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URBAN DESIGN AND PLANNING

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URBAN DESIGN AND PLANNING

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Traditional Dwellings and Settlements

Working Paper Series

THE IMPACT OF MILITARY IMMIGRATION ACTIVITIES IN THE MING AND QING DYNASTIES ON THE HUMAN LAND RELATIONS AND URBAN CONSTRUCTION OF HISTORICAL TOWNS ALONG THE XIAN-QIAN- DIAN POST ROAD: A CASE STUDY OF ZHENYUAN ANCIENT TOWN

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THE IMPACT OF MILITARY IMMIGRATION ACTIVITIES IN THE MING AND QING DYNASTIES ON THE HUMAN LAND RELATIONS AND URBAN CONSTRUCTION OF HISTORICAL TOWNS ALONG THE XIANG-QIAN-DIAN POST ROAD: A CASE STUDY OF ZHENYUAN ANCIENT TOWNS



The Ming central government dug a post road from Guizhou to Yunnan to access the region. However, the central government had limited control over the road. In 1381, after conquering Yunnan, Zhu Yuanzhang deployed 300,000 soldiers in Yunnan and Guizhou to secure China's southwest. Later, he relocated many migrants to Guizhou. The Xiang-Qian-Dian Post Road was a vital official road in the southwest during the Ming and Qing dynasties. It originated from Huaibua in Hunan Province. The road passed through Zhenyuan, Kaili, Guiyang, Anshun, Panxian and other places in northeastern Guizhou, then entered Fuyuan County in Yunnan and arrived at Kunming via Qujing and other places. This road had a direct impact on Guizhou's future development. Along the road lived many Han immigrants who established immigrant towns. These historical towns developed specific spatial patterns under the influence of immigrant culture, military culture, ethnic relations and local environment. The road created a typical linear cultural heritage space that contrasted with the ethnic settlements and towns on both sides of the road.

Chinese cities have experienced large-scale and rapid expansion for more than 30 years, resulting in a shortage of land resources and making it hard to maintain the development style of scale expansion. Urban space development is now undergoing an important transition from incremental planning to stock planning. Guizhou has many mountains and uneven land, with very limited land for development and use. The cities along the migration route are the earliest cities built in Guizhou, with a long history that reflects the development process of Guizhou as a province. The city's existing space has a lot of architectural heritage and preserves some historical patterns. Therefore, the activation and renewal of existing space are very important for Guizhou's urban development. This study is guided by the evolution law of the spatial form of historical towns in the area formed by the migration events along the Xiang-Qian-Dian Post Roads in Guizhou.

The current protection strategies mostly focus on restoring traditional styles, but tradition itself is not an end in itself. Tradition should be a means to continue local culture and respond to local natural and social environments. This study focuses on how post road migration affects the Built environment and how to form a set of traditional building strategies. Zhenyuan is the east gate of Guizhou Province, known as the "key to Dianchu and the gateway to eastern Guizhou". The construction of immigrant towns in Guizhou is the embryonic form of the early urban society in Guizhou. This study takes the formation of urban social space along the immigrant post road in Guizhou as the research content, and takes the ancient town of Zhenyuan in Guizhou as the research object. Through the analysis of architectural typology and Urban morphology, the historical stratification process of the construction and development of immigrant cities along the post road is sorted out, and the landscape environment, settlement texture The traditional construction strategy of four aspects: architectural style and scale system, defining the structural elements relied on for the future development of the city, provides planning and design reference for the renewal of historical urban stock along the post road, thus achieving the historical continuity of the city while maintaining local characteristics.

1. INTRODUCTION

1.1 The Xiang-Qian-Dian Post Road



Fig 1: Road Map from Beijing to Thirteen Provinces during the Ming Dynasty (Source: Huang, Bian. (Ming Dynasty), Yang, Zhentai, Revised. *Yitong Road Course Map. (Ming Dynasty)*)



Fig 2: Road Map from Nanjing to Thirteen Provinces during the Ming Dynasty (Source: Huang, Bian. (Ming Dynasty), Yang, Zhentai, Revised. *Yitong Road Course Map. (Ming Dynasty)*)



Fig 3: The location of the Xian-Qian-Dian Post Road in the cities and towns passing through Guizhou Province (Source: Self drawn by the author)

The Xiang-Qian-Dian Ancient Post Road is one of the significant historical transportation routes in China. It links three regions, namely Hunan (Xiang), Guizhou (Qian), and Yunnan (Dian), serving as a crucial trade and military passage that traverses the southwestern part of southern China. The post road was established after the Yuan Dynasty's capital was moved to Dadu (Beijing) in 1291AD (Fig 1, 2, 3). The total length of the route is over 1,400 kilometers, with a section of approximately 600 kilometers passing through the province of

Guizhou. This post road traverses more than 30 counties and cities across three provinces, covering an area of nearly 80,000 square kilometers. Along its path, there are over 20 different ethnic groups, with a total population of nearly 20 million people. It is the region with the highest concentration of urban centers, dense population, active economy, and frequent cultural exchanges in southwestern China.

