

# DISSECTING THE URBAN ANATOMY: MODERNIST LAYERS, INSTITUTIONAL LANDMARKS, AND THE HERITAGE-CITY SYNERGY IN CARTAGENA

Semih Goksel YILDIRIM <sup>1✉</sup>, Vincenzina LA SPINA <sup>2</sup>

<sup>1</sup>*Istanbul Gelisim University, Istanbul, Turkey*

<sup>2</sup>*Universidad Politécnica de Cartagena, Cartagena, Spain*

## Article History:

- received 9 January 2026
- accepted 2 September 2026

**Abstract.** Cartagena, Spain, is a unique Mediterranean coastal city defined by its transition from a rigid 18th-century military stronghold to a dynamic modern center. While its ancient ruins are well-documented, the city's later layers – specifically its modernist architecture and institutional landmarks – are often overlooked in urban discourse. This neglect creates a gap between heritage preservation and the living city, risking a “museumification” that disconnects historical sites from contemporary social life. This study posits that Cartagena's urban identity is sustained through a “Heritage-City Synergy”. It argues that the integration of modernist aesthetics, the adaptive reuse of institutional buildings, and the performance of urban rituals act as the primary engines that transform a static historical anatomy into a vibrant, functional urban environment. The research focuses on three analytical pillars: (1) the Modernist Identity emerged from the engineering reclamation of the Almarjal lagoon; (2) the Institutional Adaptive Reuse exemplified by the Polytechnic University of Cartagena (UPCT) campus within former military barracks; and (3) the urban rituals, such as the Carthaginians and Romans festival, that socially re-appropriate historical spaces. The spatial scope covers the historic harbor-front, the military fringe-belt, and the Ensanche district. The findings reveal that the “Heritage-City Synergy” has successfully prevented urban obsolescence. The transformation of exclusionary military edges into academic nodes has injected new socio-economic vitality into the core, while urban rituals bridge the chronological gaps between different historical eras. This synergy ensures that Cartagena's identity remains a living, felt experience rather than a fragmented collection of relics. This study provides a framework for managing historical port cities by emphasizing functional and social continuity. The proposed “Anatomical Decoding” framework offers a scalable methodology applicable to diverse global port typologies, from Northern European industrial waterfronts to high-density Asian maritime hubs, providing a vital tool for balancing heritage-led vitality with the pressures of contemporary urban development and tourism.

**Keywords:** urban anatomy, institutional adaptive reuse, modernist identity, urban rituals, Heritage-City Synergy, Mediterranean coastal urbanism, Cartagena.

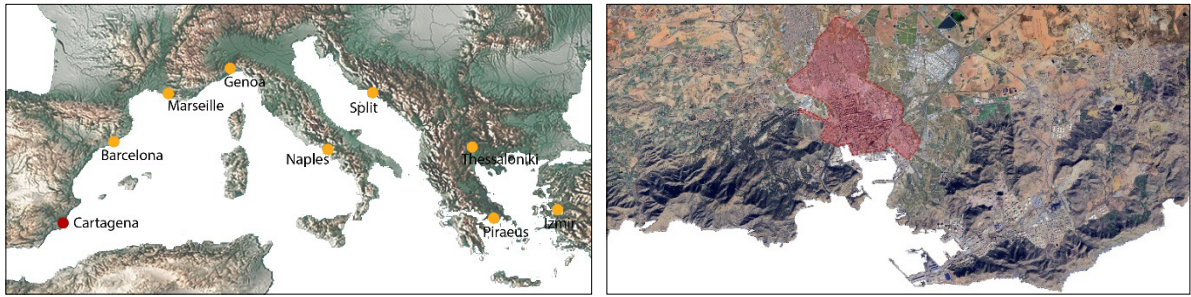
✉Corresponding author. E-mail: [sgyildirim@gelisim.edu.tr](mailto:sgyildirim@gelisim.edu.tr)

## 1. Introduction

Cartagena is situated in the south-east of the Iberian Peninsula within the Region of Murcia. The common features of Mediterranean coastal cities can be understood through their multilayered urban structures shaped by successive civilizations and a strong interplay between topography and the sea. Leontidou (1990) highlights the interactions between social structures and cultural diversity in these transformations, while Hohenberg and Lees (1995) emphasize the continuity within this Mediterranean framework. The comparative context of this study is established through a selection of representative Mediterranean coastal typologies, as illustrated in Figure 1. By highlighting Cartagena alongside major port cities such as Barcelona, Marseille, Genoa, Naples, Split, Thessaloniki, Piraeus, and Izmir, the research situates the city's development within a wider regional setting. These cities were selected

because they share a common morphological DNA, where the complex interaction of rugged topography and strategic harbor infrastructures has decisively shaped their contemporary identity. Thus, Figure 1 provides the necessary macro-scale comparative lens to understand Cartagena's unique “urban anatomy” – a compact center and port-oriented morphology that stands as a quintessential representative of Mediterranean coastal urbanism.

Within this broader milieu, Cartagena's significance has always been rooted in its privileged location and unique topography: a small peninsula between the Mediterranean Sea and an inland lagoon known as the Estero Almarjal. Founded around 227 BC by the Carthaginian general Hasdrubal as Qart-Hadasht, the city reached a morphological peak during the Roman Empire as Carthago Nova (Figure 2a–2b). The Roman era represents the most significant historical turning point, where the city's regular grid plan – organized around the *cardo* and *decumanus* – was

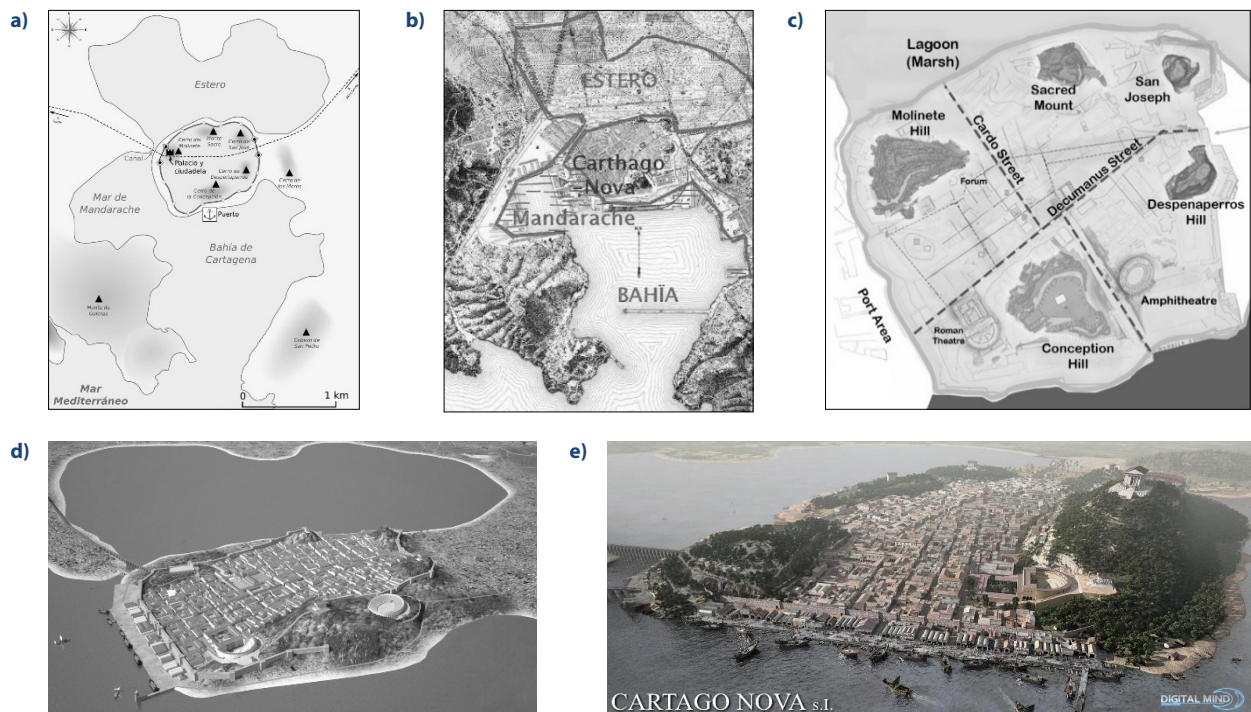


**Figure 1.** Map of Mediterranean coastal cities and position of Cartagena (left), map showing Cartagena's port-city relationship (right) (source: produced by the authors based on Google Earth)

