Revue d'Histoire Méditerranéenne. Vol.07 , n° 2. Décembre2025, p. 292-306

P-ISSN: 2716-764X, E-ISSN: 2716-7747

Reçu le : 21- 07- 2025	Accepté le : 05 – 12 - 2025	Publié le : 28- 12- 2025

The morpho-structural and functional effects of Constantine's historical urban restructuring, from the Ottoman era to the contemporary period.

Les effets morpho-structurels et fonctionnels de la restructuration urbaine historique de la ville de Constantine, de l'époque ottomane à la période contemporaine.

DEBBABI Sami
Centre de Recherche en Aménagement du Territoire (CRAT), Constantine, Algérie.
sami.debbabi@crat.dz

Abstract:

The current urban form of the city of Constantine is the result of a long historical transformation process, evolving from the dense and compact medina with clearly defined boundaries to a vast metropolitan area composed of multiple centers. The city has gradually been shaped by interventions carried out during the Ottoman period, the colonial era, and more recently by political decisions adopted by the Algerian state, materialized from the early years of independence through extensive housing projects that generated rapid population growth. Successive reconfigurations have profoundly disrupted the historic spatial order, leading to extensive urban expansions and ultimately to the gradual relocation of populations and activities towards new growth poles. This long and gradual development has deeply transformed the city's morphology, structure, and centrality system.

This paper provides a diachronic analysis of Constantine's urban evolution from the Ottoman era to recent years. It aims to illustrate the effects of morpho-structural transformation resulting from various construction and demolition operations that the city and its center have experienced, and how these interventions have influenced the city's growth model and current functioning, as well as that of its metropolitan area. The central research question addressed is: How have the successive historical morphological reconfigurations of the city of Constantine transformed its urban structure and redefined its centrality system?

It aims to identify the morphological and political processes that have shaped this urban restructuring and to assess the extent of the relocation of central activities towards emerging peripheral centers and their impacts on population practices. The adopted approach is based on the concepts of center and centrality, examining the central attributes of the city's centrality system through field observations, historical readings from various research works, and surveys capturing recent changes in individual practices influenced by the city's morphological transformation. A questionnaire survey, conducted among 384 residents between 2015 and 2016, collected data on daily mobility practices.

The findings clearly demonstrate that Constantine's structural transition is the outcome of a process deeply rooted in history. Successive urban policies have had clear and evident effects on the city's development model, in the absence of controlled planning. The findings highlight the gradual relocation of populations to emerging centers, accompanied by extensive decentralization of activities and services, particularly towards the new town of Ali Mendjeli, which remains a powerful center. The study also shows that the historic center is still the main functional reference for the metropolitan area, even with these changes. The study ultimately suggests that local policymakers facilitate this polycentric transformation by creating a network of cities founded on complementarity rather than competition.

Keywords: Centrality, Urban restructuring, Urban functioning, polycentric area.

Résumé :

La forme urbaine actuelle de la ville de Constantine est le résultat d'un long processus de transformation historique. De la Médina dense et compacte avec des limites bien définies vers une vaste aire métropolitaine. La ville est donc peu à peu façonnée par les interventions menées au cours de la période ottomane, coloniales et récemment par les vastes programmes de logement générant une forte croissance démographique. Les reconfigurations successives ont largement bouleversé l'ordre spatial, entraînant de vastes extensions urbaines qui ont conduit au final au déplacement progressif des populations et des activités vers de nouveaux centers. Ce développement progressif a profondément transformé la structure de la ville et de son système de centralité.

Cet article propose une analyse diachronique de l'évolution urbaine de la ville de Constantine depuis l'époque ottomane jusqu'à ces dernières années. Il vise à illustrer les effets de la recomposition morpho-structurelle résultant des différentes opérations de destruction et de construction que la ville et son centre ont connues, et la manière dont celles-ci ont influencé le modèle de croissance et le fonctionnement actuel de la ville et de son aire métropolitaine, en s'interrogeant sur Comment la succession des reconfigurations morphologiques historiques de la ville de Constantine ont transformé sa structure urbaine et ont redéfini son système de centralité ?

L'objectif est d'illustrer les processus morphologiques et politiques qui ont façonné cette recomposition urbaine et à saisir l'ampleur de la délocalisation des activités à caractère central vers les centers émergeants dans la périphérie sur les pratiques des populations. L'approche adoptée repose sur les concepts de centre et de la centralité, en examinant les attributs centraux du système de centralité de la ville, à partir d'observations de terrain et de lectures historiques issues de divers travaux de recherche, ainsi que d'enquêtes de terrain permettant de saisir les évolutions récentes des pratiques individuelles influencées par la transformation morphologique de la ville. Une enquête par questionnaire, menée auprès de 384 habitants est menée entre 2015 et 2016 permettant de récolter des données sur les pratiques quotidiennes de mobilité.

Les résultats obtenus confirment que la transition structurelle de Constantine est le résultat d'un processus qui trouve racines dans l'histoire profonde. Les politiques urbaines successives ont eu des effets clairs et évidents sur le modèle de développement urbain de la ville, en l'absence d'une planification maîtrisée. Les résultats mettent en évidence le déplacement progressif des populations vers les nouveaux centers émergents, accompagné par une vaste délocalisation des activités et des services, en particulier vers la ville nouvelle Ali Mendjeli qui demeure un centre puissant. L'étude confirme que malgré ces changements, le centre historique reste le principal référent fonctionnel de l'aire métropolitaine. Au final l'étude propose aux décideurs locaux des mesure correctif, par la mise en place d'un réseau de ville basé sur la complémentarité des centers plutôt que la concurrence.

Mots-clés : Centralité, restructuration urbaine, fonctionnement urbain, espace polycentrique.

Debbabi Sami, sami.debbabi@crat.dz

Introduction:

The historical development of Constantine has transformed its urban structure and operation through time. The city evolved from a small centralized design to a large metropolitan area, which includes multiple new outer urban settlements. (Debbabi, 2021: 51). Most of research conducted on the city's urban structure has largely limited to a morphological description of its structural shifts, overlooking the spatial logics and urban policies that have driven the reconfiguration of its centrality system. Understanding how and why the city of Constantine has transitioned from a monocentric model to a polycentric system makes it possible not only to retrace its urban evolution, but also to shed light on the impact of political decisions and the current and future challenges of urban planning and governance not only for Constantine but also for all Algerian cities that have adopted the same model of urban development.