1.2 Historical Background and Current Situation of Zhenyuan

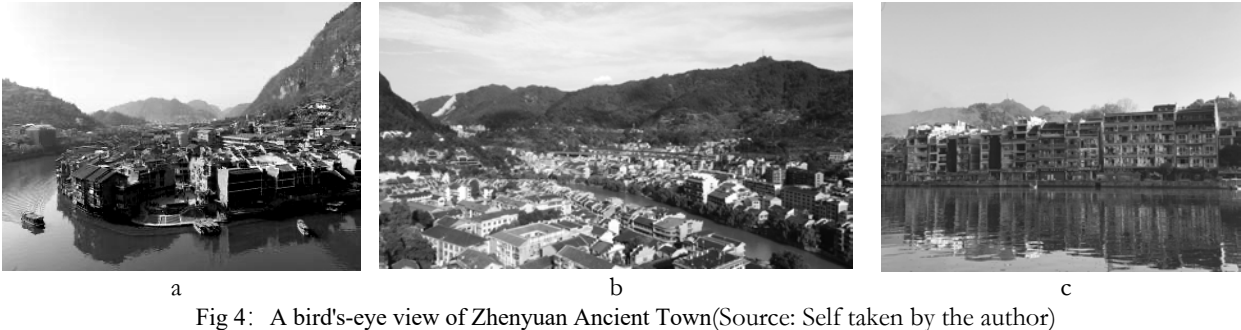


Fig 4: A bird's-eye view of Zhenyuan Ancient Town(Source: Self taken by the author)



Fig 5: Zhenyuan Map (Source: 2022 Google Earth)

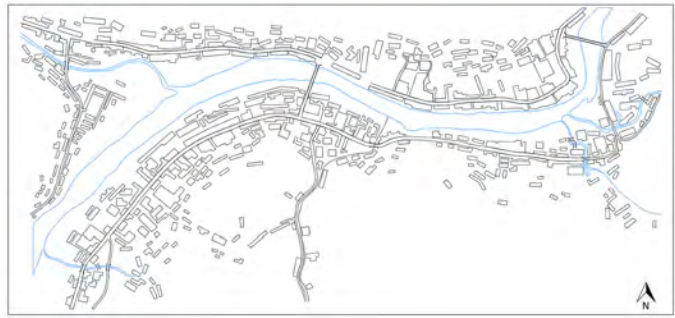


Fig 6: Zhenyuan City Form(Source: Self drawn by the author)

Zhenyuan Ancient City has a long history, important status, and rich culture, making it one of the 100 historical and cultural cities in China. In history, the town was called Wuyang and was named after the Miao ancestors moved from Wuyang, Henan to Zhenyuan five thousand years ago. The establishment history of Zhenyuan has been 2280 years since the establishment of a county in the 30th year of King Zhao of Qin (227 BC). Since ancient times, Zhenyuan has been a hub of land and water transportation connecting the mainland and the border areas, with special significance in military strategy. It is not only the "throat of Hunan and Guizhou" 湘黔咽喉(Xiang Qian Yan Hou)¹, but also the "key to Yunnan and Guizhou" 滇楚锁钥(Dian Chu

¹ It refers to a narrow passage or isthmus located between the provinces of Hunan (Xiang) and Guizhou (Qian), serving as a critical point or transportation corridor connecting the two regions.

Suo Yao)². Due to its ability to stabilize the southwest, it is named "Zhenyuan". During the Yuan Dynasty, a post road was built from Huguang to Yunnan, and Zhenyuan was the first pier of the Wuyang River. After reaching Kunming, there were roads that could lead to Myanmar and Southeast Asia. Since the Yuan and Ming dynasties, Burmese envoys who came to Beijing to pay tribute must pass through Zhenyuan. The goods from Yunnan's post roads were launched in Zhenyuan, making it an important water and land terminal on the Southwest Corridor, thus becoming the "Southwest Metropolitan". Zhenyuan's unique geographical location has made it renowned as a strategic and military stronghold. Since ancient times, it has been said, "To control Yunnan and Chu, one must capture Zhenyuan," and "To establish connections with Yunnan and Guizhou, one must first secure Zhenyuan." It is also referred to as the "Gateway to Eastern Guizhou."

