

THE IMPACT OF URBAN DEVELOPMENT STRATEGIES ON SPATIAL ORGANISATION, URBAN FUNCTIONING AND INHABITANT PRACTICES: THE CASE OF THE METROPOLIS OF CONSTANTINE

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ABSTRACT

This paper illustrates the impact of urbanisation strategies on the spatial organisation and urban functioning of the metropolis of Constantine, highlighting new trends in the occupation of space and their repercussions on inhabitants' practices. The approach adopted is based on centrality, combining indicators of concentration, mobility and attraction. Changes will be examined through socio-economic statistics and field surveys, in the form of observations, counting and questionnaire interviews with residents. The results obtained illustrate clearly the organisational shift, reflected by the spatial redistribution of centrality attributes (populations, activities, services), and the urban functioning mode, which is increasingly taking a polycentric form, generating new forms of multi-directional mobility on increasingly larger scales.

KEY WORDS: *extension strategies, resident practices, spatial organisation, urban functioning, urban policies.*

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Introduction

Background and context

Theorists and researchers have been striving since the 19th century to understand the principles governing the organisation and functioning of cities. As a result, several theoretical models have been developed to explain the different patterns of urban growth, providing a solid foundation for urban research (Fache, 2008). Classic theories, such as Johann Heinrich von Thünen's isolated state model (1826), Walter Christaller's central place theory (1933), and August Lösch's economic spatial model (1940), have laid the groundwork for understanding the spatial organisation of cities and their operational mechanisms. While these models remain influential, contemporary urban studies increasingly focus on adapting them to modern urban dynamics, particularly in the context of emerging economies and rapid urbanisation (Batty, 2021; 2022).

These theories laid the foundations for the work of Beckman (1958), and Berry and Pred (1961) in the United States, before spreading globally. They established an order and a hierarchy in the distribution of services and the arrangement of cities and urban networks (Ouellet, Polèse, 1977), based on the quantity and quality of services that largely determine each city's centrality and its position in the urban hierarchy, according to the criteria of range and threshold (Oueslati-Hammami, 2010). As a result, everyday goods and services are provided by numerous small centres, whereas rare goods and specialised services, which are required less frequently, are concentrated in a few large urban hubs.

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From the 1990s onwards, research on cities and urban configurations shifted its focus to the decline of the traditional compact city and the rise of dispersed and fragmented urban landscapes (Chalas, 2010). This transformation was driven by the expansion of suburban areas, the decentralisation of economic activities, and increased mobility, leading to a shift from monocentric to increasingly polycentric urban forms (Baumont, Bourdon, 2002; Rallet, Torre, 2008). The emergence of secondary urban centres around major metropolitan areas became a key focus, particularly in relation to the socio-economic and spatial dynamics governing polycentric urban systems.

Recent studies have emphasised the limitations of these early models in capturing the complexity of contemporary urban growth, especially in regions experiencing accelerated urban transitions, such as North Africa (Brenner, Schmid, 2015). These developments necessitate a reevaluation of classic urban theories to better account for the fragmented and decentralised urban patterns observed today (Wood, Phelps, 2020). While this hierarchical structuring remains relevant, recent studies highlight the increasing complexity of urban networks in the 21st century, where digital economies and improved transport infrastructure reshape traditional centralities (Meijers et al., 2016). The emergence of polycentric urban forms, particularly in developing regions, challenges the distinction between intra-urban and inter-urban scales, and increased inter-connectivity between secondary and primary urban centres (Halleux et al., 2021).

This trend towards the reconfiguration of territories sometimes generates conflicts between public and private actors, the officially defined boundaries of urban areas, the lived realities of residents, and the expansion ambitions of urban authorities (Dockerill, 2020). These changes challenge the classic urban hierarchy model, calling for new frameworks that integrate networked urbanism and functional polycentrism (Pain, Shi, 2021). The increasing role of technological advancements and improved transport networks have facilitated the emergence of multi-nodal urban systems, where economic activity is no longer solely concentrated in a single dominant city, but is distributed across interconnected urban regions (Földes, Příbyl, 2023).

More recent studies show that polycentrism is not just a morphological phenomenon, but also a functional and economic restructuring of urban spaces (Meijers, Burger, 2016). Public policies have fostered urban centralities through the development of the road network, influencing location choices for businesses and public entities. Key planning strategies include a radial-concentric road structure, new multifunctional neighbourhoods, and historic centre preservation (Miranda et al., 2020). The urban growth of contemporary cities following this model has given rise to territories with new spatial and functional dimensions, distinct from the industrial-era urban patterns characterised by monocentric polarisation, compactness, and the high-density concentration of activities and populations. The technological advances of the 20th and 21st centuries, particularly the development of intra-urban transport networks, digital connectivity, and widespread automobile use, have driven cities towards increasingly fragmented, dispersed and networked forms (Batty, 2021). Traditional urban cores have gradually lost their dominance, as secondary centres emerge, forming complex metropolitan systems, where economic, social and mobility patterns are no longer dictated by a single central node.

In emerging economies, state-led urban planning remains a dominant force, shaping the trajectory of polycentric urban development. In Algeria, national policies have encouraged the creation of new towns, initially envisaged as satellite towns to absorb the surplus demographic masses of large cities (Hamouche, 2023). For instance, cities like Constantine have undergone profound transformations due to demographic expansion and the rise of new urban centres, causing a radical transformation of the territorial order (Lifa, 2024).

These changes have reshaped land management patterns, socio-spatial interactions, and governance challenges, as policymakers struggle to balance urban expansion with equitable urban planning, infrastructure and service provision (Saharaoui, Bada, 2021). The rapid urban expansion has been accompanied by a reconfiguration of spatial interactions, particularly with emerging secondary hubs, such as Ali Mendjeli and El Khroub, which serve as economic and residential extensions of the metropolis (Debbabi, 2021). These new urban centres developed not only as extensions of the main city, but as functionally differentiated areas, with economic, commercial and residential roles, comforted by an accelerated process of peri-urbanisation, leading to the proliferation of new housing estates, commercial centres and administrative centres in peripheral areas.