The city of Constantine is shaped by a long, rich, and complex urban history. The city maintained its Medina-based spatial arrangement until French colonizers arrived. The urban center of the city received its characteristics from religious institutions and economic and political activities (Boudjabi, 2005: 19). The colonial period introduced new forms of centrality through abrupt interventions in the street network and the built environment (Pagand, 1994: 288). The

construction and demolition operations carried out during this period profoundly altered its morphology and largely influenced its future development. Post-independence urbanization gave rise to satellite towns and increasingly distant peripheral areas that remained functionally dependent on the historic center (Marouk, 2010). The establishment of new urban centers resulted in population movement toward outer areas which caused activities to shift toward peripheral locations. This urban phenomenon is known in major cities worldwide. It results in multiple central points which create polycentric urban areas (Chalas, 2010: 29).

Reflections on the city have always been abundant. Since the 1820s, theorists and researchers trying to understand the mechanisms and principles that guide the evolution of cities, making several theories and models to explain the different forms and aspects of urban growth. In the 1990s, urban research have addressed the transition from monocentric spatial organization models to polycentric organization (Rallet & Torre, 2008). The urban growth of contemporary cities took on new forms and dimensions compared to the traditional growth models favored the emergence of large metropolitan area. (Salvati et al., 2018). The research on urban centrality has developed through time by implementing new methods which study human and economic movement patterns. The combination of topological indicators with flow-based measures generates reliable assessments of urban functioning (Derudder et al., 2021). The combination of human movement data from people with flow measurements allows researchers to identify polycentric city structures according to Cabrera-Arnau et al. (2023). The analysis of morphological city structures does not show central hierarchy patterns which flow variability successfully detects.

The X-index together with other flow-based metrics enable researchers to identify major metropolitan centers through statistical methods (Wang et al., 2023). The Flow-based methods demonstrate their highest value for Southern cities because they enable researchers to study population movements across their urban areas (Yin et al., 2025). The research demonstrated that polycentric development brings multiple benefits because it reduces traffic congestion in central areas and delivers improved accessibility to various locations and equal territorial growth. The management of large metropolitan areas faces two major challenges because their weak governance systems require substantial funding to connect their separate urban centers (Wang & Liu, 2025; Xue et al., 2025).

The research on post-independence urban development in Algeria has concentrated on how spontaneous growth exceeded the historic center's capacity to establish new peripheral centralities (Saidi et al., 2023)(Ahcène & Mouhieddine, 2020). Multiple academic studies about Constantine (Benabbas, 2010; Benidir, 2007; Boudjabi et al., 2018;Fezzai, 2024) have investigated this topic through historical research which proves the medina continues to function as a vital part of urban operations.They mainly address the creation of the "Coudiat Aty", which introduced a strong administrative function. The new town of Ali Mendjeli has become the main subject of research as an emerging center, with studies describing its genesis and its growing role as an economic pole. More recent data indicate that the city of Ali Mendjeli is increasingly functioning as an economic, administrative, and residential pole capable of competing with certain functions of Constantine's historic center (Debbabi, 2025).

Existing studies cover a large part of the question of the restructuring of centrality within contemporary cities. They generally rely on quantitative and qualitative indicators to measure structural shifts. This literature review highlights a lack of diachronic comparison linking the history of urban planning to the formation of current emerging centralities. The present paper aims to fill this gap, it provides a retrospective interpretation of the historical process of urban restructurings that have affected the city of Constantine, focusing on the period from the Ottoman era to the present day. It is based on a historical and morphological analytical approach to the transformations, drawing on demographic and economic statistics as well as data collected in the

field on inhabitants' practices, with the aim of understanding the mechanisms and logics that have shaped the contemporary city of Constantine.

The main question addressed in this paper is: How have the successive historical morphological reconfigurations of the city of Constantine transformed its urban structure and redefined its centrality system?

Building on this main question, the paper also seeks to identify the logics and political decisions that have driven this reconfiguration, to grasp its form, and to assess the extent of the relocation of central functions towards the periphery. It further discusses the specificity of the polycentric model that today characterizes the metropolitan area of Constantine in comparison with international references. From this perspective, the study hypothesizes that Constantine's evolution towards a polycentric model is not the result of a controlled planning process, but rather of a succession of political and historical reconfiguration that have gradually shifted central functions towards the peripheries, leading to a redefinition of urban hierarchies and the centrality system.

The research uses a mixed-methods approach which combines historical analyses with morphological observations and demographic and economic statistics and field survey data. The research aims to study how political and economic factors influence the development of the centrality system through historical analysis. The research framework for this study consists of the following sequential steps:

- **First phase:** Data were collected from primary and secondary sources, including historical plans (Master plans), colonial archives (Staff maps), historical texts, and published research, to reconstruct the major phases of urban evolution, which brought significant changes to the city's morphology. This stage was reinforced by detailed examinations of the different urban structures composing the city, based on the collected maps, to justify and understand the logics underlying urban development.

- **Second phase:** In this phase, the researcher used a questionnaire survey to collect data from people who live in different neighborhoods and peripheral centers throughout the metropolitan area. The research adopts a random sampling technique to distribute the questionnaire to 384 participants who represented all of the Constantine metropolitan areas. Thus, following such research design, the researcher is to study people's daily activities and their movement patterns to understand present-day centrality effects on social behaviors and validate previous study findings.

- **Third phase:** A cross-analysis of the results from these two phases was carried out (historical readings and recent collected data) to confirm and explain the relationship between the city's historical evolution and its current urban functioning. The analyses combine qualitative approaches (description and interpretation of urban forms) and quantitative measures (population and activity densities, mobility indices, and the distribution of central functions).

1. Conceptual framework

Centrality refers to the functional weight of an urban center that is, the variety, intensity and hierarchical importance of the activities it concentrates. These functions shape both the rank of the center within the urban system and its capacity to generate social and economic interactions (Chaline, 1990: 139). The distinction between *center* and *centrality* lies in the shift from a physical location to a functional notion (Lebrun, 2002: 23).

Polycentrism refers to the plurality of urban centers, it is manifested by the emergence of new urban centralities around which social and functional ties develop (Bouzouina, 2008: 4). Theoretically, polycentrism is seen as an opportunity for equitable, and sustainable urban development. It can reduce disparities and spatial and social segregation (Aguilera, 2006: 2). The emergence of secondary centralities brings peripheral populations closer to jobs and services, and helps to minimize the daily commuting movements of individuals (Richardson, 1988: 9).