Zhenyuan emerged due to the construction of post roads, with prefecture city and walled city facing each other across the river, with both administrative and military geographical units. It is a typical representative of early cities in Guizhou. The post roads served as both military and commercial immigrants during the Ming and Qing dynasties, and the migration of immigrants and the demand for military defense and commercial trade development were closely related to the urban construction and spatial development of Zhenyuan. Therefore, this paper aims to explore how the construction of post roads and related activities affect the built environment and bring corresponding spatial response laws and feedback characteristics under different spatiotemporal backgrounds, and hopes to use such internal laws and inevitability to provide spatial planning principles for future updates of urban and rural stock,

2. METHOD CONSTRUCTION

This paper sets the content of time range, spatial range, and research scale hierarchy based on the historical background and current characteristics of the research object. Regarding the research time frame, this study mainly selected China's Ming and Qing dynasties (1368-1840 AD) as the main research period. Because ancient post roads were formed in the Ming Dynasty, Guizhou was established as a province in the early Ming Dynasty, and the first batch of cities in Guizhou were also built as a result. The Qing Dynasty was a period when local society in Guizhou tended to stabilize and commercial trade became increasingly prosperous. Regarding the selection of spatial scope, this study mainly focuses on the prefecture city" and walled city" on both sides of the Wuyang River, the specific scope is based on the core protected areas designated for the two regions in the protection plan for the historical and cultural city of Zhenyuan, A is the

² The words means that Zhenyuan is a crucial region or passageway between Yunnan (Dian) and Hunan (Chu), holding strategic significance, much like a key in a lock, controlling this area is equivalent to having vital control over access rights.

core protected area of prefecture city" , and B is the core protected area of walled city" (Fig7 a) . The scale hierarchy of the study mainly focuses on typical historical sites within the core protected areas (Fig7 b,c).



Fig 7: Core protected areas and historical sites(Source: Self drawn by the author)

2.1 Related Research Methods

The research methods for the development and evolution of historical towns can be mainly divided into three categories: historical research based on literature research and field investigations, combined with deductive analysis of historical images and current information, research on spatial evolution laws based on architectural typology and urban morphology, and research on spatiotemporal digital humanistic methods combining geographic spatial information technology and heritage digitization technology.

2.2 Method Design

This study constructs a research method for the evolution and development of historical towns based on existing research methods and existing data. The analysis process divides the research content into historical information and spatial information. Firstly, historical information is organized, and secondly, spatial information is used to proofread and analyze historical information.

(1) Historical Information Analysis

The content of historical information is generally complex, so this paper proposes a method of multi-source text information mutual matching for the study of historical information. The information in this paper mainly comes from three types of information: "on-site information, text information, and image information", On-site information (field surveys, spatial surveying), textual information (local chronicles, inscriptions, poetry manuscripts, maps), image information (historical photos, keyhole satellite images). Based on this, research is conducted on the mutual verification of

information at three levels: "on-site information, text information, and image information" to verify the location, layout, and basic spatial form of historical towns.

(2) Spatial Information Analysis

This study applies urban morphology and architectural typology as methods for spatial information visualization to collect spatial data and applies architectural typology to analyze various spatial units and architectural types at the micro level. Finally, extract spatial prototypes, summarize the basic laws of block formation, grasp the basic scale system of towns, and also summarize cultural symbols from architectural types to explore the reshaping methods of immigration activities that accompany post roads on the environment.

3. URBAN CONSTRUCTION ANALYSIS

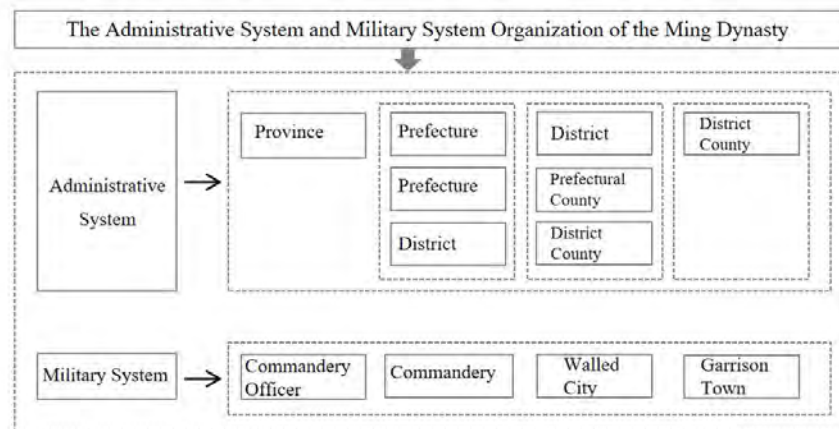


Fig8: The main structure of the administrative and military system of the Ming Dynasty
(Source: Self drawn by the author)

