988, from 15% to 21% in 2008, and maintains this percentage in 2016 (Table 2). This relative increase in the urban weight of the Wilaya capital is due to the development of urbanization in the city of Jijel compared to other cities in the micro region. This primacy of Jijel explains the limited space given to medium-sized cities in the context of the priority of the regional level.

The I2 ratio has always been below 1, despite its relative increase from 0.58 in 1988 to 0.79 in 1998 and 0.83 in 2008 and 2016 (Table 2). This situation reflects a settlement of the urban system in Jijel.

Table 2. Primacy parameters of Jijel 1988-2016.

/	Formula	1988	1998	2008	2016
Index I1	P1/$\sum Pi$	0,15	0,20	0,21	0,21
Index I2	I2 = P1/b	0,58	0,79	0,83	0,83
Jefferson Index	J=P1/P2	1,27	0,79	0,83	0,83
Stewart's Index	S=P1/P2+P3+P4	0,55	0,68	0,70	0,70

The primacy ratio I2 and the Stewart index (the ratio of the first city to the three cities that follow it in the demographic hierarchy) have not stopped rising since 1988, passing respectively from 0.55 to 0.83 in 2016 and from 0.55 to 0.83 in twenty years to have a stability between 2008 and 2016.

While the Jefferson index (the ratio between the first city (Jijel) and the second city) has been reduced in 1998 from 1.27 in 1988 to 0.79 in 1998. This gap begins to rise significantly from 1998 from 0.79 to 0.83 and remain stable between 2008 and 2016.

The Primacy Ratio I2 and the Stewart Index (the ratio of the first city to the three cities that follow it in the demographic hierarchy) have increased unceasingly since 1988, from 0.55 to 0.83 in 2016 and from 0.55 to 0.83 in twenty years, respectively, to be stable between 2008 and 2016. The Jefferson index (the ratio between the first city and the second city) decreased from 1.27 in 1988 to 0.79 in 1998. This gap begins to increase from 0.79 to 0.83 in 1998 and remains stable between 2008 and 2016.

Functional Hierarchical Distribution Analysis, Application of the AHP method

Figure 2 shows the decomposition of our problem into an ordered hierarchical structure of criteria and sub-criteria.

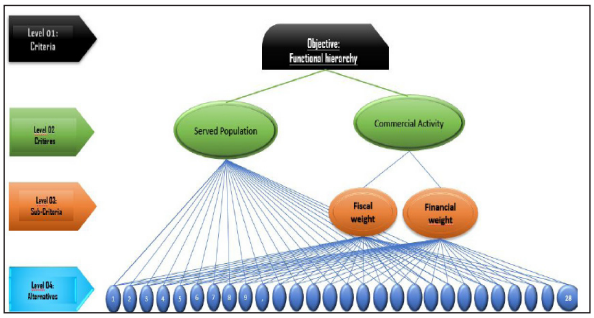


Figure 2. The hierarchical structure of the problem

Identification and weighting of criteria

The elaboration of the criteria is a crucial step in the identification of the Jijelian cities for local and regional development. Our structural variable consists of two dimensions: the served population and commercial activity. The served population is calculated using Reilly's (1931) gravity model: $I = P / D^2$, where the attraction of a center to a place is proportional to its population and inversely proportional to the square of the distance from that place (FARHI, 2001). Based on the measures introduced by the Algerian Finance Law, commercial activities can be divided into two categories of taxpayers subject to two types of tax regimes. A real regime and another lump sum regime.

Pursuant to Article 282ter of the Finance Law (Law No. 06-24 of 6 Dhou El Hidja 1427, corresponding to December 26, 2006, which carries the 2007 Finance Law), all individuals engaged in commercial activities whose annual turnover does not exceed three million dinars, i.e., 20,584 $ American dollars, are subject to the single apartment tax IFU, while all individuals or legal entities whose turnover exceeds three million dinars are subject to the real tax regime. These two variables, closely linked by interactions, impose the nature of the dimensions, their number, as well as their criteria.

Table 3 summarizes the data of the criteria for the analysis according to the General Directorate of Taxes (DGI) Algiers, 2017 and the Directorate for the Programming of the Budgetary System DPSB Jijel, 2017.