Problem statement and research gap

The remarkable urban growth of Algerian cities over the past 30 years has led to the formation of vast urban agglomerations, where territorial functioning has become problematic and critical. This expansion is marked by a demographic explosion, growing demand for housing, and the saturation of urban fabrics in major cities, resulting in congestion issues and increasingly challenging mobility for residents.

As with any research in the field of urban planning, this study serves as a tool to guide public authorities and planners in making informed decisions regarding the future development of the agglomeration. It provides valuable insights into the status and dynamics of the spaces that compose it. Any future urban decision or intervention must take into account the new polycentric form and logic that Constantine is gradually adopting.

The findings can be used to assess whether polycentric urban planning, previously implemented in developed countries and currently applied in the context of Algerian cities, can effectively enhance the efficiency of urban systems, particularly in terms of mobility, leading to the decongestion of traditional city centres. They also provide insights into the effectiveness of policy choices that adopt polycentrism as a development model for Algerian territories and the necessary adjustments for future urban planning policies.

The depletion of developable land within the municipality of Constantine compelled the public authorities and planners to redirect the city's growth towards satellite towns. Consequently, Constantine experienced a significant deconcentration and diffusion of its urban fabric, marked by the emergence of satellite towns and new cities within a 15-kilometre radius. However, the challenges faced by the metropolis have been further exacerbated by the emergence of intensive travel over increasingly long distances between the central city and the newly established satellite towns. With a weak public transport system, daily life for residents has become a struggle. At the same time, people have turned to private cars to commute, which has rapidly contributed to the saturation of the road infrastructure and an increase in road insecurity. According to a study conducted in 2008 by the state-owned consulting firm (URBACO, 2008), based on a sample of 26,000 people, 47% of trips within the metropolitan area are destined for the main city of Constantine for various reasons, while the remaining 53% involve long-distance travel between peripheral cities.

In this paper, we aim to understand the form and logic of this territorial restructuring, as well as its impact on the overall functioning of the agglomeration and on the everyday practices of its residents. This work builds upon and confirms previous research on the organisational and functional structure of the agglomeration, with our contribution focusing on illustrating this transformation by examining its repercussions in the daily lives and habits of residents.

Objectives and hypotheses

The idea for this paper emerged from a broader reflection on the concepts of metropolisation and the irreversible transformation of the form, scale, and even the functioning of today's cities. Its overarching objective is to analyse contemporary urban structures, which are increasingly adopting polycentric forms.

To achieve this, we have chosen the case of the agglomeration of Constantine to highlight the process of emerging new centralities, uncover the structural changes within the agglomeration, and understand its organisation and functioning.

The focus will be on three main aspects:

First: demographic and residential changes to reveal the population dynamics in the peripheral towns.

Second: the development of activities, particularly commercial activities, in the peripheral towns of the agglomeration.

Third: the consequences of these two types of changes on the centrality system and the overall functioning of the agglomeration, by examining resident practices and mobility patterns.

This work is based on the hypothesis that Constantine is no longer a city structured around the traditional centre/periphery model, but rather an agglomeration comprising, in addition to the main centre, a network of peripheral centres that actively contribute to the urban functioning of the agglomeration.

Significance and structure of the paper

To achieve this objective, a deductive approach was adopted. Building on an existing theoretical framework, we established the benchmarks and analytical elements necessary for the empirical work. A descriptive analysis method was employed to study the essential components of the urban system of the agglomeration of Constantine.

We aim to highlight the functioning of this system by examining the weight and organisational role of its components, as well as the existence of interaction and influence links, which are considered essential conditions for the formation of polycentric urban systems.

Initially, we will revisit the tools for urban and centrality development implemented by the state during the post-independence period. This will illustrate the impact of the housing crisis on the territorial reconfiguration process of the agglomeration, and provide the reader with a clear understanding of the context behind the observed transformations.

Subsequently, we will undertake an analysis of the residential migration phenomenon and its repercussions on the demographic shift toward the satellite towns of the agglomeration. The same approach will be applied to economic activities and services to confirm the development of centrality attributes in the peripheral towns of the agglomeration. Finally, we will examine the effect of these structural changes on residents' practices and the spatial attractiveness of the towns within the agglomeration.

1. Materials and methods

1.1. Study design and setting

The methodology adopted in this paper is based on the concepts of centre and centrality. By examining the functional disparities observed between different locations, we aim to understand the organisational and functional dynamics of the agglomeration using indicators of concentration, mobility and attraction:

A cartographic and analytical study of polarisation phenomena was conducted, drawing on data from various General Population Censuses (RGPH 1987, 1998, 2008) and the Economic Census (2011). The objective was to identify new trends in the distribution of population densities and economic activities across the territory, and to test the hypothesis of a demographic and economic shift towards peripheral areas.

A questionnaire survey was conducted among residents of the agglomeration to assess inhabitant practices, define the catchment areas of the centres, and understand the interdependencies that emerge between the towns within the agglomeration.

1.2. Structure and objectives of the questionnaire

The questionnaire survey is a tool that helps to better assess the urban reconfiguration of the agglomeration of Constantine by analysing residents' behaviours and daily practices (shopping, work, leisure, etc). It also provides insights into the city's organisational and functional dynamics. The survey was conducted during November and December 2015, and extended into the first months of 2016 up until March.

The questionnaire consisted of three main groups of questions:

- Information about the respondent.
- Information on attraction sites and the frequency of visits.
- Questions about residents' mobility and the accessibility of places.

The sample used in this study was a random sample, which ensures that all individuals in the surveyed population had an equal chance of being included in the study. The population targeted by the survey consisted of individuals who influence the urban dynamics of the agglomeration. In reality, this population included active individuals. According to the definition provided by the National Office of Statistics (ONS),

the age of this population ranged from 15 to 60 years, the retirement age. However, in our case, we included individuals over 60 years old, as they remained active in terms of mobility for the purposes of our study.

For populations exceeding 20,000 individuals, the sample size does not vary significantly.