strategically adapted to this dramatic natural landscape (Figure 2d). As illustrated in Figure 2c, recent research using Digital Elevation Models (DEM) reveals that Roman urbanism in Cartagena was a topographically sensitive strategy where the city was structured around five main hills, with the Estero acting as a marshy estuary that dictated the limits of urban growth. This integrated approach to geography and military control allowed Carthago Nova to become one of the most vital administrative hubs in the western Mediterranean, a legacy that remains visible today through the coexistence of social and civic spaces like the Roman Theatre and the Molinete Hill within the modern city pattern (Figure 2e).

While “urban anatomy” has been used to analyze modern infrastructures (Ascher, 2005) or informal transport networks (Jauregui-Fung et al., 2019), holistic approaches

integrating historical layering with contemporary social morphology – particularly in coastal cities – remain scarce. In Cartagena, existing scholarship is often fragmented: heritage, urban development, and spatial analysis are typically pursued in isolation. The central problem addressed here is the limited research integrating Cartagena's ancient “skeleton” with its contemporary socio-spatial dynamics, as “soft” dimensions – modernist districts, institutional landmarks, and social rituals – are often excluded from morphological discourse. This leads to a “museumification” risk, where the historical core becomes disconnected from modern life (Sharpley, 2020). The coexistence of layers, such as the Roman Theatre adjacent to the 19th-century Palacio Consistorial, raises the key question: How can institutional adaptive reuse and social rituals turn a rigid historical anatomy into a vibrant modern synergy?



**Figure 2.** Urban plan of the Roman period surrounded by sea and lagoon: a) Topographic plan of Qart Hadašt under Hasdrubal (Hoyos, 2003); b) Map illustrating the strategic position of Carthago Nova between the bay and the Estero lagoon (Aforca, n.d.); c) Topographical distribution of the five main hills and the Roman grid system (authors' elaboration based on García-León et al., 2015); d) Volumetric 3D model showing the adaptation of the urban grid to the natural landscape (VirTimePlace, n.d.); e) 3D reconstruction of Carthago Nova (Digital Mind S.L., 2012, timestamp 01:02:41)

This study assumes that Cartagena's urban development is best interpreted through the interaction between its historical layers and contemporary spatial patterns, specifically through what we term the "Heritage-City Synergy". It is hypothesized that the adaptive reuse of 18th-century military landmarks and the ritualistic use of public space (such as the *Cartagineses y Romanos* festival) act as vital connectors that prevent morphological fragmentation. The city's natural bay topography and its roles as a military and commercial harbor have been decisive in shaping this synergy, influencing the configuration of paths, edges, nodes, and landmarks.

The primary aim is to analyze Cartagena's multi-layered historical pattern alongside its contemporary urban morphology to reveal the typological characteristics of "living" Mediterranean coastal urbanism. By examining the interplay between historical continuity and institutional transformation, the research seeks to position Cartagena as a representative case for explaining how geographical and military constraints decisively shape modern urban form (Selvi Ünlü, 2025). The spatial scope encompasses the historic core, the port district, and the surrounding hills. The analysis applies Kevin Lynch's elements to trace how port-related axes function as "paths," hills serve as "edges", and monuments act as permanent "landmarks" bridging the gap between the 18th-century military city and the dynamic modern hub.

The principal contribution lies in establishing a systematic framework for analyzing Cartagena's urban anatomy by integrating historical strata with contemporary social and institutional patterns, providing a methodological reference for other Mediterranean coastal cities. The structure of the paper is organized to reflect this multidisciplinary approach: Section 2 details the methodological design. Section 3 explores the "Socio-morphological foundations" of Cartagena and the Modernist Identity (Soler Tortosa, 2015). Section 4 examines the "Heritage-City Synergy" through Institutional Adaptive Reuse (UPCT) and urban rituals. Section 5 deciphers the "Perceptual image" of the city, followed by a discussion and conclusion that offers a comprehensive foundation for understanding an urban anatomy that successfully bridges ancient origins and modern manifestations.

## 2. Materials and methods

The methodological framework of this research is designed to dissect the socio-spatial layers of Cartagena by integrating morphological analysis with perceptual and institutional assessments. This multidimensional approach allows for a comprehensive understanding of how historical strata evolve into a functional contemporary synergy, organized around three analytical pillars: Modernist Identity, Institutional Adaptive Reuse, and urban rituals.

The historical-morphological foundation of the study relies on the principles of "plan units" and "fringe-belt" theory established by Conzen (1960). Within this scope, the research examines the transition from 18th-century

military fortifications to the 19th-century modernist expansion (Ensanche). This provides the technical basis for Section 3, where the reclamation of the Almarjal lagoon is analyzed as a pivotal event that redefined the city's social topography and established its Modernist Identity.

To investigate the "Heritage-City Synergy", the research utilizes institutional and ritualistic assessments as its primary socio-spatial lens. As detailed in Section 4, the Institutional Adaptive Reuse of 18th-century military buildings into the Polytechnic University of Cartagena (UPCT) campus is evaluated through comparative functional mapping. This analysis reveals how institutional occupancy injects new vitality into former exclusionary "edges". Simultaneously, urban rituals, specifically the spatial routes of the "Carthaginians and Romans" festival, are examined to reveal how the ritualistic re-appropriation of historical space reinforces collective memory and urban identity.

The perceptual dimension of the study applies the five core elements of the urban image – paths, edges, districts, nodes, and landmarks – defined by Lynch (1960). As elaborated in Section 5, this lens measures the "legibility" of the urban anatomy and determines how historical structures, ranging from Roman remains to military landmarks, function within the mental map of the modern citizen. The integration of Lynch's elements allows the study to analyze how modernist paths, academic nodes, and ritualistic landmarks reinforce one another to create a cohesive urban identity.

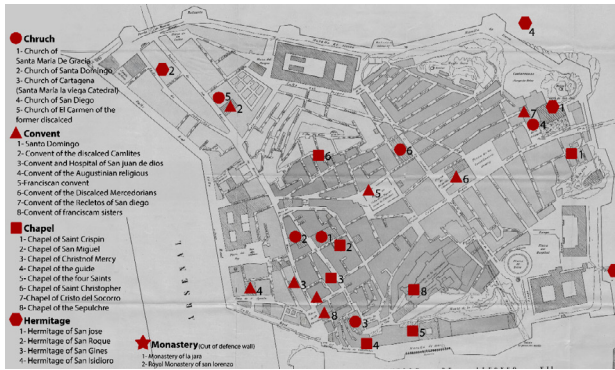
The data synthesis is derived from a rigorous combination of primary and secondary sources to ensure a holistic "decoding of the urban anatomy". These data sets include historical cartography (18th–20th centuries), architectural catalogs from the Cartagena City Council, and UPCT archives. These are complemented by contemporary spatial drawings and digital elevation models prepared using Autodesk® Forma. The convergence of these diverse data sets allows quantitative morphological data to be balanced with qualitative social insights, thereby validating the synergy between Cartagena's heritage and its modern development.