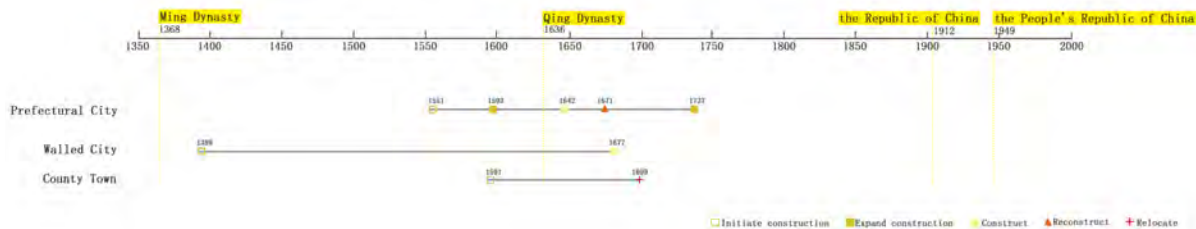


Fig 9: Historical Evolution of Zhenyuan City Construction (Source: Self drawn by the author)

Guizhou was established mainly for the military purpose of controlling southwestern China, therefore, Guizhou during (Fig8) the Ming Dynasty belonged to a place where both administrative

and military systems coexisted. Under the administrative system, there are three levels of cities: "Prefecture City"府城 (Fu Chen) , "District City"州城 (Zhou Chen) , and "County City"县城 (Xian Chen). Under the military system, there are three levels of military geographical units: "Commandery"都司 (Du Si) , "Walled City"卫城 (Wei Chen) , and "Garrison Town"所城 (Suo Chen) ³. Some of the "Walled City" and "Garrison Town" do not have actual control over land, and they rely on "Prefecture City", "District City", and "County City" to exist. The people in "Walled City" and "Garrison Town" are military households, while the people in "Prefecture City", "Walled City", and "County City" are civilian households.

Zhenyuan was first established as a “Walled City” in the 21st year of the Hongwu era of the Ming Dynasty (1388). It forms a triangle with Pingxi Walled City (now Yuping), Qinglang Walled City (now Zhenyuan Qingxi), and Pianqiao Walled City (now Shibing), controlling the border between Hunan and Guizhou. After the Qing Dynasty, the central government gradually integrated the local administrative system and military system, until the 22nd year of the Kangxi reign (1683AD) when Zhenyuan Walled City and Zhenyuan Prefecture City merged into one city.

3.1 Site Selection and Scale

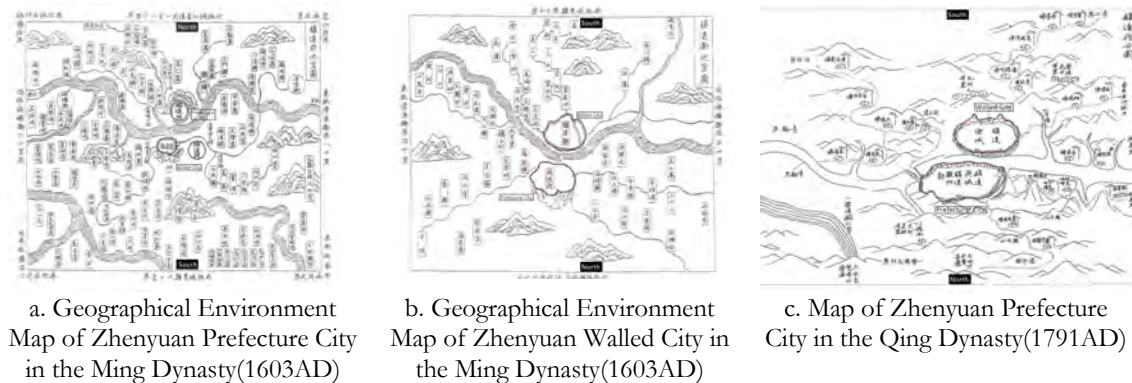


Fig 10: Zhenyuan City and Its Surrounding Environment
(Source: a,b.Ming (Wanli) era, Guo Zizhang, "Gazetteer of Guizhou". c.Qing (Qianlong) era, "Gazetteer of Zhenyuan Prefecture".)

³ "Walled City"and "Garrison Town"are part of military geographical units. Some "Walled City"and "Garrison Town"have actual territorial jurisdiction, known as"Actual Land Walled City and Garrison Town" "实土卫所"(shí tǔ wèi suǒ), while some do not have territorial jurisdiction and only have military households under their control, known as "Virtual Land Walled City and Garrison Town" "虚土卫所"(xū tǔ wèi suǒ). Most of the "Walled City"and "Garrison Town" in Guizhou are "Actual Land Walled City and Garrison Town" with actual territorial control.