To determine the optimal sample size, we used the following equation: $n = (t^2 * p (1-p)) / e^2$

- n : Sample size for a very large (infinite) population.
- t : Margin coefficient derived from the confidence level 's' (for $s = 95\%$, $t = 1.96$).
- s : Confidence level (or confidence threshold) ensuring the reliability of the measurement (95% in our case).
- e : Margin of error allowed for the estimated value (e.g. $\pm 5\%$).
- p : Proportion of the population exhibiting a given characteristic. If p is unknown, we use ($p = 0.5$) (also called the probability of success or positive occurrence).
- $n = [(1.96)^2 * 0.5 (1 - 0.5)] / (0.05)^2 = 381$ individuals.

This value was adjusted according to our total population, estimated at 580,981 individuals:

$$n^2 = n / 1 + [(n - 1) / N]$$

N : Total population size (also called the parent, reference, or original population).

$$n^2 = 381 / 1 + [(381 - 1) / 580981] = 384 \text{ individuals}$$

The questionnaire was administered directly to 384 individuals, evenly distributed across the six towns of the agglomeration. To ensure that the results were reliable and representative, the entire agglomeration was covered by the survey, with distribution based on the importance of each city as follows: Constantine (94 respondents), All Other Cities (58 respondents).

In this context, the term 'Constantine Agglomeration' was used in this paper to refer to the city of Constantine, which, through its development process, integrated the territories of neighbouring municipalities.

1.3. Conceptual framework

When addressing the organisation and functioning of territories, the concept of centrality emerges as a fundamental tool for analysis and understanding. In this paper, we use the concept of centrality as a framework to illustrate the structural transformations experienced by the Constantine agglomeration and their impacts on urban and social dynamics following the adoption of decentralisation and polycentricity strategies (Debbabi, 2021).

The notion of centrality dates back to the 1930s. It is often employed imprecisely, and is frequently conflated with the concept of the centre, especially when centrality is reduced to the attributes of city centres. However, a clear distinction exists between location and function (Bordreuil, 1985; Lebrun, 2002). Centrality refers to the degree of functional complexity achieved by a centre through demographic, economic, functional, political and symbolic attributes, enabling it to attract flows of people and goods (Mathian, Berroir, Sanders, Saint-Julien, 2004). This aligns with Christaller's definition, which describes centrality as the ability of a central element to attract or influence its periphery: the rarer the services, the higher the centrality, and the larger the area of influence (Choay, Merlin, 1988).

Historically, centrality was often defined in relation to historical centres, characterised by dense urban fabrics, significant historical elements, and a strong mix of functions and uses. However, technological advancements have introduced new lifestyles in cities, fundamentally altering work, living, leisure and shopping practices. Our relationship with the city has shifted significantly (Bonfiglioli, 2001), and the locations of urban activities and functions have become increasingly differentiated. The principle of proximity, once essential for activities requiring direct interaction, is no longer indispensable. Centrality has become multiple and diverse (Da Cunha, 2010).

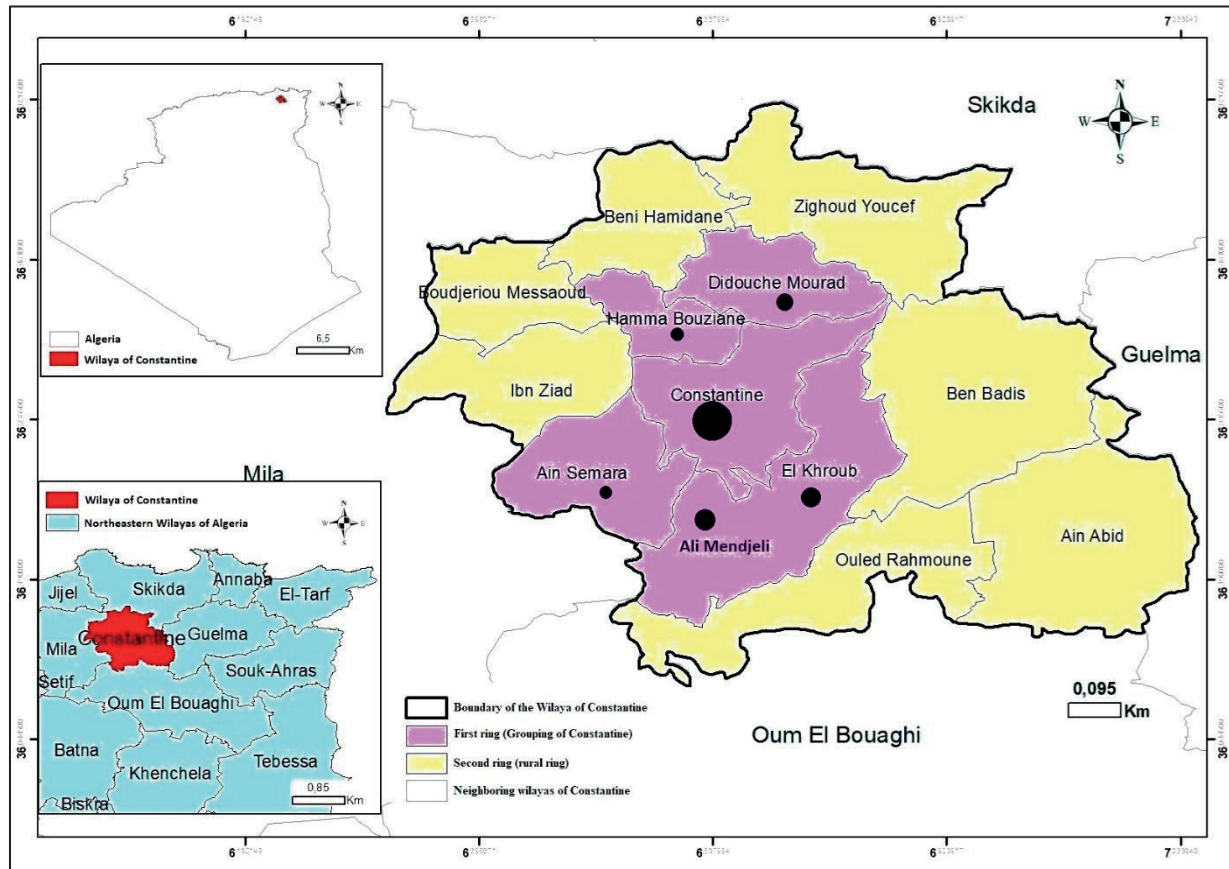


Figure 1. A map of the Constantine metropolis, showing the first and second urban rings

Source: Map created by Chaouche Tayara Roubila 2024.