## 3. The socio-morphological foundations

The contemporary urban anatomy of Cartagena is a product of deep-seated historical processes where geographical constraints and social institutions have constantly interacted. This section examines the socio-morphological evolution of the city by tracing its development from early religious and topographical anchors to the transformative modernist expansions of the late 19th century. By understanding these foundations, the transition from a rigid military enclosure to a modern, synergetic urban environment becomes legible.

### 3.1. Religious and geographical roots

The early urban identity of Cartagena is deeply intertwined with its dramatic topography and the historical distribution of religious institutions, which together established the city's primary social nodes. Throughout its evolution,



**Figure 3.** Distribution map of religious structures on a map belong to 1887 (source: authors' elaboration based on Exea y Pozuelo, 1887)

the five hills – Molinete, Monte Sacro, Monte de San José, Despeñaperros, and Castillo de la Concepción – have functioned not only as defensive barriers but as symbolic “edges” and observation decks that governed the city’s visual and social orientation (Segado Vázquez & Maciá Albendín, 2015). This topographical constraint created a condensed urban anatomy where the harbor remained the primary economic engine, while the elevations provided strategic vantage points for both military oversight and civic identity (Jiménez-Vicario et al., 2018).

Religious institutions functioned as the city’s early social anchors, particularly during the Medieval and Early Modern eras, when the spatial distribution of these structures defined the “social anatomy” of the core. Monasteries and convents were not merely isolated spiritual retreats; they acted as primary “nodes” that organized the

daily urban life of the surrounding districts. As illustrated in Figure 3, the mapping of these structures on the 1887 plan reveals a deliberate placement that bridged the gap between the compact historic core and the defensive perimeters (Grandal López, 1996). These religious landmarks, such as the Cathedral of Santa María la Vieja, served as fixation lines for urban growth and established a permanent character for specific districts long before 19th-century modernization. The resilience of these sites testifies to how institutional permanence provides continuity amidst military and administrative shifts (Ros McDonnell & Rodeñas López, 2012).

Furthermore, the geographical features of the site fostered a unique culture of observation dictated by the bay and the encircling hills. Unlike flatter Mediterranean counterparts, Cartagena’s morphology forces a vertical interaction with the landscape, a synergy captured in Figure 4, which illustrates the bay as a focal “Node” (Figure 4a, 4c) alongside the archaeological stratification of the historic core (Figure 4b). These hills served as natural landmarks ensuring urban legibility as street patterns evolved from the irregular medieval fabric to the more structured military city of the 18th century (Busquets, 2006). This duality between maritime-commercial activities at the waterfront and defensive-institutional functions on the heights established a socio-spatial tension that eventually propelled the city to outgrow its topographical and military confines through 19th-century expansion projects (Soler Tortosa, 2015). The early religious and geographical framework thus demonstrates that Cartagena’s modern “synergy” is a continuation of a tradition where institutional landmarks and natural features act as the primary anchors of urban memory.



**Figure 4.** Topographical features of Cartagena and surroundings; a) Aerial view of the port and historic center (Lorente, 2020b); b) View of the historic core and archaeological stratification from an elevated vantage point (source: author's personal archive); c) View of the bay from the Cabezo de San Julián (Ramallo Asensio & Martínez Andreu, 2010)

### 3.2. The modernist expansion (Ensanche) and the “Almarjal” reclamation

The late 19th and early 20th centuries marked a definitive departure from Cartagena’s traditional “compact city” model, as the unprecedented prosperity from the local mining industry demanded a new spatial expression for the rising industrial bourgeoisie (Pérez Rojas, 1986). This period of expansion was not merely a territorial increase but a profound socio-morphological transformation facilitated by the formal “Ensanche” plan. The most significant challenge and subsequent achievement of this era was the urbanization of the Almarjal lagoon (the Estero), a vast marshland that had historically acted as a natural barrier to the city’s northward growth (Ros McDonnell & Rodenas López, 2012). The engineering feat of reclaiming the Almarjal transformed a marshland into a structured urban district, as evidenced in the 1897 (Figure 5a) and 1912 (Figure 5b) expansion plans.

As the lagoon was drained and replaced by a grid, the city’s center of gravity shifted beyond the rigid 18th-century military walls, creating a transitional zone between the ancient core and the emerging industrial periphery (Soler Tortosa, 2015). This reclaimed space became the canvas for a Modernist identity and a distinct bourgeois aesthetic, blending Eclecticism and Modernism to manifest the socio-economic status of the new elite. Led by visionary architects such as Víctor Beltrí and Tomás Rico, this era utilized ornamental styles – from floral Art Nouveau motifs to neo-baroque facades – to create a high-density, monumental urban environment that shared striking similarities with other Mediterranean centers like Barcelona and Valencia (Jiménez-Vicario et al., 2018; Soler Tortosa, 2015).

Unlike many European expansions that ignored the pre-existing fabric, Cartagena’s modernist layer respected the “ancient skeleton” established by the Romans. The new modernist “Paths” were successfully integrated with the historical core, ensuring that the modern urban image remained a coherent extension of the city’s historical anatomy. As evidenced in the building block analysis in Figure 5c–5d, this period established a permanent set of “Landmarks” that bridge the gap between the rigid military

past and the dynamic maritime administrative hub of the present. The “Almarjal” reclamation and the subsequent modernist boom represent the moment when Cartagena’s urban anatomy became a socio-spatial synergy, proving that even significant geographical constraints could be overcome to forge a modern, legible, and aesthetically unified city.

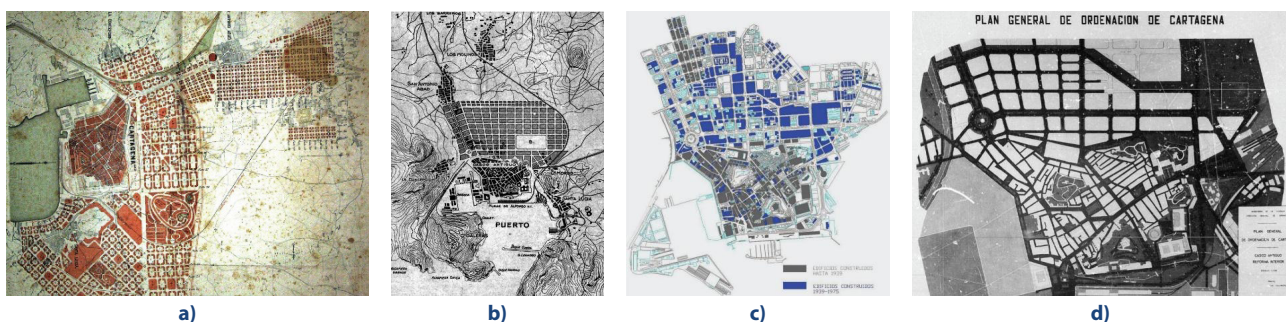
## 4. Heritage-City Synergy

The concept of “Heritage-City Synergy” in Cartagena is materialized through the dynamic interaction between preserved physical structures and their contemporary functional and social re-appropriation. This synergy transcends simple architectural restoration, acting as a bridge that integrates historically exclusionary spaces into the daily life of the modern citizen. By examining the dual engines of this transformation – institutional adaptive reuse and urban rituals – this section reveals how the city’s rigid historical anatomy is converted into a vibrant, living organism.