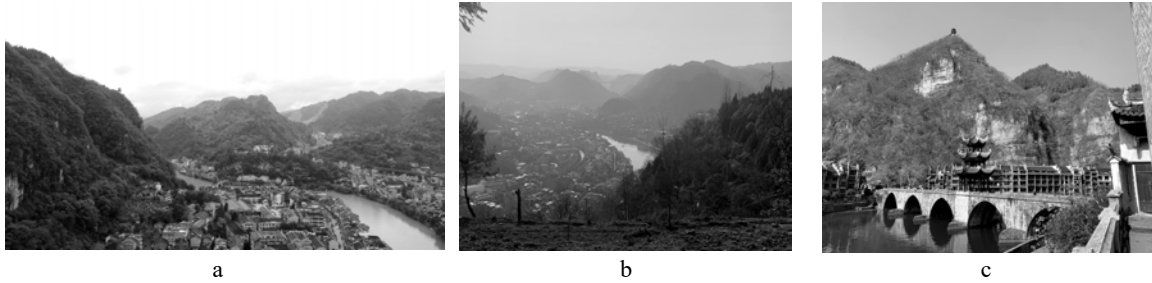


Fig 11: A bird's-eye view of Zhenyuan Ancient Town

The site selection of Zhenyuan was primarily driven by its military defense capabilities, chosen in a mountainous valley that was easily defensible. The flat land along both sides of the Wuyang River is narrow and limited in terms of available construction space, making it less ideal for urban habitation. However, Zhenyuan City is surrounded by mountains on all sides, with water flowing through the middle, forming a natural barrier with steep mountain peaks and converging streams (Fig10,11). Secondly, from the perspective of transportation, the Wuyang River channel is the first station to transfer from the Central Plains to Guizhou by water and land. It is a hub for human and logistics flow, and the stability of Zhenyuan plays an important role in local stability. Therefore, Zhenyuan is highly suitable as a gateway and strategic pass.

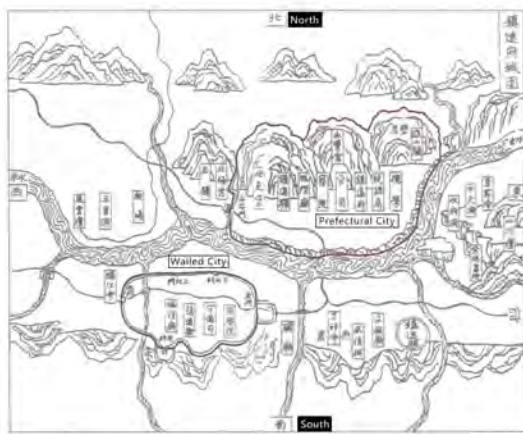
In terms of urban spatial scale, Zhenyuan's prefecture city and the walled city are situated along the Wuyang River, with the walled city to the south of the river and the prefecture city to the north. The city wall of prefecture city is located on Shiping Mountain, winding and undulating along the mountain until it reaches the banks of Wuyang River. It is one hundred and twenty feet (400m) long, one hundred and fifteen feet (5m) high, with seventy-six buttresses and iron doors. The walled city was constructed below Wulao Mountain, with its northern boundary along the Yang River. Its city wall has a circumference of 920 meters (3090 meters), a height of 1.3 feet (4.3 meters), and a width of 8 feet (2.67 meters). It has 1872 battlements, nine gun emplacements, five city gates in the east, west, south, upper north, and lower north, as well as two water gates and three city walls. The transportation along the Wuyang River is bustling, with twelve docks and eight guildhalls constructed on both banks, making it a thriving hub for commerce.

In terms of urban population size, according to historical records, only from 1821 to 1850 AD, there were 2062 industrial and commercial workers who migrated to Zhenyuan along post roads from other places, living along both banks of the river, and the streets were constantly bustling with traffic

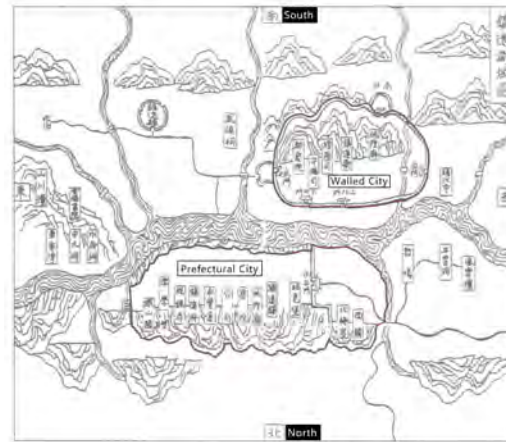
and horses. During the heyday of urban commerce, there were over 3600 residential buildings, over 7000 households, and over 35000 people in the two cities of prefecture city and walled city.⁴

In general, during the Ming Dynasty, the various cities in Zhenyuan existed independently. In the Qing Dynasty, as the border situation stabilized, the central government merged the local military and administrative systems. Prefecture city and walled city" were unified into a single city. The urban population increased, and the city's size gradually expanded. Bridges were built to connect both sides of the Wuyang River, and the urban infrastructure improved gradually.