In this new context, it is crucial to define the operative nature of this new form of centrality, rather than clinging to nostalgic terminology. The focus should shift to examining phenomena such as polarisation, concentration and functional specialisations in major urban agglomerations and metropolitan areas (Ascher, 2003). The ambiguity of centrality lies largely in its evolving form and morphology, adapting alongside societal and lifestyle changes. Therefore, it is no longer sufficient to focus solely on the historical cores of cities when developing strategies for structuring urban agglomerations. Modern forms of centrality must also be considered (Bourdin, 2003).

Today, centrality encompasses a variety of meanings. Nonetheless, the term is often used interchangeably to describe polarisation phenomena in two distinct generations of cities (Bourdin, 2003). Shopping centres, multiplex cinemas and specialised activity hubs represent the new elements of contemporary centrality. For economic and operational reasons, these entities tend to distance themselves from traditional centres, favouring locations near motorways and transport systems to maintain accessibility, a role historically ensured by proximity. Specialisation and the separation of central functions are key characteristics of these new forms of centrality, which starkly contrast with the old principles of functional mix, conviviality, shared spaces and leisurely exploration (Wiel, 2003).

1.4. The study area

Constantine, the capital of eastern Algeria, is evolving into a genuine regional metropolis, due to its population size, functions, and its important role in the eastern part of the country. Despite the administrative

reduction of its territory, the city has managed to establish an expansive metropolitan area, the boundaries of which remain somewhat undefined.

From its origins as a *medina* perched atop a rocky outcrop spanning only a few hundred metres, to the colonial city that developed in a nearly concentric pattern extending roughly three kilometres from the rock, Constantine has transformed significantly in the post-independence era. This period saw sprawling, tentacle-like expansions into its periphery, extending up to six kilometres.

Today, Constantine covers a metropolitan area of 930,000 inhabitants (ONS, 2008), encompassing not only the core city but also five surrounding towns, within the administrative boundaries of Didouche Mourad and Hamma Bouziane to the north, and Ain Smara, El Khroub including the new town of Ali Mendjeli to the south. Together, these areas form the daily living and activity hub of the metropolis.

One of the defining features of this interconnected urban system is the significant commuter movement between the core city and its peripheral towns. Virtually all studies conducted on this topic underscore the importance of this phenomenon. According to M. Côte, 'the core city, which houses 500,000 residents at night, accommodates nearly 800,000 during the middle of the day' (Côte, 2006).

2. Results and discussion

2.1. New urbanisation approaches and the production of centrality

In the early years following independence, Constantine retained the same centrality system inherited from the colonial era, namely a single-centre system. Urban policies during this period focused on completing the 22,000 housing programme initiated under the 1958 Constantine Plan for the Constantine Department (Bouchareb, 2006). The primary concern of the local authorities was addressing the housing crisis through mass construction and industrialised building processes, with little attention given to functional aspects of the urban fabric. The resulting neighbourhoods were predominantly large housing complexes. Driven by rapid population growth and rural migration, this urban policy led to the city's saturation as early as the 1970s.

According to the National Office of Statistics (ONS, 1992), Constantine's population increased from 245,621 in 1966 to 345,566 in 1977. The migration balance, which was estimated at +6.5% before independence (1948–1954), surged to +24.2% in the years immediately following independence.

Starting in 1975, to alleviate congestion in the historic centre of the agglomeration, the local authorities began shifting urbanisation from the main city to former colonial-era village cores, such as El Khroub, Ain Smara, Didouche Mourad and Hamma Bouziane. These were transformed into satellite towns functionally connected to the mother city through shared facilities and services. This new vision was initially outlined in the 1969 Master Urban Plan (PUD), and later revisited by the (CADAT) planning office in 1973. It established a new general framework for the organisation and urban expansion of the Constantine agglomeration (Marouk, 2010).

This strategy underwent several revisions, first through efforts to enhance the functional roles of the satellite towns, and later by creating new cities to address the dysfunctions caused by the monocentric structure of the Constantine agglomeration.

However, the uneven distribution of social and economic facilities across the agglomeration perpetuated the daily commuter flows from satellite towns to the historic centre of Constantine. The range and quality of services available in the centre, encompassing commerce, cultural amenities, health care and universities, justified its dominance and attraction. As a result, the convergence phenomenon persisted even after the population shift to the satellites, further exacerbating the monocentric dominance of an already overburdened city.

Within a relatively small area, the city centre housed a significant concentration of commercial establishments, with a density of 46.8 shops per hectare, far exceeding the agglomeration's average of 4.22 shops per hectare. This imbalance highlighted the centre's overwhelming centrality and the challenges of decentralisation in practice.

2.1.1. New urban housing Zones (ZHUN)

The failure of the 'large housing estates' policy, in both urbanistic and functional respects, led the state, through Ministerial Circular No 335 of 19 February 1975, to introduce a new urbanisation procedure. This procedure established New Urban Housing Zones (ZHUN), and was based on the principle of integrating newly created urban areas with existing ones. The objective was twofold: to maximise the use of existing infrastructure and facilities, while providing new equipment and services to benefit residents of older neighbourhoods. The emphasis was placed on creating accompanying and proximity-based facilities.

Unfortunately, unfavourable economic conditions and the acute housing crisis forced local authorities to prioritise the construction of housing and essential educational facilities at the expense of complementary infrastructure. As a result, the newly created neighbourhoods were transformed into veritable dormitory suburbs.

Over the years, efforts to enhance the urban and functional aspects of ZHUNs were initiated to improve the living environment for residents. These efforts capitalised on the enactment of Law No 90-29 in 1990, concerning planning and urban development. The Land Use Plan (POS), a new urban production and spatial organisation tool, was introduced to guide state interventions and programmes, aligning them with the broader development strategies outlined in the 'urban development plan'.

Under this new framework, several operations aimed at requalifying and restructuring ZHUNs were launched across the Constantine agglomeration.