### 4.1. Institutional adaptive reuse: the UPCT case

The transition of Cartagena from a strictly fortified military outpost to a vibrant academic and administrative center represents the most successful example of “Heritage-City Synergy” in its contemporary history. Central to this transformation has been the adaptive reuse of 18th-century military buildings, which formerly constituted a rigid “inner fringe-belt” of defensive and logistical structures (Whitehand, 1988; Kubat, 1997). The strategic decision to repurpose these massive granite edifices into the campus of the Polytechnic University of Cartagena (UPCT) has not only preserved the city’s urban anatomy but has also injected a new socio-economic vitality into the historic core.

Historically, the military buildings of the Borbón era have evolved from exclusionary enclosures into academic nodes, fundamentally reversing their original spatial logic. Structures such as the Antigones Barracks, the Marine Hospital, and the CIM were initially designed as closed,

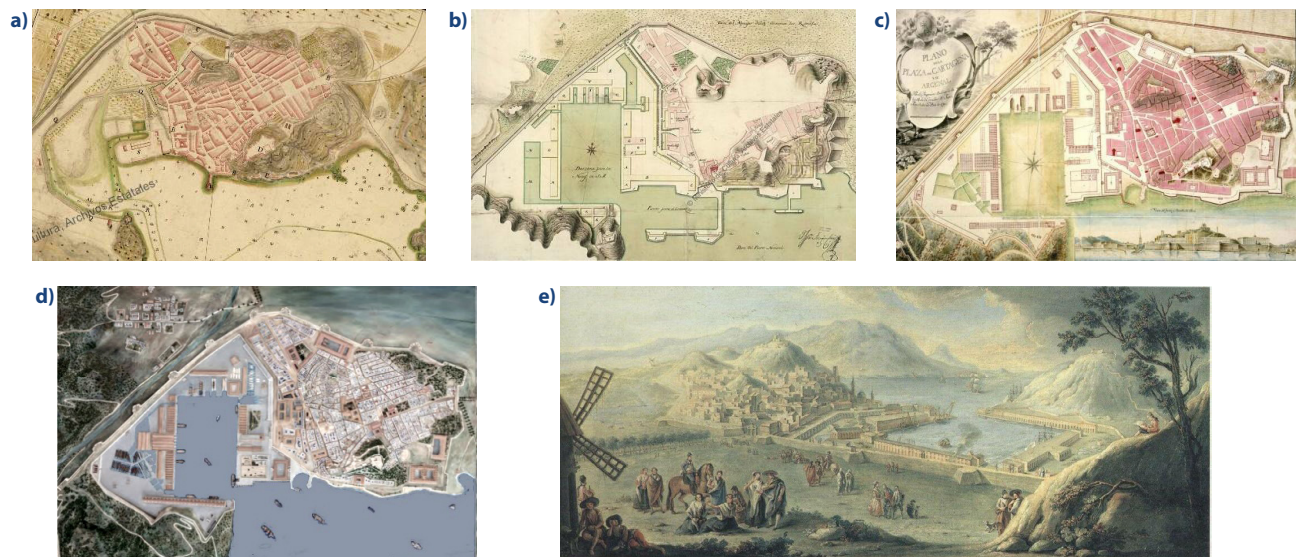


**Figure 5.** Spatial transformations during the 19th and 20th century: a) The 1897 urban expansion plan (Ramos Bascuñana et al., 1897); b) The 1912 urban expansion plan (Ros McDonnell & Rodenas López, 2012); c) Building blocks constructed before 1939 and between 1939 and 1975 (Soler Tortosa, 2015); d) Map of old town and expansion district (ensanche) in the 1961 General Management Plan (Soler Tortosa, 2015)

introverted “edges” that separated the city from its defensive perimeters (Figures 6a–e). By opening these monumental sites to the student population and the public, the intervention of UPCT has transformed them from exclusionary barriers into prominent “Institutional Landmarks” and “Nodes” of social interaction (Savoldi, 2024). A prime example of this synergy is the CIM building, which now serves as a hybrid cultural-academic hub hosting both the Escuela Técnica Superior de Arquitectura de Edificación (ETSAE) and the Naval Museum (Museo Naval) (Figure 7).

This process is characterized by a “respectful innovation” that ensures functional synergy and urban continuity

without compromising morphological integrity. The internal spatial volumes of the 18th-century barracks were adapted to modern classrooms and laboratories, effectively preventing the “obsolescence” typically associated with abandoned military heritage. As synthesized through the revitalized public spaces (Table 1), this functional shift is remarkable: the Antigonos Barracks now serves as the School of Telecommunication Engineering, the Marine Hospital houses the School of Industrial Engineering, and the CIM complex bridges the gap between the harbor-front and the civic center as the Faculty of Business Sciences and Architecture. Instead of becoming static museums,



**Figure 6.** Borbón port construction process: a) 1746 (Feringán, 1746); b) 1751 (Feringán, 1751); c) 1799 (Ordovás, 1799); d) Scaled model representing 1799 conditions (Heras Millán, 2017); e) 1786 (De La Cruz, 1786)



**Figure 7.** The CIM building, hosting the UPCT Department of Architecture (ETSAE) and the Naval Museum (source: author's personal archive)

**Table 1.** Plazas and major urban interaction nodes in Cartagena

|   | Space / Axis           | Historical function                    | Contemporary role                                  |
|---|------------------------|----------------------------------------|----------------------------------------------------|
| a | Plaza del Ayuntamiento | Civic and ceremonial centre            | Tourism focal point, municipal activities          |
| b | Plaza de San Francisco | Religious gatherings, markets          | Cultural events, urban leisure space               |
| c | Plaza de la Merced     | Convent                                | Urban leisure space                                |
| d | Calle Mayor            | Commercial and civic axis link harbour | Pedestrian promenade, retail and cultural corridor |
| e | Calle del Carmen       | Secondary commercial axis              | Local retail, daily urban life                     |
| f | Harbourfront           | Military port, trade gateway           | Redeveloped leisure and cultural waterfront        |

these buildings act as “living scaffolds” where the weight of historical stone is balanced by the energy of modern academic life, revitalizing surrounding paths and plazas (Zarei et al., 2024). Consequently, the UPCT case proves that urban identity is most resilient when it is functional, creating a “Cultural Axis” that links the port, the hills, and the historical core – where the city’s modernist heritage is most concentrated – while ensuring the city’s anatomy remains legible and cohesive (Selvi Ünlü, 2025).

#### 4.2. Urban rituals as spatial re-appropriation

In Cartagena, the urban anatomy is not merely a physical arrangement of stones and streets; it is a “living stage” that is periodically re-appropriated through deeply rooted urban rituals. These rituals, manifesting as religious, historical, and social festivals (Figure 8a, 8c), transform the city’s historical “Paths” and “Nodes” into active spaces of collective memory (Rossi, 1982). This social re-appropriation ensures that the archaeological strata – often hidden or static – are reintegrated into the contemporary citizen’s daily life and identity.

The ritualistic use of historical space finds its most prominent expression in the “Carthaginians and Romans” (Cartagineses y Romanos) festival (Figure 8b), which

dramatically re-enacts the city’s ancient origins. As depicted in Figures 8a–8c, these parades and historical representations do not take place in isolated peripheral stadiums but within the very heart of the Punic and Roman grid. The procession routes effectively “activate” the ancient *Cardo* and *Decumanus*, turning the rigid morphological skeleton into a dynamic social theater. This ritualistic engagement serves as a vital bridge between the “invisible scaffold” of the past and the visible celebrations of the present (Segado Vázquez & Maciá Albendín, 2015).