Today, there is a lively debate between two schools of thought: those who advocate for a monocentric city, and those who view it as multipolar, structured around multiple centers, where the traditional hierarchy and pyramidal organization from the main center to the periphery are no longer relevant.

2. Centrality within the Historical Medina of Constantine

The Medina is an essential component in studying the organization of cities in the Arab world in general, and North African cities in particular, as it was the gathering place for the main economic activities. The place of this historical entity now representing only a small part of metropolitan area remains undeniable in social dynamics and urban functioning (Signoles, 2001: 9). The Medina of Constantine was characterized by a fortified enclosure (figure 1). This wall defined the physical limits of the Medina, serving as a defense and preventing any foreign penetration; access was only possible through gates (Boudjabi, 2005:19).

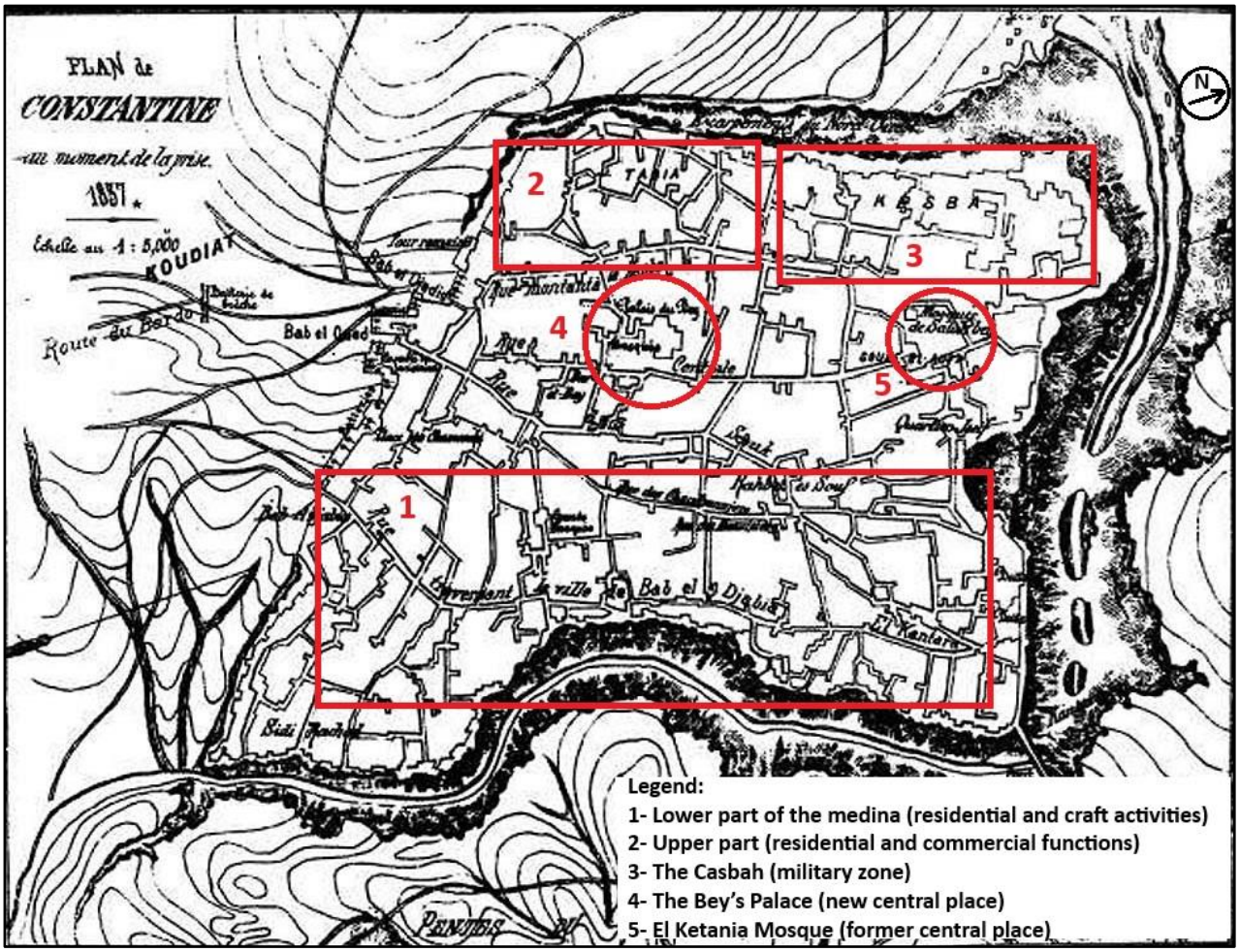
The urban structure of medinas is radial and concentric, with its components organized in a strict and hierarchical manner. From the center to the periphery, activities and facilities are arranged according to a well-defined order of importance: major commercial activities and religious establishments at the core, residential neighborhoods further out, and secondary and artisanal activities on the city's outskirts (Raymond, 1985: 179). Significant transformations it underwent during the colonial era, including the destruction of a large part of its old fabric, which was replaced by wide avenues allowing vehicular access, and the introduction of new European-style facilities (banks, town hall, casinos, theatre, cinema, etc.).These transformations allowed the medina to strengthen its centrality and continue to serve as the city's sole and main center during the early years of colonial occupation, before the construction of a new European center outside the rock on the 'Coudiat-Aty' hill (Benidir, 2007: 103)

Like all Arab medinas, the functioning of the Constantine medina was based on the trilogy of "religion - economy - politics," which formed the key elements of centrality. "A close reading of plans of North African medinas proves that the idea of religious and commercial centrality is generally confirmed in the adjacent or even overlapping construction of mosques and souks in most Islamic cities"(Oueslati-Hammami, 2010: 105).

- **Religious Centrality**

Religious centrality was embodied by the mosque, surrounded by a network of educational and social institutions "madrasas, zawiyas" (Oueslati-Hammami, 2010: 103). The mosque played a fundamental role in organizing urban space and daily life. Unlike cathedrals in the Western world, mosques served as a regulator of life and a symbol of the city's identity (Khenoucha, 2010: 18). "There were 90 Quranic schools associated with 60 mosques, welcoming 1,350 students and serving educational functions from preschool to higher levels. For university-level education, seven madrasas, accommodating 900 students, took over" (Benidir, 2007: 50).