2.1.2. Housing developments (subdivision)

Initially, before the creation of the Provincial Land Agency (PLA) in 1986, housing developments were not a significant housing production tool. The government would only sporadically release a few hundred plots for self-build, but the supply was always less than the demand. Following the establishment of land agencies, housing production through developments saw a steady rise. The land agency allocated vast areas across the agglomeration (around 13,000 lots from the agency, and 30,680 lots from the PDAU) (Benidir, 2007).

By the 1990s, the government began to acknowledge the urban crisis it was facing and the challenges of managing the housing sector alone. This realisation was reflected in a series of laws and ordinances that opened the field of urban development to other state and private actors.

The establishment of the Provincial Land Agency (PLA) for urban land management and regulation introduced a new dynamic in urbanisation, resulting in the rapid expansion of Constantine's urban area. Housing developments became an essential tool in the housing sector because they helped alleviate social pressures stemming from high housing demand, offering various social classes the opportunity to build their homes without the lengthy procedures associated with acquiring collective housing. However, this housing production method contributed to urban fragmentation and the encroachment on highly fertile agricultural lands. It also opened the door to speculation and rising land prices.

Whether planned or illegal, public or private, housing developments in Algeria have always served not only a residential purpose but also an economic one. In many of these developments, especially those occupied by middle-class residents, homeowners transformed their ground floors into commercial spaces, such as mini-markets, medical offices, event halls, private schools and storage facilities. These commercial activities either provided employment for the owners or a secondary income to help complete their homes.

Over time, these commercial practices proliferated, and housing developments became hotspots for informal traders. They soon began to function like activity zones, offering various advantages (low rent, strategic location, large customer base). The high commercial density, specialisation and accessibility transformed these urban entities into commercial hubs.

Housing developments in Constantine have specialised in nearly all commercial sectors: food products, clothing, construction materials, home goods, etc. Notable examples include Oued El Hed for food and spare parts, ONAMA for home goods, Djebli Ahmed (Kantouli) for appliances, Hamma for carpentry, and the Khroub area for construction materials. Commercial activity in these developments is almost anarchic, chan-

ging with economic shifts. Without principles or strategic planning, these areas can disrupt the overall urban dynamic of the agglomeration. They require support and regulation in line with Constantine's metropolitan development strategies.

2.1.3. New Towns: a concrete step towards polycentricity in the Constantine agglomeration

The saturation of Constantine, the scarcity of developable land, and the instability of available urban land prompted a shift towards the first wave of growth displacement. The satellite cities of Khroub, Hamma Bouziane, Didouche Mourad and Ain Smara became the target areas for new housing projects. Initially, Khroub bore the brunt of Constantine's growth, leading to its saturation. Over time, intense and accelerated urbanisation reached all the satellite cities, consuming the land reserves of all four municipalities.

In response to this alarming situation, characterised by a lack of developable land and the irrational consumption of fertile agricultural land, local authorities initiated a second phase of growth displacement. This coincided with the launch of a major national housing programme. Given its size and status as a metropolis, Constantine was allocated a significant portion of this housing programme, resulting in the creation of two new towns:

- Massinissa new town in Khroub, which is attached to the existing urban fabric of the city, covering an area of 445 hectares.
- Ali Mendjeli new town in Ain El Bey, located in the triangle between the municipalities of Constantine, Ain Smara and Khroub, spanning an area of 1,500 hectares. It continues to accommodate the growth of the entire province to this day.

The population migration and growth transfer to these new peripheral centres have greatly contributed to their rapid development. They have quickly achieved the status of strong centres, now playing a full role in the urban dynamic of the Constantine agglomeration.

2.2. Residential mobility in favour of suburban cities of the metropolitan area

The strategy of exploiting the land potential of the old village cores dating back to the French colonial era, through the creation of satellite towns, generated an intense migratory movement that, over the years, has significantly disrupted rural lifestyles and the spatial structure of the suburbs of Constantine, establishing a remarkable urban dynamic through the launch of large housing programmes.

Apart from the new town, the demographic growth of emerging peripheral centres began in the 1970s, with population sizes ranging between 5,000 and 20,000 inhabitants. During the first decade (1977–1987), the towns of El Khroub, Hamma and Smara recorded the highest growth rates of 7%, 5% and 8% respectively, adding 25,000, 15,000 and 8,000 inhabitants to their existing populations. In the second decade (1987–1998), the city of Didouche also experienced a high growth rate of 6%, with an increase of 17,000 inhabitants. However, in the last decade (1998–2008), with the creation of the new town of Ali Mendjeli, the growth rates of satellite towns began to stabilise due to the saturation of available land, particularly in El Khroub and Didouche, where the average growth rate declined to 2.5%.

The results of the last four population and housing censuses (RGPG 1977–1987–1998–2008) revealed significant residential mobility towards the satellite towns, as reflected in a migration balance that reached an average of 3.5% between 1987 and 2008. A total of 42% of the population in the satellite towns came from outside, mainly from the city of Constantine, which recorded a negative migration balance of -2.5% during the same period. As a result, the population of the satellite towns showed an upward trend, increasing from 116,439 to 348,255 inhabitants. In parallel, the population of Constantine itself decreased significantly in 2008 (438,164 inhabitants), after reaching 481,947 in 1998.

Table 1: The demographic growth and residential migration of the population of the Constantine metropolitan area.

Cities of the metropolis	Municipal population			Growth rate (%)		Net migration (%)	
	1987	1998	2008	87–98	98–08	87–98	98–08
Constantine	447807	481947	438164	0,67	-0,95	-1,48	-2,67
El Khroub	49581	89920	177560	5,56	7,04	3,41	5,32
Hamma B	36656	58307	84250	4,31	3,75	2,16	2,03
Didouche M	16547	33266	48500	6,55	3,84	4,4	1,23
Ain Smara	13655	24426	37945	5,43	4,50	3,28	2,76
Edges cities	116439	205919	348255	5,32	5,40	3,17	3,63

Source: National Statistical Office (ONS) results of general population and housing censuses (RGPH).