Beyond mere celebration, these festivals function as perceptual anchors that enhance urban legibility by mapping collective memory onto the city’s permanent landmarks. The spatial logic of Cartagena’s rituals, including the solemn processions of *Semana Santa* (Holy Week) (Figure 8a), relies on the city’s “Landmarks” and “Edges”, such as the five hills and the historic harbor, which provide a natural amphitheater for these events. Main plazas, particularly the Plaza del Ayuntamiento, function as major “Nodes” where ritualistic energy is concentrated, creating intense emotional and social associations with specific urban sites (Lynch, 1960; Jiménez-Vicario et al., 2018). As outlined in the city’s social documentation, these diverse festivals – ranging from solemn processions to the vibrant Carnival (Figure 8c) – foster a sense of “belonging” that



**Figure 8.** Parades belonging to religious, cultural and social events: a) *Semana Santa* (from left to right: Ayuntamiento de Cartagena, 2019, 2013; Agrupación de San Juan Marrajo, 2024; Ayuntamiento de Cartagena, 2017b); b) Fiesty of Carthaginians and Romans (Villalgorido, 2023, 2024); c) Carnival of Cartagena (Ayuntamiento de Cartagena, 2017a, 2025; Lorente, 2020a)

transcends the physical preservation of ruins. By walking the same paths navigated for millennia, participants perform a “spatial re-appropriation” that preserves identity more effectively than legal protection, ensuring the anatomy remains meaningful and deeply connected to collective memory (Sharpley, 2020).

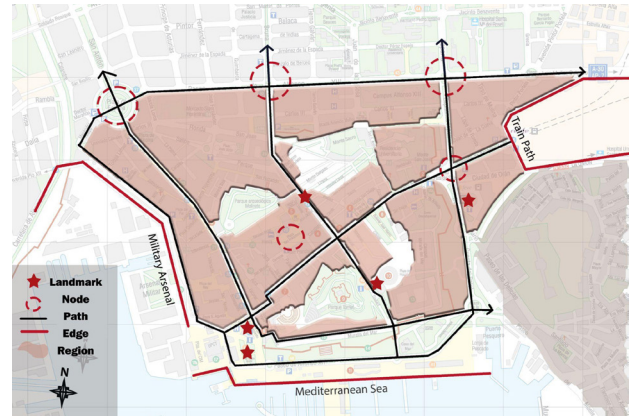
Interestingly, these festivals also act as “morphological repairs” for areas of the city that have undergone significant structural change. For instance, the use of the reclaimed lands of the Almarjal – where the modern festival camp is frequently located – integrates the 19th-century expansion with the ancient core. This creates a unified urban experience that effectively ignores the chronological gaps between the different layers of the urban fabric (Soler Tortosa, 2015). Through the lens of urban rituals, Cartagena is perceived not as a fragmented city of various eras, but as a singular, continuous entity defined by the rhythm of its social life.

## 5. Deciphering the perceptual image

The “Heritage-City Synergy” discussed in the previous sections finds its empirical expression in the contemporary perceptual image of Cartagena. By applying Kevin Lynch’s framework (Lynch, 1960), we can decipher how the ancient skeleton and its modern social overlays are synthesized within the mental maps of the inhabitants. In a Mediterranean port city like Cartagena, legibility is not just a product of geometric clarity but a result of “morphological permanence”, where historical elements continue to function as primary cognitive anchors (Rossi, 1982; Selvi Ünlü, 2025).

The mapping of the perceptual skeleton reveals a highly legible structure where topography and historical axes define the city’s fundamental orientation. As illustrated in Figure 9, the port acts as the definitive “Edge”, while the five hills serve as dominant “Landmarks” providing a vertical orientation that complements the horizontal street grid. The Lynchian analysis demonstrates that the city’s legibility is significantly enhanced by the persistence of its historical anatomy; the primary “Paths” today are, in many cases, direct continuations of the Roman *Cardo* and *Decumanus* and the 18th-century military axes.

A crucial finding in this perceptual decoding is the functional evolution of “Nodes” and “Landmarks” from military enclosures to institutional anchors. While traditional



**Figure 9.** Urban scheme of Cartagena based on Lynch’s model (source: authors’ elaboration based on Google Maps and Lynch, 1960)

landmarks in Cartagena are often archaeological – such as the Roman Theatre – the contemporary image is increasingly defined by “Institutional Landmarks” created through adaptive reuse (Savoldi, 2024). The UPCT campus buildings, for example, have transitioned from being exclusionary military “Edges” into vibrant social “Nodes”. As shown in the solid-void (Figure 10d) and layered diagrams (Figure 10a, 10c), the historical defense walls that once restricted movement now define the boundaries of cultural and academic districts, creating a “permeable anatomy” (Busquets, 2006).

The contemporary urban identity is further characterized by “layered legibility”, where different historical eras form a cohesive and navigable synergy. The citizen navigates a space where a 19th-century modernist facade may overlook a 1st-century Roman ruin, all while being anchored by an 18th-century military barracks-turned-university (Jiménez-Vicario et al., 2018). This synergy prevents the city from feeling like a fragmented collection of different eras; instead, the “Paths” created by the modernist expansion and the “Nodes” established by institutional reuse work together to form a cohesive identity (Conzen, 1960; Soler Tortosa, 2015). Ultimately, this analysis confirms that the “invisible scaffold” of the past is not a hindrance to modern life but its primary facilitator, transforming military rigidity into academic and ritualistic fluidity.



**Figure 10.** Layered diagram of morphological evolution: a) Urban layout with defense walls in the 16th century (Grandal López, 1996); b) Urban layout with defense walls in the 17th century (Grandal López, 1996); c) Urban limits in the late 17th century (Pérez Yelo, 2013); d) Solid-void analysis of the contemporary urban pattern, showing built versus open spaces (source: produced by the authors using Autodesk® Forma)

## 6. Findings and discussion

The analysis of Cartagena's urban anatomy reveals that the city's contemporary identity is not a static preservation of the past, but a result of a dynamic "Heritage-City Synergy". The findings indicate that the transition from a rigid military outpost to a vibrant academic and cultural center represents a sophisticated morphological evolution rather than a rupture in historical continuity. While the rigorous technical correlation between Conzen's physical form units and Lynch's perceptual elements is addressed in a separate, more technically oriented morphological study, the present research focuses on the socio-spatial and ritualistic activation of these layers. This synergy demonstrates how diverse historical strata – from Punic foundations to modernist expansions – interact to form a functional, felt, and lived urban experience.

The transformation of the 18th-century military "fringe-belt" into an institutional axis represents a significant morphological repair that reshaped the city's spatial logic. Historically, these defense lines functioned

as exclusionary "edges" that physically and socially constrained the city's growth. However, the adaptive reuse of these massive granite structures by the Polytechnic University of Cartagena (UPCT) has fundamentally reversed this isolationist character. As summarized in the analytical axes and chronological layering (Tables 2–3), these former military barriers have been successfully converted into the city's primary "nodes" of activity, effectively preventing the urban obsolescence often associated with abandoned military heritage. The resilience of these structures lies in their ability to maintain morphological permanence while undergoing a total functional shift – from defense to education – thereby injecting new socio-economic vitality into the historic core.