Figure 1:
Map of the city in 1837: the structuring of centrality.



source : (Mercier, 1896)

- **Economic Centrality**

The city's economic influence extended far beyond its political reach, integrating territories in the province that would otherwise have been quite foreign to it. The centralization of economic power in the capital is further confirmed by the road network. While transversal networks certainly existed, the main network radiated towards Constantine (Pagand, 1995: 2).

The economic activity of the Medina was structured around the souks, generally named after the trade they hosted. The functional specialization and spatial separation of economic activities were clear characteristics of the medina's economic organization, with a strict and rigorous hierarchy based on the nature and importance of the activity. (Oueslati-Hammami, 2010: 104). Fondouks, " hotel" was part of the economic centrality of medinas. These are square buildings shaped like cloisters containing rooms, stores, and shops for merchants. They served multiple functions, acting as lodgings for visitors and foreign merchants, sales points or warehouses for goods and artisanal products, similar to today's wholesale markets, and places of transactions (Sennoune, 2004 : 453).

- **Administrative Centrality**

Although less visible, administrative centrality was embodied by the Bey's palace, the seat of local power and a symbol of Ottoman governance. Its successive relocations particularly under Hadj

Ahmed Bey in 1826, indicate a deliberate attempt to spatially refocus authority, anticipating forthcoming structural transformations (Boufenara, 2008: 97).

In 1826, with the accession of Hadj Ahmed Bey to power, the center (represented by the Bey's palace) was moved south of the medina to gain a deeper and more central position compared to Saleh Bey's "peripheral" palace (figure1). The strained relations with France prompted Hadj Ahmed Bey to strengthen the fortifications and relocate his palace. The creation of the new center, the "current Bey's Palace," was completed in 1829 with the construction of a public square and the restoration of Hassan Pasha Mosque (Benidir, 2007: 47).

3. The colonial period (1830-1962): the duplication of the center, a new form of centrality

This period was marked by the colonial authorities' desire to create a new center to replace the traditional Medina. As early as 1840, a city expansion project was considered to accommodate the growing European population and introduce new facilities and urban functions. However, the project stalled due to site constraints (Pagand, 1994: 288). Although this project dated back to 1852, construction only began in 1907 after a six-hectare land plot was cleared on the Coudiat-Aty hill. The center duplication project took a long time to implement due to the site's challenging topography. The land was a thirty-meter-high hill, which posed enormous technical problems at the time. Major levelling works required imperial authorization, granted in 1850 by a Ministerial Ordinance (Bouchareb, 2006: 56).

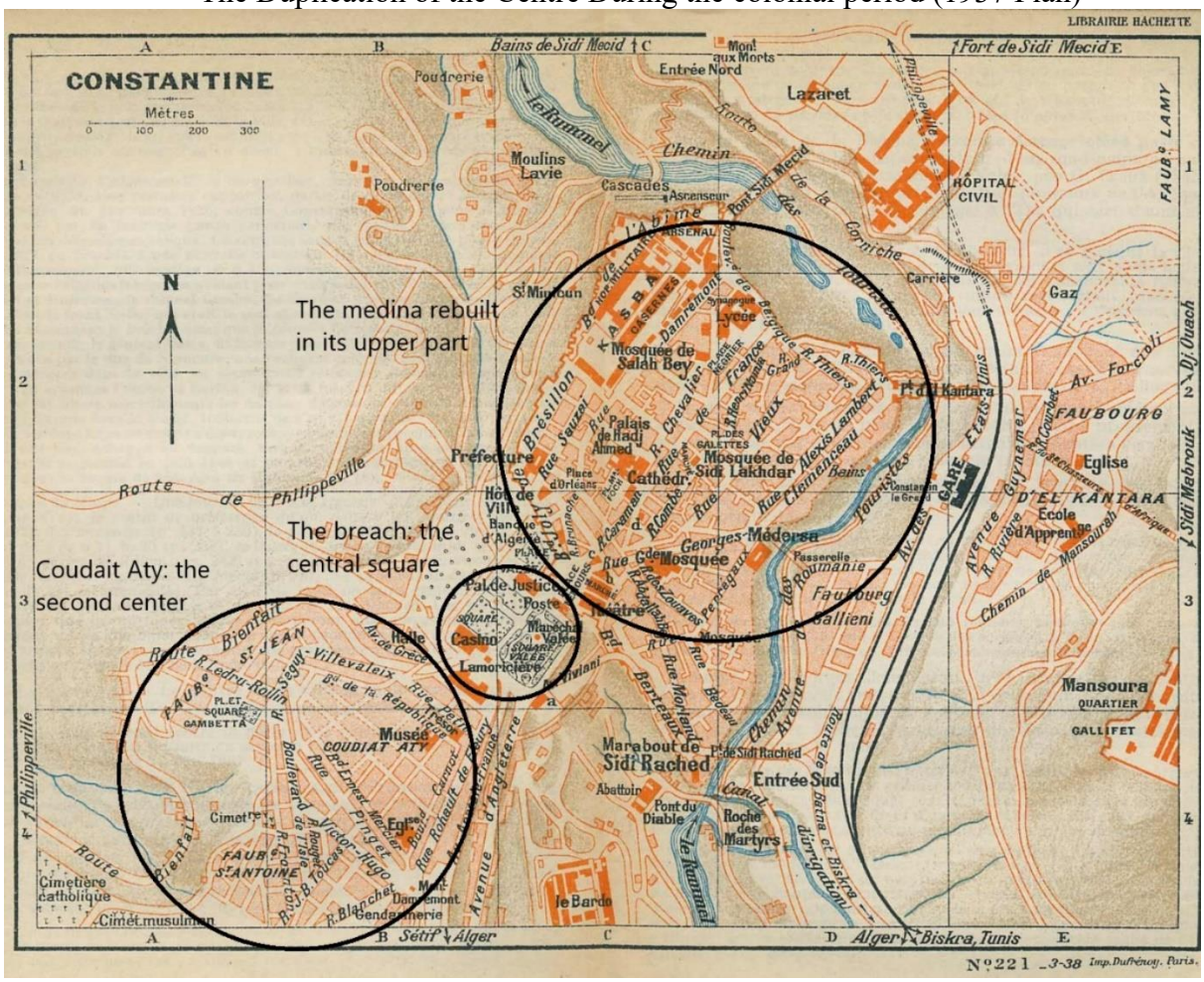
After its inauguration, the Coudiat quickly took its place in the city's urban organization and dynamics without diminishing the importance of the medina, which remained a central urban area due to delays in the new center's completion and European investments in the rock. "All major establishments were soon concentrated there. Until the end of the century, 'the city' was limited to the Rock, and any expansion was considered a mere suburb" (Pagand, 1994: 282). Together, the two areas formed what is now known as Constantine's city center. Due to its architectural composition, enriched by high-end residential buildings at the time, and its urban composition characterized by a high concentration of administrative, financial, cultural, and educational facilities, the Coudiat established itself as the premier administrative center. The spatial gap separating it from the medina was quickly filled by development works at the "Brèche" (break) and the creation of avenues and streets linking the two entities. The urban developments and new constructions in Constantine during this period represent one of the major phases of the city's reshaping, which would largely determine its future urban dynamics, giving it a polarizing role and the power to dominate and attract the entire eastern region of the country.