During this process of suburban urbanisation, urban development disparities emerged between the northern and southern parts of the metropolitan area of Constantine. The southern suburbs, due to the availability of developable land and the establishment of the new town of Ali Mendjeli, absorbed the majority of the development projects planned for the Constantine province. Demographic statistics from 2008 confirm that 70% of the population in the metropolitan area's suburban ring is concentrated in the south (ONS 2008), which is somewhat contradictory to the polycentric and balanced development policy for the metropolitan area.

2.3. The development of commercial activity and services in the suburbs of the metropolitan area

The continuous population growth in the suburbs has led to a remarkable commercial dynamic over time, largely driven by private actors. Similarly, infrastructure and administrative service programmes have been initiated by the state to meet the needs of the rapidly growing population. Using data from the 2011 economic census, we were able to map the commercial and service centralities through the global centrality index ($Cgi = di/du$), which examines the ratio between the density of services or businesses in a specific neighborhood (di) and their average density across the entire metropolitan area (du).

The gradient of commercial concentration between districts varies according to population density distribution, neighbourhood dynamics, and vibrancy, as commercial presence is entirely dependent on its viability, ensured by customer demand. The most dense areas are generally city centres and high-density neighbourhoods intersected by major traffic flows, whether vehicular or pedestrian. On the map, the concentration adopts a polar pattern, with only a few districts in the urban agglomeration standing out.

The spatial configuration of commercial activities remains dominated by the city of Constantine, which concentrates the majority of businesses. The highest commercial global centrality index is recorded in the Sidi Rached urban sector, which represents the central core of the city (index value = 230). The gap with other centres is significant, being five times higher than that of El Khroub, the strongest centre after Constantine. Within El Khroub, two central districts stand out, Boulevard El Emir Abdelkader (index = 33), and Boulevard 1600 (index = 41).

Beyond the main city centre, whose centrality is clearly established and indisputable (due to its history, architecture, monuments, urban functions, public spaces, etc), new centralities have emerged in the suburbs of the metropolitan area. The redistribution of centrality attributes (commerce, facilities, services) in favour of the suburbs has taken on both a multi-polar and a concentrated form. The first form is multi-functional, developing in the central neighbourhoods of suburban cities (typically the old village cores). The second form is mono-functional, emerging in some residential developments along major roads, taking the form of activity hubs.

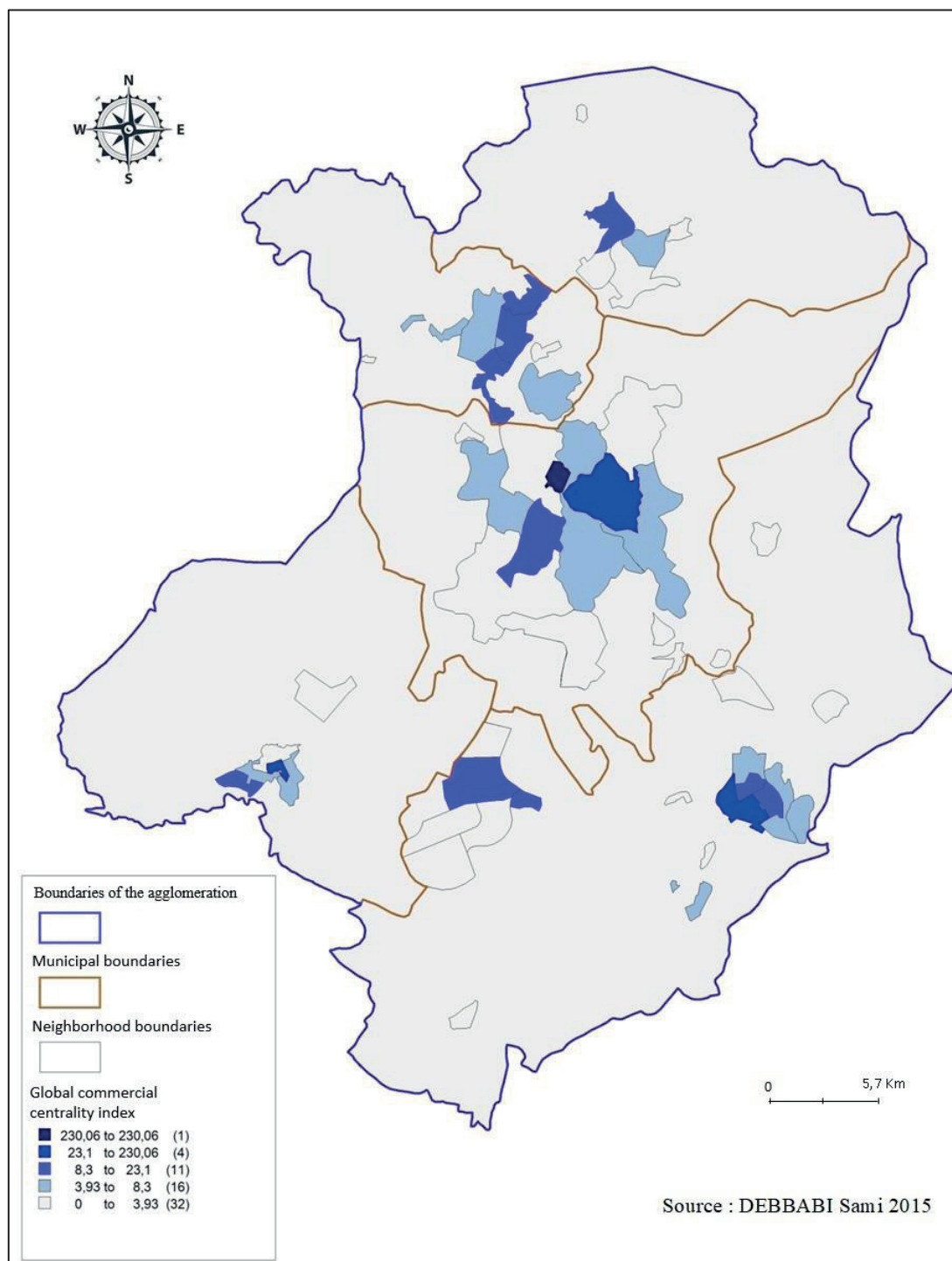


Figure 2. A map of the centrality of public services in the Constantine metropolitan area

Source: Debbabi Sami (2015); map produced from the district mapping of the ONS (2008), and the interpretation of data from the economic census.