A critical finding of this research is the role of urban rituals as the "soul" of the anatomy, acting as a mechanism for social re-appropriation and historical integration. The "Carthaginians and Romans" festival, for instance, allows participants to effectively "mask" the chronological gaps between the Punic-Roman foundations and the modernist Ensanche. By utilizing the historical core as a living stage,

**Table 2.** Analytical axes derived from the literature for the Cartagena case study

| Analytical axis                                                                           | Focus of analysis                                                                                    | Application to Cartagena                                                                                                                                                     | Literature sources                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Multi-layered morphology shaped by topography and historical strata                    | Morphological layers, topography-harbor relations, defense systems, continuity of urban form         | Roman grid plan, Medieval organic pattern, 19th-century <i>ensanche</i> expansion; the decisive role of topography (hills, valleys) and the port in shaping urban morphology | Ascher (2005), Conzen (1960), García-León et al. (2015), Hazar and Kubat (2015), Lynch (1960), Noguera Celdrán et al. (2012), Ros McDonnell et al. (2012), Stone and Zimansky (2004)                |
| 2. Architectural patterns and styles as indicators of social and economic transformations | Vernacular to modernist typologies, eclecticism, public and domestic architecture, building typology | Bourgeois prestige buildings (eclectic/modernist houses), emblematic public buildings (Palacio Consistorial), functionalist-modernist developments in the 20th century       | Conzen (1960), Ferrándiz Araújo (2015), Jauregui-Fung et al. (2019), Jiménez-Vicario et al. (2018), La Spina (2021), Rodríguez Martín (2013), Ros McDonnell et al. (2012), Ros Torres et al. (2016) |
| 3. Urban interactions, restoration, and adaptive reuse dynamics                           | Restoration, adaptive reuse, social dynamics, heritage management, cultural continuity               | Foro Romano-Molinete project, adaptive reuse of the Roman Theatre, 2005 PEOPCH process; transformation of industrial/military areas, tourism and social interactions         | García Martín et al. (2022), Mateos Cruz and Palma García (2020), Noguera Celdrán et al. (2016), Petric and Crnjak-Karanović (2016), Segado Vázquez and Maciá Albendín (2015)                       |

**Table 3.** Chronological layering of Cartagena's urban form

|   | Historical period                          | Morphological features                                                     | Present-day traces                                                                                                                            |
|---|--------------------------------------------|----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| a | Roman Period (Carthago Nova)               | Orthogonal grid ( <i>cardo-decumanus</i> ), forum, theatre, amphitheatre   | Roman Theatre (restored), street alignments in historic core                                                                                  |
| b | Medieval Era                               | Organic street network,                                                    | Remnants of fortifications, Old Cathedral, irregular street pattern                                                                           |
| c | Early Modern Period 16th to 18th centuries | Convents, monasteries, defensive walls                                     | Old City Hall (1622), ecclesiastical complexes (now squares)                                                                                  |
| d | 19th century (Ensanche)                    | Expansion grid ( <i>ensanche</i> ), new civic buildings, bourgeois housing | Ensanche district; eclectic and modernist residential blocks reconstructed in the old town following the 1873–74 Canton of Cartagena conflict |
| e | Early 20th century                         | Functionalist and modernist interventions                                  | New City Hall (1900–07), Market halls, early modernist housing, new public buildings                                                          |
| f | Contemporary Era                           | Adaptive reuse, heritage-led regeneration, tourism-driven spaces           | Foro Romano-Molinete, refurbished harbourfront, cultural facilities, museums, and educational buildings (UPCT)                                |

these rituals integrate archaeological strata – which might otherwise remain hidden or static – into the contemporary citizen's daily life. As depicted in the spatial logic of these events (Figure 8), this synergy suggests that the “invisible scaffold” of the past is activated through human performance, turning a rigid historical skeleton into a fluid and dynamic social theater.

Despite these successes, the findings point toward a growing “identity paradox” where the high visibility of heritage risks leading to the commodification of the urban fabric. While the integration of historical layers and the reclamation of the Almarjal have significantly enhanced urban legibility, they have also introduced the challenges of the “tourist-historic city”. The high concentration of multi-layered heritage risks attracting an intensity of tourism that could facilitate “heritage gentrification”, as argued by Ashworth and Tunbridge (2000). The discussion highlights that for the “Heritage-City Synergy” to remain sustainable, urban planning must ensure that the historical core continues to serve the collective memory and social needs of local residents. To prevent the anatomy from becoming a “museumified” relic, the synergy between the historical fabric and living culture must prioritize functional continuity over the mere visitor's gaze.

## 7. Conclusions

This study has dissected the urban anatomy of Cartagena not as a collection of static historical layers, but as a dynamic “Heritage-City Synergy” where military, modernist, and social strata actively support contemporary life. By moving beyond the traditional focus on archaeological preservation, the research demonstrates that the city's identity is sustained through the functional integration of its later historical layers into the contemporary urban fabric.

The findings confirm that the transition from a rigid 18th-century military stronghold to a vibrant academic hub was a sophisticated morphological evolution. The adaptive reuse of the military “fringe-belt” by the Polytechnic University of Cartagena (UPCT) serves as a global benchmark for turning exclusionary defensive barriers into inclusive social nodes. Furthermore, the analysis reveals that urban rituals, such as the Carthaginians and Romans festival, are not merely cultural events but essential morphological tools that socially re-appropriate the physical fabric and bridge chronological gaps within the city's anatomy.

However, this synergy faces an “identity paradox” where the successful reclamation of heritage risks leading to urban museumification. The successful reclamation of modernist districts and the high visibility of the city's multi-layered heritage risk attracting an intensity of tourism that could lead to gentrification. To prevent Cartagena from becoming a “museumified” relic, future urban planning must prioritize the needs and collective memory of local residents, ensuring that the “invisible scaffolds” of the past continue to facilitate a living, functional city.

Ultimately, Cartagena stands as a robust model for Mediterranean coastal cities struggling to balance heritage with modern urban requirements. Decoding the city as a “living anatomy” proves that urban resilience is achieved when historical permanence meets social and institutional fluidity. Future research should expand this “Anatomical Decoding” framework to diverse global port typologies – ranging from the industrial waterfronts of Northern Europe to the high-density maritime hubs of Asia – to test its applicability across different socio-morphological contexts. Furthermore, subsequent studies should include environmental sustainability and the long-term economic impacts of heritage-led transformations on the city's social periphery.

## Acknowledgements

This study emerged following the first author's Erasmus+ faculty mobility visit from Istanbul Gelisim University to Universidad Politécnica de Cartagena (UPCT) in Fall 2023. The authors would like to express their sincere thanks to Zahraa Taha, who was an undergraduate Erasmus+ exchange student at UPCT during Spring 2024, for her technical assistance in preparing the geographic mapping and graphic materials.

## Funding

The first author's mobility was supported by the Erasmus+ Programme of the European Union [grant number 2021-1-TR01-KA131-HED-000003790].

## Disclosure statement

The authors declare no conflict of interest.