Table 3. Served population and Commercial Activity (DGI, DPSB,2017).

CITY	served population	Commercial activity	
		Fiscal weight %.	Financial weight %.
Jijel	159407	31,00	30,84
El Milia	92369	14,09	16,47
Taher	93354	14,76	14,38
Emir Abdelkader	47263	5,91	6,86
Kaous	31674	4,05	4,30
Chekfa	32230	3,09	2,65
Djimla	20432	1,79	2,53
El Kennar	19955	1,98	2,38
El Ancer	24632	2,91	2,25
Sidi Maarouf	25588	2,69	1,88
El Aouana	15995	1,80	1,60
Djemaa Beni Hbibi	18408	2,15	1,52
Texenna	19001	1,41	1,51
Ouled Yahia Khadrouche	21902	1,33	1,43
ZiamaMansouriah	14884	1,81	1,28
Boudriaa Ben Yadjis	12831	0,66	1,22
Sidi Abdelaziz	13003	1,36	1,16
Settara	18145	1,59	1,13
BouraouiBelhadef	12339	1,43	1,11
Boucif Ouled Asker	15969	0,89	0,71
Chahna	10714	0,77	0,66
Ouled Rabah	12536	0,64	0,65
Udjana	11773	0,66	0,56
Kheiri Oued Adjoul	5848	0,60	0,35
Ghebala	6243	0,31	0,26
Bordj T'har	4967	0,15	0,14
Selma Ben Ziada	1190	0,07	0,10
Erraguen	3012	0,11	0,10

According to the AHP method, we obtain a matrix of pair wise comparison relations. In our case, we created two (02) matrices, namely:

- A level 2 (served population- commercial activity) comparison matrix.

Table 4. Comparison matrix main category

Comparison matrix main category		
General	**Alternative (city)**	
	Criterion.1 (The served population)	**Criterion.2(Commercial activity)**
Criterion.1(The served population)		
Criterion.2(Commercial activity)		

- A level 3(fiscal percentage - financial percentage) comparison matrix

Table 5. Comparison Matrix Subcategory

Comparison matrix subcategory		
Criterion.2 (Commercial activity)	**Alternative (city)**	
	Criterion.2.1 (Fiscal percentage)	**Criterion.2.2 (Financial percentage)**
Criterion.2.1 (Fiscal percentage)		
Criterion.2.2 (Financial percentage)		

Normalization of the comparison matrices is performed automatically based on the data entered into the electronic data entry form of the software EXPERT CHOICE. The criteria weighting step consists in comparing the different elements of a hierarchical level to determine the importance of the criterion and its contribution to the solution of the problem. The synthetic level of cities is defined according to a geometric grid of importance hierarchized in 9 scales and according to the numerical scale of binary comparison (Saaty, 1984).

Served Population: Priority Vector Analysis

By weighting the criterion of served population according to the AHP, we obtain three types of attractiveness based primarily on the priority vector of each city. Table 6

- The first threshold corresponds to the main attraction, which includes the cities of the upper category (from the ninth category) and the cities of the middle category (corresponding to the eighth and seventh categories) with a population greater than 120,000. Not surprisingly, Jijel (with a priority vector of 0.214) is the only city at the top of the urban hierarchy that concentrates facilities of great economic and administrative importance, as well as higher level jobs.
- The second threshold corresponds to the medium attraction, which includes the lower stratum medium cities (sixth and fifth level cities) and the intermediate cities (fourth level cities), whose served population varies between 54,000 and 108,000 people. Taher and El Milia, with a priority of 0.126, are the only two lower-middle stratum medium cities that have a medium level of attraction. The latter two cities are endowed cities with diverse activities. They are experiencing economic dynamism due to the various programs initiated or underway.
- The last threshold concerns the minor attraction, where the small cities of the higher stratum (third level) and the lower stratum (first and second level) are united. Under the command of the medium cities are the small cities, among which the city of Emir Abdelkader stands out (with a served population between 36,000 and 54,000 inhabitants and a priority vector of 0.076). This group is considered secondary support for the coastal strip. At the bottom of the hierarchy are 24 small cities. They are characterized by a small population coverage and low economic importance. The analysis shows a notable weakness due to the absence of levels 8, 7, 5, 4 and 2, which explains an imbalance in the distribution of luxury trade.