When it comes to commercial activity, driven largely by private actors, the concentration is heavily influenced by population density and traffic flows. The densest areas are generally the city centres and neighbourhoods crossed by major flows of vehicles or people. The concentration gradient on the map is clearly visible, with only a few neighbourhoods in the metropolitan area performing this function. In contrast to commercial activity, services and facilities are distributed more evenly, for reasons related to equity and the smooth functioning of the area, as well as the implementation of strategic guidelines for polycentric development in the metropolitan area.

This development of commercial activity and services in suburban cities, while not diminishing the polarising role of the main city centre, has changed its dimensions by introducing new competing centrality hubs in the suburbs. These new centres are likely to influence residents' practices and social behaviour. Constantine city centre is no longer confined to the historic downtown; it is no longer singular and unifying, but has instead become plural and multi-faceted. The role of central spaces is not completely questioned in the case of the Constantine metropolitan area, as these spaces are still characterised by high levels of concentration compared to surrounding areas.

2.4. Resident practices and spatial attractiveness of cities in the metropolitan area

The effect of the polycentric development strategy in the metropolitan area of Constantine is also evident in societal practices. In addition to large-scale inter-urban residential migrations, the basic daily activities of work, shopping and leisure have changed significantly. The disassociation of these historically inseparable activities is the most visible characteristic. The results of the survey revealed increasingly complex new realities relating to the daily lives of residents, which will be addressed in the following paragraphs.

Pendular movements related to work are the first social behaviour affected by the spatial reconfiguration of the metropolitan area. The results of the survey conducted among the population of the metropolis indicate that half the surveyed population works outside their town of residence, leading to intense inter-urban commuting within the metropolitan area. Each city in the metropolitan area has developed its own job market, gaining a certain degree of autonomy from the main city centre, while still maintaining aspects of interdependence and complementarity. Work, considered to be the main driver of travel, leads to only short-distance movements within the metropolitan area, as the employment zones in the northern and southern parts of the area are relatively independent and separated.

More broadly, the daily lives of the residents of the metropolitan area have transcended the usual boundaries of cities, incorporating larger territories that, in most cases, involve two or even three towns simultaneously. The origin-destination matrix of daily commutes within the metropolitan area indicates that 'inter-city' movements are dominant (57%). This interdependence is especially evident between the cities of Constantine, Ali Mendjeli, Khroub and Hamma, which are respectively the most visited cities in the metropolitan area, with flow rates from external areas varying between 48% and 78%. The geographically peripheral positioning of the towns of Didouche Mourad and Ain Smara has made them less accessible, and consequently less attractive to the population of Constantine. The movements of the population of Constantine, except for obligatory trips, primarily occur toward the closest and most attractive centres, namely Constantine, Ali Mendjeli, and to a lesser extent Khroub. These flows are what truly define the dynamics and organisation of centrality within the metropolitan area of Constantine, and provide reliable indicators of the effects of political choices.

2.4.1. The catchment area of the agglomeration centres for services and commerce

The principle is to identify the origins of consumers for each centre based on predefined goods and services. To achieve this, we cross-referenced the questions 'place of residence' and 'frequented centres' for each sector of activity. The results enabled us to define the areas of influence (radius of attraction) of each centre.

The analysis of the centers' areas of influence reveals a remarkable nesting within gravitational fields. Each sector of activity shapes distinct gravitational fields due to the specific characteristics and specialisations observed in each centre.

Table 3: Characteristics of the catchment areas of the agglomeration's towns

Services	Cities	Visits			Catchment area		
		High	Medium	Low	Major	Intermediate	Local
Administrative	Constantine	■			■		
	Khroub		■		■		
	Ali Mendjeli		■				■
	Hamma. B			■			■
	Didouche. M			■			■
	Ain Smara		■				■
Healthcare	Constantine	■			■		
	Khroub		■			■	
	Ali Mendjeli		■				■
	Hamma. B			■			■
	Didouche. M			■			■
	Ain Smara		■				■
Commerce	Constantine	■			■		
	Khroub		■		■		
	Ali Mendjeli	■			■		
	Hamma. B		■			■	
	Didouche. M			■			■
	Ain Smara		■				■

Source: The author, questionnaire survey 2015.

For example, when it comes to administrative or financial services, the population of the Constantine agglomeration meets a significant portion of its needs within its own town of residence. On average, 45% of the needs of peripheral municipalities are met locally, while 38% are satisfied at the level of the Constantine city centre, whose catchment area extends across the entire agglomeration. Around 70% of its clientele comes from peripheral towns.

Commerce thrives in almost all the cities of the agglomeration. On average, 60% of the population sources these types of products from outside their town of residence, even when their own town has a good supply capacity. For example, in Constantine, only 40% of respondents visit the city centre to purchase household equipment, while 18% go to Khroub, 14% to Ali Mendjeli, and 15% to Hamma. Regarding the extent of the centres' catchment areas, it is observed that Constantine, Khroub, Hamma and Ali Mendjeli attract customers from across the entire agglomeration, with external visitation rates of 75%, 72%, 58% and 44%, respectively.

An analysis of the results of the questionnaire survey on commuting for various functional purposes confirms the involvement of all the studied cities in the urban functioning of the metropolitan area. Specialisation and the tendency to cluster activities are the most visible characteristics in the formation of new centralities. The historical city centre no longer dominates the attraction of flows alone; the emerging new centralities have managed to capture a significant portion of the clientele. They have even managed to dominate the attraction of flows in certain sectors such as furniture, building materials and home appliances. Tracking the geographical origins of consumers for each type of service confirms the organising role and the density of functional relationships maintained by the new centralities with the population throughout the metropolitan area of Constantine. The influence of the main city centre, with its centrality attributes, historical significance and geographical position, has not significantly impacted the prosperity of the new centralities, which have benefited from residential migrations and favourable accessibility conditions.