By the end of the colonial period, Constantine adopted a dual urban structure (figure2), characterized by the juxtaposition of the historic center (the Medina) and the European center (Coudiat-Aty and its extensions). This duality created a hybrid urban system, in which each pole maintained a specific function:

- The Medina: A center with a popular commercial and cultural character
- The Coudiat-Aty: A European administrative and service center
- The "Brèche**":** A transitional and connecting space between the two, composed of boulevards and gardens on either side

These findings suggest that the colonial period should not be interpreted as a rupture, but rather as a phase that amplified urban centrality and laid the foundations for the subsequent contemporary polycentric process.

Figure 2:
The Duplication of the Centre During the colonial period (1937 Plan)



Source: (Institut Géographique National, 1945)

4. The post-independence city: from the city scale to the urban conglomerate, a new territory for the expansion of centrality

During this period the city of Constantine entered a phase of deep transformation that radically altered its structure, shifting from a compact city operating through a single center to a vast metropolitan area functioning through multiple centers. This transformation resulted from a combination of factors, including rapid population growth and the absence of a rigorous planning framework capable of absorbing this demographic shock and proposing well-designed solutions.

Within the space of three decades, by the 1990s, the city's population grew dramatically, with alarming growth rates that quickly led to the saturation of the historic center, highlighting the limitations of the monocentric urban model inherited from the colonial period. It became evident that this model was unable to meet the increasing demand for housing, facilities, and especially accessibility, which had become increasingly critical in the central area.

In response to this situation, public authorities adopted a new strategy of spatial restructuring based on the decentralization of urban growth. Urbanization was now to extend beyond the conventional boundaries of Constantine, towards satellite towns intended to relieve pressure on the historic center. Initially these cities are conceived as residential poles functionally dependent on the historic center, the satellite towns were gradually integrated into the city's overall functioning through extensive projects of equipment provision and urban improvements across all sectors (education, transport, leisure).

This orientation was formalized in the 1969 Master Plan (le Plan Directeur d'urbanisme PUD 1969) and reinforced with the establishment of the CADAT studies (Caisse de Développement de

l'Agglomération de Constantine) in 1973. It was later revised in the 1990s by the Intercommunal Master (Plan directeur d'aménagement et d'urbanisme intercommunal, PDAU 1998), which laid out a new planning framework aimed at establishing genuine polycentrism to manage the Constantine metropolitan area effectively, by the creation of the new town of Ali Mendjeli, located within the cities of Constantine, El Khroub, Aïn Smara , designed to accommodate 300,000 inhabitants over an area of 1,500 hectares.

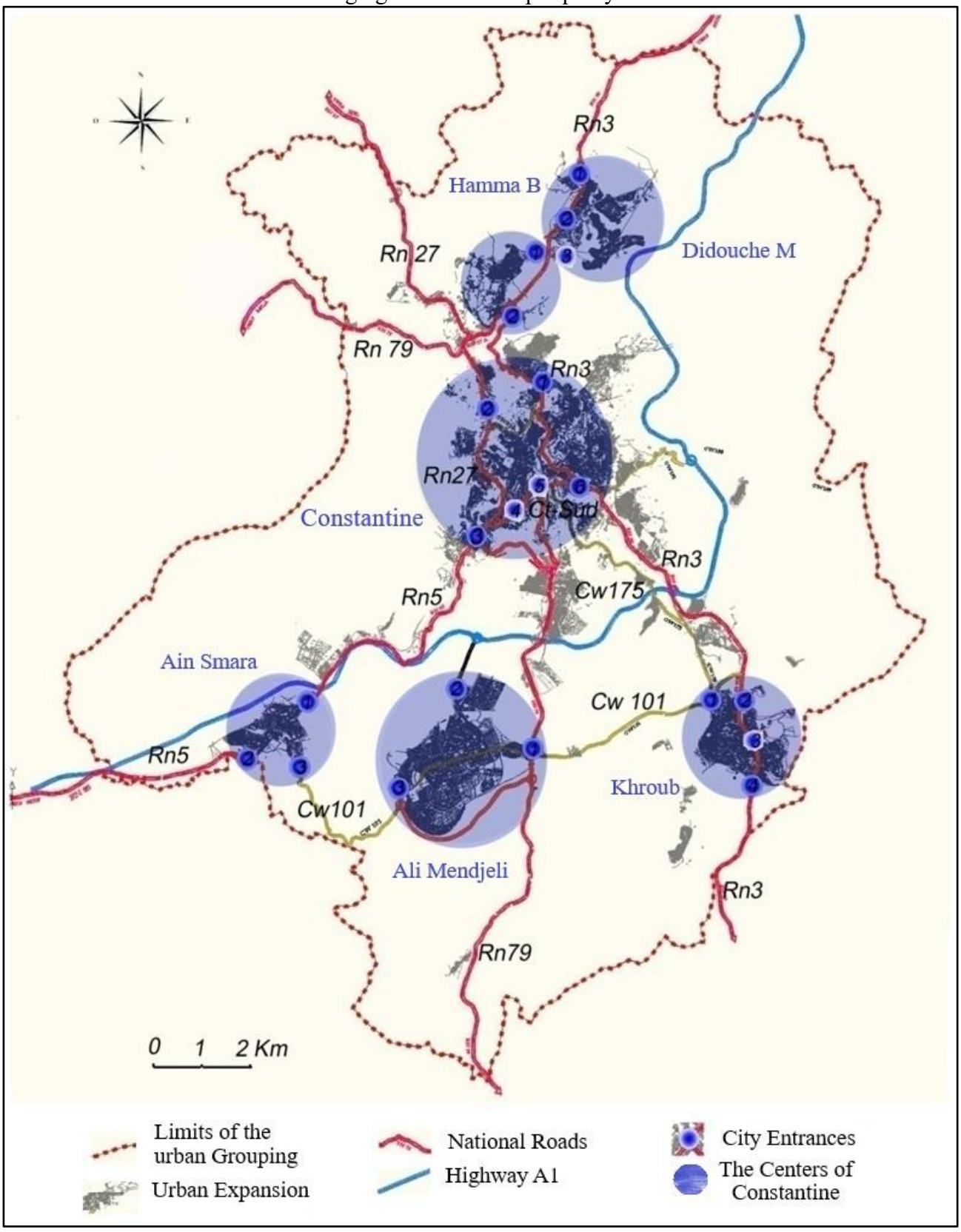
The periphery of Constantine experienced accelerated demographic growth, even surpassing that of the historic center (584,716 inhabitants compared to 506,034 in 2018). Meanwhile, the historic center recorded a population decline, with a growth rate of –0.95% between 1998 and 2008, whereas the peripheral municipalities displayed high growth rates during the same period, reaching an average of 5.68%. This situation is mainly due to the large-scale relocation of populations from the city center, which recorded a migratory balance of –2.67% (National Office of Statistics, ONS) (ONS, 2011), reflecting resettlement projects and efforts to improve living conditions.