Table 6. Prioritization (criterion 1: served population)

Level 01: Criteria	**Criterion 1: Served population**	
Level 02: Sub-Criteria	**/**	
Cities	**Priority Vector**	**Synthetic level of served population**
Jijel	0,214	9
El Milia	0,126	6
Taher	0,126	6
Emir Abdelkader	0,076	3
Chekfa	0,026	1
Djemaa Beni Hbibi	0,026	1
Djimla	0,026	1
El Ancer	0,026	1
El Kennar	0,026	1
Kheiri Oued Adjoul	0,026	1
Ouled Yahia Khadrouche	0,026	1
Settara	0,026	1
Sidi Maarouf	0,026	1
Texana	0,026	1
Bordj T'har	0,014	1
BoucifOuledAskeur	0,014	1
Boudriaa Beni Yadjis	0,014	1
BouraouiBelhadef	0,014	1
Chahna	0,014	1
El Aouana	0,014	1
Erraguene	0,014	1
Ghebala	0,014	1
Kaous	0,014	1
Oudjana	0,014	1
Ouled Rabah	0,014	1
Selma Benziada	0,014	1
Sidi Abdelaziz	0,014	1
ZiammaMansouria	0,014	1

Poor Quantitative and Qualitative Distribution of Commercial Activity

The definition of the synthetic level of commercial activity was based on the principle of arithmetic progression, where the average was calculated from the sum of the two previous levels calculated according to the principle of geometric progression (Saaty, 1984).

The superposition of two indicators (fiscal and financial percentages) shows the irrational distribution of trade in the Jijel area, where the city of Jijel crushes all other cities, occupying level 7 with a priority vector of 0.188. Then directly on level 5 and 4 we find the two capitals of Daïras (respectively El Milia and Taher) whose priority vector is equal to 0.127 and 0.109 respectively, then on level 2 it was occupied only by the capital of Emir Abdelkader. At the first level, 24 cities are classified. The study comparing the level 4 of the hierarchical structure of the problem according to the criterion of commercial activity shows the classification of the cities of Jijel, of which the city of Jijel is at the top of the micro regional network with a priority vector of 0.188. Table 7

Table 7. Prioritization (criterion 2 (commercial activity) + sub-criteria (fiscal and financial weight))

Level 01: Criteria	Commercial Activity			
Level 02: Sub-Criteria	Fiscal priority vector	Financial priority vector	SYN Priority Vector	SYN level
Jijel	0,191	0,185	**0,188**	**7**
Taher	0,112	0,106	**0,109**	**4**
El Milia	0,112	0,141	**0,127**	**5**
Emir Abdelkader	0,043	0,042	**0,043**	**2**
Kaous	0,023	0,022	**0,022**	**1**
Chekfa	0,023	0,022	**0,022**	**1**
El Ancer	0,023	0,022	**0,022**	**1**
Sidi Maarouf	0,023	0,022	**0,022**	**1**
Djemaa Beni Hbibi	0,023	0,022	**0,022**	**1**
El Kennar	0,023	0,022	**0,022**	**1**
ZiammaMansouria	0,023	0,022	**0,022**	**1**
El Aouana	0,023	0,022	**0,022**	**1**
Djimla	0,023	0,022	**0,022**	**1**
Settara	0,023	0,022	**0,022**	**1**
BouraouiBelhadef	0,023	0,022	**0,022**	**1**
Texana	0,023	0,022	**0,022**	**1**
Sidi Abdelaziz	0,023	0,022	**0,022**	**1**
Ouled Yahia Khadrouche	0,023	0,022	**0,022**	**1**
Boucif Ouled Askeur	0,023	0,022	**0,022**	**1**
Chahna	0,023	0,022	**0,022**	**1**
Boudriaa Beni Yadjis	0,023	0,022	**0,022**	**1**
Oudjana	0,023	0,022	**0,022**	**1**
Ouled Rabah	0,023	0,022	**0,022**	**1**
Kheiri Oued Adjoul	0,023	0,022	**0,022**	**1**
Ghebala	0,023	0,022	**0,022**	**1**
Bordj T'har	0,023	0,022	**0,022**	**1**
Erraguene	0,023	0,022	**0,022**	**1**
Selma Benziada	0,023	0,022	**0,022**	**1**
28 Cities SYN: synthetic				