## References

- Aforca. (n.d.). *Patrimonio; Arquitectura militar en Cartagena* [Military architecture heritage in Cartagena]. Retrieved May 30, 2025, from [https://aforca.org/antigua/patrimonio\\_de\\_arquitectura\\_militar\\_en\\_cartagena.htm](https://aforca.org/antigua/patrimonio_de_arquitectura_militar_en_cartagena.htm)
- Agrupación de San Juan Marrajo. (2024). *San Juan en la noche del Viernes Santo* [Saint John on the night of Good Friday]. <https://sanjuanmarrajo.org/agrupacion/procesiones/viernes-santo-noche/>
- Ascher, K. (2005). *The works: Anatomy of a city*. The Penguin Press.
- Ashworth, G. J., & Tunbridge, J. E. (2000). *The tourist-historic city: Retrospect and prospect of managing the heritage city*. Routledge. <https://doi.org/10.4324/9780080519470>
- Ayuntamiento de Cartagena. (2013, March 25). *Los niños californios acompañaron la Entrada de Jesús en Jerusalén* [The California children accompanied the Entry of Jesus into Jerusalem] [Photograph]. Portal de Noticias del Ayuntamiento de Cartagena. [https://www.cartagena.es/detalle\\_noticias.asp?id=27865](https://www.cartagena.es/detalle_noticias.asp?id=27865)
- Ayuntamiento de Cartagena. (2017a). *El desfile del carnaval hizo vibrar a Cartagena en el fin de semana grande* [The carnival parade made Cartagena vibrate on the big weekend]. [https://www.cartagena.es/detalle\\_noticias.asp?id=41730](https://www.cartagena.es/detalle_noticias.asp?id=41730)

- Ayuntamiento de Cartagena. (2017b). *Procesión del Resucitado en la Semana Santa de Cartagena* [Resurrection procession during Holy Week in Cartagena] [Photograph by J. Albaladejo]. Archivo Fotográfico del Ayuntamiento de Cartagena. [https://www.cartagena.es/detalle\\_galeria\\_imagenes.asp?id=42622](https://www.cartagena.es/detalle_galeria_imagenes.asp?id=42622)
- Ayuntamiento de Cartagena. (2019, April 18). *Los Californios celebraron su gran día el Miércoles Santo con la Procesión del Cristo del Prendimiento* [The Californios celebrated their big day on Holy Wednesday with the Procession of Christ of the Arrest] [Photograph by J. Albaladejo]. Portal de Noticias del Ayuntamiento de Cartagena. [https://www.cartagena.es/detalle\\_noticias.asp?id=53949](https://www.cartagena.es/detalle_noticias.asp?id=53949)
- Ayuntamiento de Cartagena. (2025). *Cartagena se viste de fiesta para vivir el Gran Desfile de Carnaval* [Cartagena dresses up to experience the Great Carnival Parade]. [https://www.cartagena.es/detalle\\_noticias.asp?id=82310](https://www.cartagena.es/detalle_noticias.asp?id=82310)
- Busquets, J. (2006). *Barcelona: The urban evolution of a compact city*. Nicolodi & Harvard University Graduate School of Design.
- Conzen, M. R. G. (1960). Alnwick, Northumberland: A study in town-plan analysis. *Transactions and Papers (The Institute of British Geographers)*, (27), iii–122. <https://doi.org/10.2307/621094>
- De La Cruz, M. (1786). *Vista de Cartagena* [Oil on canvas]. Palacio de la Moncloa, Madrid, Spain.
- Digital Mind S.L. (2012, November 27). *Carthago Nova* [Video]. YouTube. [https://www.youtube.com/watch?v=072qD7mB\\_vs](https://www.youtube.com/watch?v=072qD7mB_vs)
- Exea y Pozuelo, J. (1887). *Plano general de la ciudad de Cartagena con su división en cuarteles* [General map of the city of Cartagena with its division into quarter] [Map]. Archivo Municipal de Cartagena (Sign. PL00191), Cartagena, España.
- Ferrándiz Araújo, V. M. (2015). El Palacio Consistorial de Cartagena, ejemplo de la arquitectura institucional en la España del cambio de siglo XIX-XX [The Cartagena City Hall, an example of institutional architecture in Spain at the turn of the 19th and 20th centuries]. *P+C*, 6, 19–32.
- Feringán, S. (1746). *Plano de la ciudad y puerto de Cartagena con todas sus fortificaciones, con expresión del ancho del canal donde se amarran los navíos de S. M.* [Map of the city and port of Cartagena with all its fortifications, indicating the width of the canal where His Majesty's ships are moored] [Manuscript map]. Archivo General de Simancas, Mapas, Planos y Dibujos (Sign. MPD 21-015), Ministerio de Cultura y Deporte.
- Feringán, S. (1751). *Plano del proyecto para construir un arsenal de marina en el puerto de Cartagena* [Project plan for constructing a naval shipyard in the port of Cartagena] [Manuscript map]. Archivos Estatales, España.
- García-León, J., García-Martín, A., & Cánovas Ambit, J. A. (2015). The city of Cartagena in the high imperial Roman era: Generation and analysis of a digital elevation model. *EGA Expresión Gráfica Arquitectónica*, 20(26), 224–231. <https://doi.org/10.4995/ega.2015.4055>
- García Martín, F. M., Bas, R. R., Martínez Marina, I., Tordera Gracia, E. R., & Rodríguez López, M. J. (2022, November 17–19). The historic center of Cartagena (Spain): Actions in the 2005–2021 period. In *II Cultural Heritage Symposium ICOMOS* (pp. 483–490). Spain, Cartagena. ICOMOS.
- Grandal López, A. (1996). *Los siglos XVI y XVII*. [The 16th and 17th centuries]. In C. Tornel Cobacho (Ed.), *Manual de historia de Cartagena* (pp. 161–220). Ayuntamiento de Cartagena.
- Hazar, D. & Kubat, A. S. (2015). Fringe belts in the process of urban planning and design: Comparative analyses of Istanbul and Barcelona. *ITU Journal of the Faculty of Architecture*, 12(1), 53–65.
- Heras Millán, J. A. (2017). *Cartagena y su Arsenal en el siglo XVIII a través de su Maqueta* [Cartagena and its arsenal in the 18th century through its model]. Asociación Cultural de Amigos del Museo Militar de Cartagena. <https://archivo.cartagena.es/gestion/documentos/22601.pdf>
- Hohenberg, P. M., & Lees, L. H. (1995). *The making of urban Europe, 1000–1994: With a new preface and a new chapter*. Harvard University Press. <https://doi.org/10.4159/9780674038738>
- Hoyos, D. (2003). *Hannibal's dynasty: Power and politics in the western Mediterranean, 247–183 BC*. Routledge.
- Jauregui-Fung, F., Kenworthy, J., Almaaroufi, S., Pulido-Castro, N., Pereira, S., & Golda-Pongratz, K. (2019). Anatomy of an informal transit city: Mobility analysis of the metropolitan area of Lima. *Urban Science*, 3(3), Article 67. <https://doi.org/10.3390/urbansci3030067>
- Jiménez-Vicario, P. M., García-Martínez, P. & Ródenas-López, M. A. (2018). The influence of North African and Middle Eastern architectures in the birth and development of modern architecture in Central Europe (1898–1937). *Mediterranean Historical Review*, 33(2), 179–198. <https://doi.org/10.1080/09518967.2018.1535394>
- Kubat, A. S. (1997). The morphological characteristics of Anatolian fortified towns. *Environment and Planning B: Planning and Design*, 24, 95–123. <https://doi.org/10.1068/b240095>
- La Spina, V. (2021). La antigua casa consistorial de Cartagena (España) en los siglos XVIII y XIX. Vicisitudes históricas e intervenciones arquitectónicas [The old town hall of Cartagena (Spain) in the eighteenth and nineteenth centuries. Historical vicissitudes and architectural interventions]. *Ars Longa*, 30, 207–224. <https://doi.org/10.7203/arslonga.30.20426>
- Leontidou, L. (1990). *The Mediterranean city in transition: Social change and urban development*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511522208>
- Lorente, E. (2020a, February 21). *Cartagena se prepara para el Gran Desfile de Carnaval este sábado* [Cartagena prepares for the Great Carnival Parade this Saturday]. *Cadena SER*. [https://cadenaser.com/emisora/2020/02/21/radio\\_cartagena/1582322152\\_196568.html](https://cadenaser.com/emisora/2020/02/21/radio_cartagena/1582322152_196568.html)
- Lorente, E. (2020b, October 17). *En 2021 podría circular el primer tren de mercancías en la dársena de Escombreras* [The first freight train could run in the Escombreras dock in 2021]. *Cadena SER*. [https://cadenaser.com/emisora/2020/10/16/radio\\_cartagena/1602868898\\_117177.html](https://cadenaser.com/emisora/2020/10/16/radio_cartagena/1602868898_117177.html)
- Lynch, K. (1960). *The image of the city*. The MIT Press.
- Mateos Cruz, P., & Palma García, F. (2020). *La arqueología urbana en las ciudades de la Hispania Romana: Proyectos integrales de investigación, conservación y difusión* [Urban archaeology in the cities of Roman Hispania: Comprehensive research, conservation, and dissemination projects]. Consortium of the Monumental City of Mérida.
- Noguera Celdrán, J. M., Madrid Balanza, M. J., & Martínez López, J. A. (2012). Una historia en construcción: Las defensas de Cartagena en la Antigüedad. Novedades de la muralla romana republicana [A story under construction: Cartagena's defences in Antiquity. Recent news-novelties about the Roman Republican city wall]. *Anales de Arqueología Cordobesa*, 23–24, 35–74.
- Noguera Celdrán, J. M., Cánovas Alcaraz, A., Madrid Balanza, M. J., & Martínez Peris, I. (Eds.). (2016). *Barrio del Foro Romano Molinete/Cartagena: Proyecto integral de recuperación y conservación* [Roman Forum District Molinete/Cartagena: Comprehensive recovery and conservation project]. *Cartagena City Council; Consortium Cartagena Puerto de Culturas*.
- Ordovás, J. J. (1799). *Plano de la plaza de Cartagena y su Arcenal* [Plan of the plaza of Cartagena and its Shipyard] [Manuscript map]. Archivo General Militar de Madrid (AGMM), Instituto de Historia y Cultura Militar, Madrid, España.