Today, Ali Mendjeli is the second most frequented city in the metropolitan area, accounting for 20% of the trips made within the metropolitan area. It is mainly visited by residents of Constantine (40%), El Khroub (39%), and Ain Smara (39%). Its population primarily travels to the cities of Constantine (65%) and Khroub (25%). The city maintains strong functional relationships with all the cities. For example, there is significant interdependence in terms of employment with the main cities in the area: 36% of Constantine's residents work in Ali Mendjeli, while 27% of Ali Mendjeli's residents work in Constantine. Additionally, 25% of those surveyed in Ali Mendjeli work in Khroub, compared to 12% of Khroub's residents working in Ali Mendjeli.

The center of Ali Mendjeli has managed to counterbalance Constantine's city center in attracting population flows in certain sectors. It has shown significant rates of visitation due to its shopping centers, its continuously developing financial services, and the establishment of new headquarters for regional institutions and companies. The city is equipped with a business zone that is being developed in phases, in line with the city's growth and the demand for investment. Which initially was merely a dormitory town, the new city, is now experiencing remarkable urban growth and a clear upward trend. The ongoing development of infrastructure projects and the growth of private-sector commerce are making the city increasingly independent from the traditional center.

The post-independence period thus marked the true phase of Constantine's structural transformation, no longer defined solely by its historic center. The emergence of a polycentric metropolitan area profoundly reshaped the spatial and functional organization of the city, including mobility patterns and centrality itself. This emerging polycentrism significantly contributed to alleviating demographic and functional pressures on the historic center through the redistribution of economic and social activities. At the same time, it improved access to facilities for peripheral populations who had long demanded social equity by enabling them to live, work and consume locally.

Figure 3:
The emerging centers in the periphery of Constantine



Source: author 2016

The emergence of peripheral centers (figure3) has also encouraged inhabitants to move to the cities on the outskirts of the metropolitan area of Constantine, which now provide all the amenities of a decent urban life. A certain balance has thus been established in the distribution of the

population across the metropolitan area. From an economic and social perspective, the peripheral centers have become integral to the daily lives of the residents of the metropolitan area by offering a lifestyle similar to, and sometimes better than, that of the main center, thanks to a variety of services, shops, jobs, and leisure activities. These peripheral centers have become spaces for sociability, supplementing the main center, particularly for their residents.

5. Current urban operating mode of the metropolitan area of Constantine

The social survey results show that peripheral centers now play an increasingly important role in both economic and social activities. The centers function as main hubs for daily activities because they house most employment opportunities and commercial businesses and service providers. The analysis of current and future transportation systems demonstrates how they enhance operational links between various centers. Consequently, multipolar accessibility provides residents with greater freedom of movement, making reliance on the historical center increasingly optional.

Table 1: Interdependence of the new centers in Constantine's metropolitan area

City of residence	Attendance in cities							Standardized mobility index	
	Constantine	Khroub	A. Mendjeli	Hamma	Didouche	Ain Smara	Total		
Constantine	92,21	24,68	40,26	11,69	2,60	5,58	187	1	165,5
Khroub	79,63	90,74	38,89	0,00	0,00	0,56	514,8	2	270,5
A. Mendjeli	64,71	25,00	95,59	4,41	4,41	16,18	110,3	2	210,3
Hamma	75,51	6,12	12,24	75,51	30,61	4,08	404	2	283,2
Didouche	57,58	6,06	12,12	45,45	90,91	6,06	618,2	2	449,6
Ain Smara	51,85	24,07	38,89	5,56	1,85	6,30	918,5	2	275,2
Total	421	177	2383	147	130	144	1252	11	1654
External attendance (%)	78,1	48,6	59,9	47,73	30,3	3,36,8		5	- - -

Source: Author, Survey 2015

The results from the cross-tabulation analysis between residential locations and travel destinations and visit frequencies appear in Table 1. The SPSS software produced the table from multiple primary tables which contained the data. The table includes standardized total trip data which uses equal population distribution for all cities to create an index that shows the number of trips residents make between their city and other metropolitan area cities. The table displays both the Total High-Frequency Attendance Indices for each city and the percentage of flows that start from outside the city.

The analysis of mobility practices within the Constantine metropolitan area reveals a clear interdependence between its urban centers, with 56.8% of trips occurring between cities, compared

to 43.2% of local trips made within each municipality. Using the standardized mobility index of residents, three categories of cities can be identified based on the intensity of recorded travel.

Residents of the city of Constantine travel the least compared to other cities, with a rate of 165.5 (the lowest mobility level). At the other extreme, inhabitants of Didouche Mourad exhibit the highest travel activity, with a mobility index estimated at 449.6. This pattern clearly reflects the relationship between a center's strength and the mobility behavior of its population: the stronger and better equipped a center is, the fewer trips its residents make to other cities, whereas residents of weaker centers (with fewer facilities) tend to travel more frequently to seek services elsewhere. For the other centers, mobility indices range between 210 and 280, depending on the hierarchical position of each center.