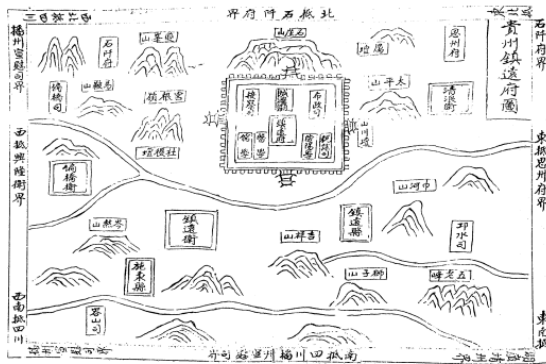
3.2 FORM AND ELEMENTS



a. Map of Zhenyuan Prefecture City (1603AD)



b. Map of Zhenyuan Walled City (1603AD)



c. Map of Zhenyuan Prefecture City (1522AD)



d. Map of Zhenyuan Walled City (1791AD)

Fig 12: Zhenyuan City and Its Surrounding Environment
(Source: a, b. Ming (Wanli) era, Guo Zizhang, "Gazetteer of Guizhou". c. Qing (Qianlong) era, "Gazetteer of Zhenyuan Prefecture". d. Ming (Jiajing) era, "Comprehensive Gazetteer of Guizhou".)

⁴ Tao Zhonglin. "Tracing the Culture of the Ancient City of Zhenyuan" [M]. Guiyang: Guizhou People's Publishing House, 2011.

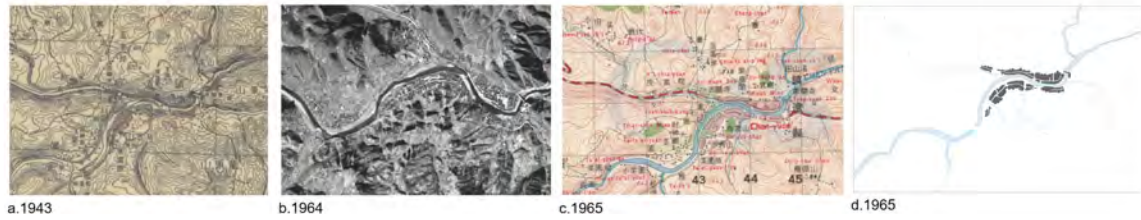


Fig 13: Modern Zhenyuan Historical Map

(Source: a. 1943 Land-based Topographic Map of Guizhou Province, b. 1965 US Joint Service Commander in Chief 1:50000 Zhenyuan Land Survey. c. 1964 Keyhole Satellite Image. d. Self drawn by the author)

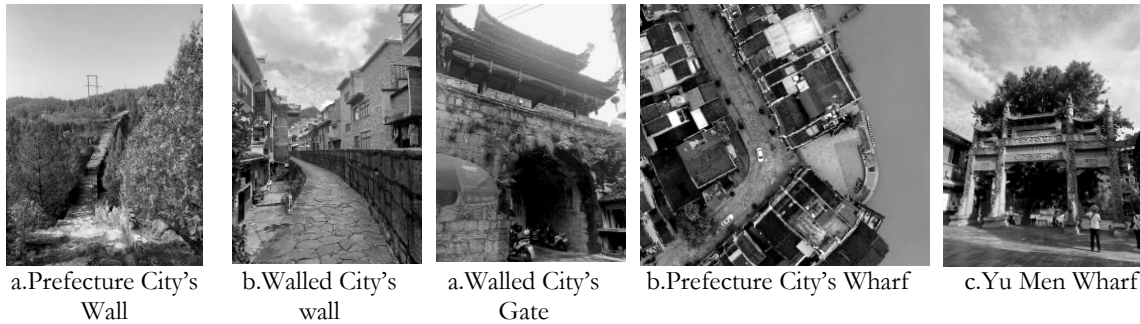


Fig 14: Zhenyuan Ancient City Wall (Source: Self taken by the author)

Fig 15: Zhenyuan Wharf (Source: Self taken by the author)