- Pérez Rojas, F. J. (1986). Cartagena 1874–1936. *Transformación urbana y arquitectura* [Cartagena, 1874–1936 (urban transformation and architecture)]. Editora Regional de Murcia.
- Pérez Yelo, M. (2013). *La sucesión del estilo, Cartagena 1503–1875: Guía de arquitectura de Cartagena* [The succession of style, Cartagena 1503–1875: Architectural guide of Cartagena] [Master's thesis, Universidad Politécnica de Cartagena]. Repositorio Institucional UPCT. <https://repositorio.upct.es/entities/publication/6e0f0d9c-5407-4c66-a54d-9bf4ce364e3e>
- Petrić, L., & Crnjak-Karanović, B. (2016). Anatomy of sustainable tourism development: A case study of the city of Split. In *Proceedings of the SITCON 2016 – Singidunum International Tourism Conference* (pp. 11–16). Singidunum University. Belgrade, Serbia.
- Ramallo Asensio, S. F., & Martínez Andreu, M. (2010). El puerto de Carthago Nova: Eje de vertebración de la actividad comercial en el sureste de la Península Ibérica [The port of Carthago Nova: Backbone of commercial activity in the southeast of the Iberian Peninsula]. *Bollettino di Archeologia on line*, 1(S B/B7/11), 141–159.
- Ramos Bascañana, F. de P., García Faria, P., & Oliver, F. de P. (1897). *Plano general del Proyecto de Ensanche, Reforma y Saneamiento de Cartagena* [General plan of the Cartagena expansion, reform, and sanitation project] [Map]. Archivo Municipal de Cartagena (AMC), Cartagena, Spain.
- Rodríguez Martín, J. A. (2013). *Renovación de la ciudad, Cartagena 1875–1936: Guía de arquitectura de Cartagena* [Urban renewal, Cartagena 1875–1936: Architectural guide of Cartagena] [Master's thesis, Universidad Politécnica de Cartagena]. Repositorio Institucional UPCT. <https://repositorio.upct.es/entities/publication/e5d5e5f0-4fb9-4b8a-9469-5ca0fa1eed9e>
- Ros McDonnell, D., Ramírez Hernández, F., & Ródenas López, M.A. (2012). El plano de Cartagena, su ensanche y sus inmediaciones por Julián Sáez [The plan of Cartagena, its expansion and surrounding area by Julián Sáez]. In *XI International Congress of Graphic Expression Applied to Building* (pp. 434–441). Polytechnic University of Valencia.
- Ros McDonnell, D., & Ródenas López, M. A. (2012). La inundación de Cartagena del 29 de septiembre de 1919 [The Cartagena flood of September 29, 1919]. *P+C*, 3, 47–60.
- Ros Torres, J., García León, J., & Vázquez Arenas, G. (2016). La calle del Carmen de Cartagena: Tradición y sostenibilidad [Carmen street in Cartagena: Tradition and sustainability]. *P+C*, 7, 147–158.
- Rossi, A. (1982). *The architecture of the city*. MIT Press.
- Savoldi, F. (2024). Contested port cities: Logistical frictions and civic mobilization in Genoa and Venice. *Environment and Planning C: Politics and Space*, 42(8), 1352–1369. <https://doi.org/10.1177/23996544241231684>
- Segado Vázquez, F., & Maciá Albendín, J. M. (2015). Cohabitation between Cartagena and Cartago Nova (Spain). *WIT Transactions on Ecology and The Environment*, 194, 461–472. <https://doi.org/10.2495/SC150401>
- Selvi Ünlü, T. (2025). Changing urban identity of a Mediterranean port city: From consistency to fragmentation. *International Journal of Urban Sciences*, 30(2), 544–568. <https://doi.org/10.1080/12265934.2025.2470228>
- Sharpley, R. (2020). Tourism, sustainable development and the theoretical divide: 20 years on. *Journal of Sustainable Tourism*, 28(11), 1932–1946. <https://doi.org/10.1080/09669582.2020.1779732>
- Soler Tortosa, G. (2015). Evolución urbana y arquitectura funcional: Cartagena en la segunda mitad del siglo XX [Urban development and functional architecture: Cartagena in the second half of the twentieth century]. *P+C*, 6, 129–140.
- Stone, E. C., & Zimansky, P. (2004). *The anatomy of a Mesopotamian city: Survey and soundings at Mashkan-shapir*. Eisenbraun Press. <https://doi.org/10.5325/j.ctv1bxh4k0>
- Whitehand, J. W. R. (1988). Urban fringe belts: Development of an idea. *Planning Perspectives*, 3(1), 47–58. <https://doi.org/10.1080/02665438808725651>
- Villalgordo, J. (2023, September 24). El gran desfile de Carthaginienses y Romanos de Cartagena, en imágenes [The Great Parade of Carthaginians and Romans in Cartagena, in pictures]. *La Verdad*. <https://www.laverdad.es/cartagineses-romanos/gran-desfile-carthaginienses-romanos-cartagena-imagenes-20230924084224-ga.html>
- Villalgordo, J. (2024, September 28). Gran desfile de Carthaginienses y Romanos 2024 [Great Parade of Carthaginians and Romans 2024]. *La Verdad*. <https://www.laverdad.es/cartagineses-romanos/gran-desfile-carthaginienses-romanos-2024-20240928223647-ga.html>
- VirTimePlace. (n.d.). *Carthago Nova*. Retrieved May 30, 2025, from <https://www.virtimeplace.com/carthago-nova>
- Zarei, M., Arasteh, M., & Shahab, S. (2024). Exploring port-city relationships: A bibliometric and content analysis. *Sustainability*, 16(11), Article 4341. <https://doi.org/10.3390/su16114341>