Interurban mobility within the metropolitan area of Constantine (based on survey responses) is conditioned by two main factors. First, by the rank and diversity of services and facilities available, and second, by accessibility (including distance, transport infrastructure, and connectivity). The trips outside one's municipality recorded in the survey are mainly directed towards the nearest or most powerful centers. For example, residents of Aïn Smara travel primarily to Constantine (the dominant center), as well as to Ali Mendjeli, the closest peripheral center.

The research data shows Constantine city underwent two stages of development starting with disorganized polycentralization before shifting toward planned urban growth. The city's structural development resulted from multiple historical and political and functional elements which confirm previous studies about Global South city polycentric growth (Derudder, 2021; Yin, 2025; Wang et al., 2023). The formation of polycentric areas results from two distinct elements which combine planned urban development with historical urban growth patterns.

The analysis of Constantine reveals an emerging morphological and functional polycentricity that is still under construction, requiring further policy measures to strengthen and improve its effectiveness. This aligns with findings from recent studies based on mobility flows (Cabrera-Arnau et al., 2023; Wang et al., 2023; Pereira, 2015), which stress the importance of assessing centrality not only through activity density, but through the capacity of a place to attract human and economic flows, and consequently to propose solutions based on interconnecting centers.

The results also support the conclusion formulated by Yin (2025), according to which flow-based centrality measures offer a better characterization of emerging urban systems, especially in contexts of rapid urban transition. The strong inter-municipal mobility observed within the metropolitan area of Constantine confirms the existence of a transversal, rather than hierarchical, system of relations between cities.

In contrast with European models, where polycentricity often stems from long-term territorial governance strategies (Chen, 2023; Xue, 2025), the situation in the Constantine metropolitan area reflects an initially spontaneous polycentrism driven by the city's specific circumstances (such as center saturation and housing needs), which was later adopted as the strategic model for the future development of the metropolis.

The planned polycentric model adopted by local planning authorities, as previously emphasized by (Wang, 2025) and Derudder (2021), can clearly be demonstrated with the emergence of Ali Mendjeli as independent center that has a crucial role in the operation of the metropolis of Constantine. In the case of Constantine, however, the weakness of the inter-municipal transport infrastructure network undermines the functioning of this polycentric system, as pointed out in the literature on Polycentric Urban Regions (Xue, 2025; Wang et al., 2025).

Conclusion:

This research aimed to understand how the successive historical reconfigurations of the city of Constantine have transformed its urban structure and system of centrality. The study is based on a confirmed hypothesis: Constantine's evolution toward a polycentric model is not the outcome of

deliberate or well-controlled planning, but rather the result of successive morphological reconfigurations shaped by distinct political and socio-spatial contexts.

The colonial period brought disruptive changes to the medina centrality through multiple interventions. These interventions separated the medina into two parts (lower and upper) before developers built a new European center which added fresh elements to the city center. The two centers eventually merged into a unified city that developed a unified structure with expanded dimensions.

Following independence, Constantine retained for a long period the monocentric system inherited from colonial times, a phase marked by a succession of urban and organizational shortcomings. The urban policies implemented during this period failed to address the strong centrality of a city that was rapidly expanding and becoming increasingly fragmented. Attempts to decentralize key services and strengthen the functional roles of peripheral towns did not result in a coherent and robust system of centrality. These local and sporadic interventions were primarily oriented toward addressing the housing crisis.

By the late 1990s, the policy of strengthening the functional roles of peripheral towns was reinforced by a new urban orientation: the development of new towns. The goal was to address the dysfunctions of the Constantine metropolitan area and the problems generated by its monocentric structure. The new strategy from urban planning documents works to reduce the existing economic disparities between different municipalities. The polycentric system transition through morphological changes has brought substantial changes to how people perform their daily activities. The modifications in resident movement patterns have created more complex travel routes which now span multiple centers and longer distances.

Our final recommendation is to establish a network of cities encompassing all municipalities of the metropolitan area, built on the principles of solidarity, cooperation and joint decision-making. The objective would be to assess the feasibility of such a project and define potential axes and scenarios of intervention. Particular attention must be devoted to transport policy, without which polycentrism and inter-city networking will struggle to take shape. The central challenge that must be addressed is how to mobilize a common and shared political will among the various decision-makers and stakeholders involved.

Bibliography:

The studies (books and articles)

1. Aguilera, A. (2006). La proximité à l'emploi dans la ville polycentrique. *Les Cahiers scientifiques du transport*(49), 29-49.
2. Ahcène, L., Mouhieddine, K. (2020). The slow and incomplete territorialization process in the new town of Ali Mendjeli. *NAQD*, *3839*(1), 223-247.
3. Benabbas, S. (2010). *La médina de Constantine : « entre usures du temps et imprécision des politiques de réhabilitation : état des lieux et évaluation critique des procédures d'intervention* ». Dar el-houda.
4. Benidir, F. (2007). *Urbanisme et planification urbaine, le cas de Constantine*, thèse doctorat d'Etat, Université Mentouri Constantine. Bibliothèque centrale Constantine 1. http://depot.umc.edu.dz/handle/123456789/7471
5. Bouadam, R. (2025). Identical Preservation and Its Implications for the Evolution of Maghrebi Medinas: A Study of Constantine's Old Town in Eastern Algeria. 41-24 ,(2)10 ,مجلة العمارة وبيئة الطفل.
6. Bouchareb, A. (2006). *Cirta ou le substratum urbain de Constantine, La région, la ville et l'architecture dans l'antiquité (une étude en archéologie urbaine)*, Doctorat d'Etat, Mentouri Constantine, 600p. bibliothèque centrale Constantine1. http://depot.umc.edu.dz/handle/123456789/8792.