Due to the topography, Zhenyuan's urban layout is characterized by a strip-like configuration, with main roads running parallel to the river, and buildings constructed along the riverbanks and streets, creating a network of streets and alleys (Fig13). From the drawings of Zhenyuan found in the local gazetteers of the Ming Dynasty, it can be observed that the early city was primarily constructed at the foot of the mountain, with city walls and gates built along one side of the river, making the city relatively enclosed. In the local gazetteer of Zhenyuan from the 6th year of the Qianlong reign (1741 AD), the illustrations depict both the prefecture city and the walled city extending toward the riverbank. The city's boundaries facing the riverbank appear to be in a state of development, with buildings organized in an orderly fashion, with their backs against the mountains and facing the water. The primary functions of these buildings are related to official government institutions (Fig12).

In terms of the city's functions and elements, during the early Ming Dynasty, the prefecture city was primarily centered around official government offices and schools, while the garrison town was

primarily focused on military administrative institutions. As the local society in Zhenyuan became more stable, the substantial presence of military households stimulated the supply of military provisions. During the Qing Dynasty, a significant influx of merchants into Zhenyuan occurred. This led to gradual changes in the city's architectural elements and functions, primarily reflected in the development of commercial facilities, residential buildings, and transportation infrastructure (Fig14,15). In terms of commercial facilities, a riverside market had already developed outside the walled city. Additionally, the significant bridges connecting the prefecture city and the garrison town had also become marketplaces for people to engage in commodity trading. Furthermore, with the gathering of merchants from various regions, various guildhalls and temples were constructed on both sides. On the south bank of the Wuyang River, the ancient architectural complex in Qingyan Cave, primarily featuring Jiangxi guildhalls⁵, has become one of the rare and well-preserved large temples built on cliffs in the country. In terms of transportation infrastructure, the docks on both banks of the Wuyang River are flourishing, forming three categories of docks: official, military, and civilian. In terms of residential buildings, the migrating merchants constructed large mansions on the spacious slopes behind the official buildings in the prefecture city. A settlement gradually formed on the north bank, bringing with it a distinct architectural style different from the local residences in Zhenyuan.

In summary, during the Ming Dynasty, the forms and components of the two cities were primarily influenced by top-down urban construction conventions. They were strongly influenced by official authorities, with a primary focus on military defense. However, in the Qing Dynasty, a large number of commercial immigrants moved to Zhenyuan, and the postal road gradually became an important trade route. The city's spatial layout broke through the boundaries of the city walls, and port development along the riverbank expanded. Urban functions and elements diversified gradually, with an increase in local guildhalls and temples.

⁵ In China, "会馆" (huiguǎn) is typically a type of building used for various social, commercial, cultural, and religious activities, such as guildhalls and ancestral halls.

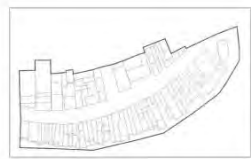
3.3 STYLE AND SCALE



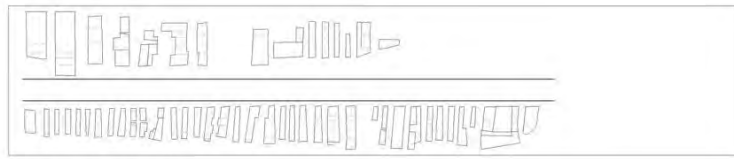
Fig 16: Street building(Source: Self taken by the author)



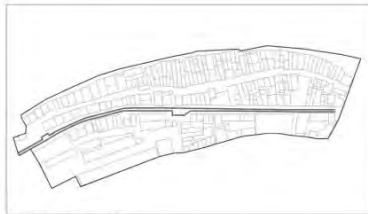
Fig 17: Riverside architecture(Source: Self taken by the author)



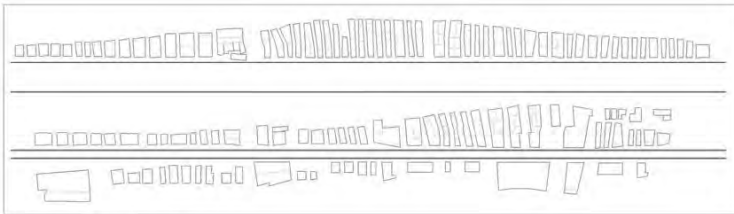
Historical Site (A)



Architectural Typology (A)



Historical Site (B)



Architectural Typology (B)

Fig 18: The types of buildings in the core conservation areas of the prefecture city and the garrison