Summary of Hierarchical Demographic Distribution

At the demographic level, the combined analysis of the hierarchy, expressed through the study of the size distribution and the study of the primacy ratios, shows that the evolution of the distribution of the cities of the Jijélien system was marked by two important periods:

✓ Period of movement between 1988 and 2008:

The analysis of this period shows that the values of the slope (a) and the quality of adjustment, represented by the coefficient r^2, decreased from 0.76 to 1.09 and from 0.96 to 0.816, respectively.

The evolution of the demographic coefficient shows an urban system with low hierarchy. At the same time, the primacy ratio b/p1 decreased from 1.09 to 1.04. This decrease expresses that the gap between the first city, which is the capital of the Wilaya, and the other cities of the urban system is widening. On the other hand, the two indices of primacy I1 and I2 register an increase, which explains the presence of a densely packed urban system whose index of primacy I1 is always below 1.

✓ Period of stability between 2008 and 2016:

This second period shows a trend of stability of the Jijelian urban system, whose values for the primacy ratio and linear adjustment (a) have remained stable since 2008 (I1 =0.83, I2 =0.212, b/P1 =1.04 and a=-1.09, respectively). This period shows an urban system of Jijel, which still has a primatial trend and a peak settlement of the city of Jijel. The analysis of the different data has allowed to measure the different parameters that show the poor demographic distribution, and consequently the Wilaya of Jijel suffers from this distribution.

Overview of Functional Hierarchical Distribution

The synthetic level of structural variables based on the two conjunctural criteria, i.e., served population and commercial activity, defines nine hierarchical levels from 1 to 9. These two dimensions correspond to the same principle: the weak hierarchical coherence of the system of Jijel. Jijel, the capital of Wilaya, is at the top of the pyramid and occupies the highest level (functional synthetic level 9). This first city dominates all 27 cities of the urban system. Fig.3

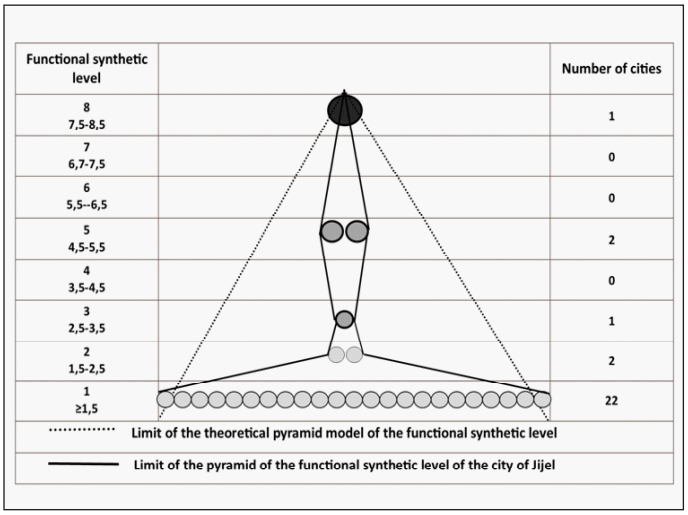


Figure 3. Pyramid of the synthetic functional level of the Wilaya of Jijel according to two criteria.

Jijel is defined as the reference pole or main pole radiating to the whole area of the Wilaya, with a priority vector of 0.210 (Table 8). It is followed by El-Milia and Taher at level 6 with a synthetic vector between 0.191-0.215.

These last two Daïra capitals dominate 25 cities belonging to the lower layers, then Emir Abdelkader, the only city at level 4 with a priority vector of 0.072, it dominates 24 cities of the lower layers. Ten level 2 cities, namely Chekfa, Djemaa Beni Hbibi, Djimla, El Ancer, El Kennar, Kouas, Ouled Yahia Khadrouche, Settara, Sidi Maarouf, Taxana. At the bottom of the pyramid are the fourteen cities whose priority vector is equal to 0.015. The analysis shows various fractures and imbalances located mainly at the middle and lower levels of the pyramid.