7. Boudjabi, N. H. (2005). *Les stratégies de la reconstruction de la ville sur la ville, analyse d'un cas d'étude : Constantine* Mentouri Constantine. https://bucket.theses-algerie.com/files/repositories-dz/1460600410996926.pdf
8. Boudjabi, N. H., Bouzahzah, F., & Bouchareb, A. (2018). Urban strategies for a renewal of Algerian cities: Constantine of tomorrow. *Civil Engineering and Architecture*, *6*(1), 18-24. https://doi.org/10.13189/cea.2018.060102
9. Boufenara, K. (2008). *La réhabilitation comme processus du projet urbain : cas de Constantine*. Magistère, option villes et projet urbain, Constantine : Université Mentouri. http://depot.umc.edu.dz/handle/123456789/5235
10. Bouzouina, L. (2008). Polycentrisme et ségrégation intra-urbaine : résultats exploratoires à partir d'une comparaison entre Lyon, Lille et Marseille. ASRDLF, CRDT. Territoires et action publique territoriale : nouvelles ressources pour le développement régional-45e colloque de l'ASRDLF, 25, 26 et 27 août 2008, Rimouski (UQAR),
11. Cabrera-Arnau, C., Zhong, C., Batty, M., Silva, R., & Kang, S. M. (2023). Inferring urban polycentricity from the variability in human mobility patterns. *Scientific Reports*, *13*(1), 5751.
12. Chalas, Y. (2010). Centre, centralité et polycentrisme dans l'urbanisation contemporaine. *Urbia. Les Cahiers du développement urbain durable* (11), 7-20.
13. Chaline, C. (1990). *Les villes du monde Arabe*. Ed. In: Masson-Armand Collin, Paris.
14. Chen, Y., Yu, Wang, L., Chen, Y., & Yung, H. K. E. (2023). Polycentric urban development with state-led administrative division adjustment: A policy insight for urban spatial transformation. *Journal of Geographical Sciences*, *33*(12), 2400-2424.
15. Debbabi, S. (2021). *La polycentralité urbaine : pour la restructuration d'un territoire fragmenté, le cas du groupement urbain de Constantine*, Saleh Boubnider, Constantine 3. http://localhost:8080/xmlui/handle/123456789/315
16. Debbabi, S. (2025). The impact of urban development strategies on spatial organization, urban functioning and inhabitant practices: the case of the metropolis of Constantine. *Regional Formation & Development Studies*, *45*(1).
17. Derudder, B., Liu, X., Wang, M., Zhang, W., Wu, K., & Caset, F. (2021). Measuring polycentric urban development: The importance of accurately determining the 'balance'between 'centers'. *Cities*, *111*, 103009.
18. Fezzai, S. (2024). Assessment of Patterns of Spatial Transformations a Comparative Study of Three Historic City Centers in Algeria. *International review for spatial planning and sustainable development*, *12*(1), 173-195.
19. Institut Géographique National, I. (1945). Plan de Constantine 1937. Librairie Hachette.
20. Lebrun, N. (2002). *Centralités urbaines et concentrations de commerces* Université de Reims-Champagne Ardenne.
21. Marouk, M. (2010). *Recherches pour un atlas de Constantine, approche statistique et thématique,* thèse de doctorat d'État Option : Cartographie et aménagement du territoire, 372p. http://depot.umc.edu.dz/handle/123456789/7073
22. Mercier, E. (1896). *Les deux sièges de Constantine' (1836-1837)'*. L. Poulet.
23. Oueslati-Hammami, I. (2010). *Les centralités du grand Tunis : acteurs, représentations et pratiques urbaines* Université Toulouse le Mirail-Toulouse II.
24. ONS. (2011). Armature urbaine (RGPH 2008) : Les principaux résultats de l'exploitation exhaustive. Algiers Algeria, (Coll. Statist., n° 163 : Série S).
25. Pagand, B. (1994). De la ville Arabe à la ville Européenne : architecture et formation urbaine à Constantine au XIXe siècle. *Revue des mondes musulmans et de la Méditerranée*, *73*(1), 281-294.
26. Pagand, B. (1995). Constantine : métropole ou ville intermédiaire ? *Cahiers de la Méditerranée*, *51*(1), 1-14.
27. Pereira, R. H. M., Nadalin, V. G., Monasteiro, L., & Albuquerque, P. H. (2015). *Quantifying urban centrality: A simple index proposal and international comparison*.
28. Rallet, A., & Torre, A. (2008). *Les nouvelles proximités urbaines*. L'Harmattan.
29. Raymond, A. (1985). *Grandes villes arabes à l'époque ottomane*. Sindbad, Paris.
30. Rebbah, I. (2014). *Croissance et étalement urbain de la ville de Constantine* thèse de doctorat, université d'Oum-El-Bouaghi. https://fr.scribd.com/document/396446335/Croissance-et-etalement-urbain-de-la-ville-de-Constantine-pdf.
31. Richardson, H. W. (1988). Monocentric, polycentric models: The future of urban economics in regional science. *The Annals of Regional Science*, *22*, 1-12.

32. Saidi, F. A., Phinzi, K., & Molnár, E. (2023). Urbanization in Algeria: Toward a More Balanced and Sustainable Urban Network? *Social Sciences*, *12*(3), 174.
33. Salvati, L., Carlucci, M., Grigoriadis, E., & Chelli, F. M. (2018). Uneven dispersion or adaptive polycentrism ? Urban expansion, population dynamics and employment growth in an 'ordinary'city. *Review of Regional Research*, *38*(1), 1-25.
34. Signoles, P, (2001). La centralité des médinas maghrébines : quel enjeu pour les politiques d'aménagement urbain ? *Insaniyat, Revue algérienne d'anthropologie et de sciences sociales* (13), 9-44.
35. Wang, X., Pei, T., Song, C., Chen, J., Liu, Y., Guo, S., . . . Shu, H. (2023a). X-index: A novel flow-based locational measure for quantifying centrality. *International Journal of Applied Earth Observation and Geoinformation*, *117*, 103187. https://doi.org/10.1016/j.jag.2023.103187
36. Wang, X., Pei, T., Song, C., Chen, J., Shu, H., Chen, X., & Wu, M. (2023b). A new flow-based centrality method for identifying statistically significant centers. *Sustainable Cities and Society*, *99*, 104984. https://doi.org/10.1016/j.scs.2023.104984
37. Wang, Y., & Liu, K. (2025). Toward Sustainable Urban Development: Exploring the Polycentric Transition of Chinese Cities Through Nighttime Lights. *Sustainability (2071-1050)*, *17*(5).
38. Xue, J., Hoyler, M., & Harrison, J. (2025). Connecting geographies of innovation and polycentric urban regions through anchoring and mobility. *Regional Studies*, *59*(1), 2525987.
39. Yin, Y., Wu, Q., Zhao, Z., & Chen, X. (2025). Quantifying centrality using a novel flow-based measure: Implications for sustainable urban development. *Computers, Environment and Urban Systems*, *116*, 102217. https://doi.org/10.1016/j.compenvurbsys.2024.102217