Conclusion

This paper falls within the field of study concerning the policies of restructuring and recomposing weakened and struggling territories. Using a centrality approach, and through indicators of concentration, mobility and attractiveness, the paper examines the impact of successive development strategies on the spatial organisation and functioning of the metropolitan area of Constantine in northeast Algeria.

The research has highlighted the influence of urban form on residents' practices in the metropolitan area of Constantine. The evolution from a monocentric model to an attempted polycentric structure has profoundly reshaped residential, economic and mobility dynamics. Our results show that the policy of creating satellite cities and new urban centres, while alleviating congestion in the historic core, has not entirely diminished its dominant attractiveness. Indeed, Constantine still attracts 70% of administrative service users, and maintains a commercial density five times higher than that of the second-largest centre, El Khroub.

The study of migration and mobility flows also revealed an intensification of commuting between peripheral centres and the city centre. Between 1987 and 2008, the net migration rate of satellite towns averaged +3.5%, whereas Constantine recorded a negative balance of -2.5%. These migrations contributed to the functional specialisation of the peripheries, notably with the emergence of commercial and service hubs in Ali Mendjeli and El Khroub, influencing residents' practices and metropolitan organisation.

However, despite these transformations, spatial disparities persist. The southern part of the metropolitan area, which is more attractive due to the availability of land, has absorbed 70% of the new residents, leading to rapid but unbalanced urban expansion compared to the north. Moreover, the new centralities have captured a significant share of urban flows, particularly in the commercial and household equipment sectors, confirming a gradual shift in the urban model.

These findings highlight the need for more balanced planning, incorporating not only density and functional diversity, but also better coordination between urban planning and transport. Adopting strategies tailored to local dynamics could foster more inclusive urban development, and mitigate the adverse effects of spatial fragmentation. In the long run, an interdisciplinary approach, combining flow analysis, spatial planning and land regulation, could offer sustainable solutions to contemporary urbanisation challenges.

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MIESTO PLĖTROS, KURIANT ERDVINIO MIESTO ORGANIZAVIMO, FUNKCIONAVIMO IR GYVENTOJŲ PATIRČIŲ STRATEGIJAS, POVEIKIS: KONSTANTINOS METROPOLIJOS ATVEJIS

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Santrauka

Šiame straipsnyje nagrinėjamas urbanizacijos strategijų poveikis Konstantinos metropolijos erdvinei organizacijai ir urbanistinei veiklai, pabrėžiant naujų teritorijų panaudojimo tendencijas ir to pasekmes gyventojams. Mes susitelkėme ties: miesto plėtros aiškinamosiomis teorijomis ir naujomis *centriškumo* sąvokos reikšmėmis šiuolaikinėse visuomenėse; strateginių sprendimų, kurie lėmė dabartinį Konstantinos regiono žemės naudojimo būdą ir funkcionavimą, logika; retrospektyvia miesto struktūros evoliucijos analize ir pagrindinių Konstantinos miesto centrinių elementų išdėstymu; daugiacentrės plėtros strategijos poveikiu Konstantinos aglomeracijos žemės naudojimo modeliams ir gyventojams.

Taikomas požiūris pagrįstas centriškumu, apimant koncentracijos, mobilumo, prieinamumo ir patrauklumo rodiklius. Pokyčiai analizuoti remiantis socioekonominė statistika ir lauko tyrimais, tokiais kaip stebėjimai, skaičiavimai, interviu su gyventojais. Iš pradžių atliktas kartografinis ir analitinis reiškinių tyrimas, remiantis įvairiais duomenimis, pvz., bendrojo gyventojų surašymo. Tyrimo tikslas – nustatyti naujas gyventojų tankio ir ekonominės veiklos pasiskirstymo teritorijoje tendencijas bei patikrinti hipotezę dėl demografinio ir ekonominio poslinkio periferinių teritorijų link. Vėliau analizuoti tarp miestiniais gyventojų mobilumo srautai, siekiant nustatyti, ar šiuos pokyčius lydi gyventojų ir veiklų erdvinis persiskirstymas. Vykdam šią tyrimo dalį pasitelkti lauko tyrimai mobilumo srautams skaičiuoti ir prieinamumo tarp centrų skirtumams ne piko ir piko valandomis matuoti. Galiausiai atlikta anketinė aglomeracijos gyventojų apklausa, siekiant įvertinti gyventojų patirtis, nustatyti centrų gravitacines zonas bei suprasti paskirų miesto rajonų tarpusavio priklausomybes, kurios formuojasi tarp miestų aglomeracijos viduje.

Masinis gyventojų perkėlimas į priemiesčius metropolijos zonoje, vykdam intensyvią gyventojų migraciją, lėmė reikšmingą centriškumo išskaidymą. Tai iš pradžių paveikė komercinę veiklą, daugiausia skatinamą privačiojo sektoriaus, vėliau valstybės iniciatyva – infrastruktūros ir administracinių paslaugų plėtrą. Tad gyventojų kasdienis gyvenimas, tradiciškai susitelkęs mažesnėse urbanistinėse teritorijose, prasiplėtė. Ilgalaikis mobilumas tapo viena pagrindinių naujo Konstantinos teritorijos urbanistinio funkcionavimo ypatybių.

Konstantinos metropolijos zonos transformavimo į bendrą plėtros teritoriją, laikantis policentrinių teritorijų principo, strategija visų norimų rezultatų nepasiekė. Vietos valdžios institucijos nepaisė tam tikrų svarbių aspektų, prie kurių reikėtų grįžti ateityje ir užbaigti nebaigtus darbus. Vienas minėtų aspektų – transporto sektoriaus ir kelių infrastruktūros plėtra, kuriai artimiausioje ateityje turėtų būti teikiama prioritetinga svarba. Esamą transporto politiką, kuri laikoma pernelyg linijine, būtina koreguoti, siekiant užtikrinti tikslingą visų Konstantinos teritorijos vienetų plėtrą. Tad pagrindinė spręstina problema – būtinybė sutelkti įvairių sprendimus priimančių ir suinteresuotųjų šalių skirtingais teritoriniais lygmenimis politinę valią.

PAGRINDINIAI ŽODŽIAI: *plėtros strategijos, gyventojų patirtys, erdvinis organizavimas, miesto funkcionavimas, miesto plėtros politika.*

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