The middle level lacks the medium-sized cities of a higher stratum (with a corresponding synthetic functional level of 8 and 7), which are considered the main carriers of the secondary centrality necessary for the equilibrium of the city.

Another observation is that these medium-sized cities are not accompanied by intermediate cities (absence of cities at levels 5 and 3), whose economic weight is low compared to theirs and higher compared to the lower levels. The absence of intermediate cities supporting the medium-sized cities can only be explained by an urban system dominated by the city of Jijel, on the one hand, and by a great weakness of the intermediate relays and the lack of coherence of the spatial framework, on the other. Consequently, this proves a functional break, where the elementary principle of urban system hierarchy of the intra-urban model theorized by Caniggia (1994) is almost absent.

Table 8. Synthesis of priorities + Functional synthetic classification of the cities of Jijel.

Cities	Priority vector	Synthetic functional level	Average weights
Jijel	0,210	**9**	**0,191-0,215**
El Milia	0,126	**6**	**0,116-0,14**
Taher	0,124	**6**	
Emir Abdelkader	0,072	**4**	**0,066-0,09**

Chekfa	0,025	**2**	**0,016-0,04**
Kaous	0,025	**2**	
Boucif Ouled Asker	0,025	**2**	
Djemaa Beni Hbibi	0,025	**2**	
Djimla	0,025	**2**	
El Ancer	0,025	**2**	
El Aouana	0,025	**2**	
El Kennar	0,025	**2**	
Ouled Yahia Khadrouche	0,025	**2**	
Settara	0,025	**2**	
Sidi Maarouf	0,015	**1**	**0-0,015**
Texenna	0,015	**1**	
Bordj T'har	0,015	**1**	
Boudriaa Ben Yadjis	0,015	**1**	
BouraouiBelhadef	0,015	**1**	
Chahna	0,015	**1**	
Erraguen	0,015	**1**	
Ghebala	0,015	**1**	
Kheiri Oued Adjoul	0,015	**1**	
Oudjana	0,015	**1**	
Ouled Rabah	0,015	**1**	
Selma Ben Ziada	0,015	**1**	
Sidi Abdelaziz	0,015	**1**	
ZiamaMansouriah	0,015	**1**	

A pathology located at the base of the pyramid with more than twenty (20) cities (levels 1 and 2), resulting in a pyramidal zone with an excess of small, poorly structured and under-equipped centers. Overlaying the theoretical model with the results of this analysis reveals the pyramidal imbalance of Jijel's functional system.

Thus, instead of a pyramidal network, the result is a profoundly unequal distribution of urban functions between an omnipotent city that monopolizes the managerial functions of commercial activity and experiences a very rapid swelling of the population, and on the other hand, a collection of small centers, without any real regional capital exercising power over them, all flattened before the great head: this is the macro cephalic organization of the micro regional system. This contrast is evident despite the existence of two medium-sized cities with significant opportunities (the port of DjenDjen, the international airport of Taher and the industrial area of Ballara in El Milia). The result is a strong, fundamental contrast between a collection of small towns and one (two or three) micro regional capital, the only one with proper urban functions.

The space of Jijelien is then served in a heterogeneous way, with the first city functionally hypertrophied in a macro cephalic micro regional system.

CONCUSION

This research was conducted with the intention of shedding light on certain issues related to the primacy of Jijel and its relations with its region in terms of population and commercial activity. The analysis focused on the coastal area of Jijel with all its opportunities and constraints. According to the conceptual analysis in terms of urban hypertrophy, a city that has a significant imbalance between demographic and economic growth and that does not reach a coherent configuration of the totality of the components of its urban system at the level of the distribution of demography and at the level of the distribution of the parameters intrinsic to its operation, can only expect incoherence, macrocephaly and, above all, urban hypertrophy. The comparison of the results from the analysis of demographic and functional hierarchies confirms the urban hypertrophy of the city of Jijel. This hypertrophy is due to a poor demographic distribution combined with a poor functional distribution.

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