Regarding the specific analysis of urban character and scale, this paper has chosen historical sections within the core conservation areas along both banks of the Wuyang River (referred to as A on the north bank of the Wuyang River and B on the south bank) for the analysis of urban blocks and building types. In terms of architectural character, Zhenyuan originally served as a gathering place for the Miao ethnic group. However, during the Ming and Qing Dynasties, a significant migration of Han Chinese from Guangdong, Guangxi, Jiangxi, Hunan, and other regions introduced more advanced architectural techniques. As a result, the city's architectural styles gradually evolved into a diverse cultural landscape. On the north bank of the Wuyang River at the foot of the mountain, there is a large residential area where traditional Miao wooden stilted houses coexist with courtyard-style residences built with bricks and stones by incoming merchants. Along both sides of the river, commercial

buildings predominate, with a strong influence from incoming merchants. The buildings along the river streets feature horse-head gables reminiscent of Hui-style architecture⁶, but they retain Miao ethnic's architectural styles in their detailed decorations(Fig16,17).

Regarding architectural scale, Zhenyuan is characterized by its narrow and small geographic area, dense population, and thriving commercial activity. The side of the street with the buildings in Zhenyuan has become a highly contested space for various merchants. Consequently, driven by commercial incentives and the substantial population, the architecture along both banks of the river in Zhenyuan has developed into structures that are elongated in depth and wide in facade, yet relatively narrow in width. On the south bank of the Wuyang River (Historical Site B, formerly the Walled City), the buildings are densely arranged outside the city wall, while those within the city wall have a relatively more spacious layout. It can be preliminarily inferred that during the Ming and Qing periods, the interior of the garrison town was primarily dedicated to military administration, where various military institutions were constructed. The necessary supplies for military households could only be obtained through trade outside the city wall. Consequently, a bustling market with densely packed buildings developed outside the city wall, while the architecture within the city wall exhibited a more loosely organized arrangement. On the north bank of the Wuyang River (Historical Site A, formerly the prefecture city), a significant residential area is distributed at the base of the mountain. Moreover, with a dense population, commercial space becomes even more limited, resulting in buildings tightly arranged in a linear fashion along both sides of the streets (Fig18).

In general, traditional architecture in Zhenyuan exhibits a significant influence from Hui-style architecture, resulting in a architectural character that combines elements of Miao traditional style with Hui-style aesthetics. However, due to constraints on available land for construction and the predominance of karst topography in Guizhou, characterized by shorter trees and smaller wooden structural elements, commercial buildings typically adhere to a basic width of a bay room. As a result, street-facing commercial buildings along the riverbanks primarily adopt the decorative style of

⁶ Hui-style architecture is an important branch of traditional Chinese architecture primarily found in Anhui and Jiangxi provinces. Additionally, Anhui gave rise to a significant business family known as the Hui merchants. Mainly during the Ming and Qing periods, these merchants engaged in commercial trade across various regions in China. They constructed buildings such as inns, businesses, and guildhalls to support their commercial activities in the places where they traded. These buildings often adopted the Hui-style architectural features, and as a result, Hui-style architecture spread and thrived in bustling commercial areas.

Hui-style architecture, while the courtyard layout typical of Hui-style architecture is mainly observed in residential buildings in the open areas on the slopes.

4. CONCLUSION

The establishment of the Xiang-Qian-Dian Postal Road transformed the originally less suitable land of Zhenyuan into a city with unique characteristics. Here, it not only became the largest commercial hub in the southwest but also earned the status of a nationally renowned historical and cultural city. The opening of the postal road broke through the inherent disadvantages of the geographical environment, bringing about the flow of people, goods, and information to this narrow valley. Eventually, the postal road evolved from a transportation artery into a cultural artery for the region. Zhenyuan itself became a microcosm of Guizhou's regional society and local culture.

In the context of urban stock renewal, local urban areas need to adopt a spatial renewal model that preserves cultural sustainability. This type of renewal model requires clear principles for defining spatial operational methods. This paper provides a preliminary analysis of the background and fundamental spatial organizational principles behind the formation of Zhenyuan's urban space from three aspects: city location and scale, urban form and urban elements, and architectural style and scale system. It offers a basic understanding of the geographical environment and urban fabric characteristics of Zhenyuan, as well as the changes in urban functions and morphology following the influx of military and commercial immigrants. It also identifies the basic rules governing architectural style and scale formation. This paper aims to provide preliminary analyses of spatial organizational patterns that can serve as principles for spatial planning in Zhenyuan, focusing on landscape characteristics, settlement fabric, architectural style, and scale system. These principles are intended to contribute to the preservation of local culture's sustainability.

NOTES AND REFERENCES

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NARRATIVES OF A SACRED MOUNTAIN. ARUNACHALA, TAMIL NADU, SOUTH OF INDIA

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NARRATIVES OF A SACRED MOUNTAIN. ARUNACHALA, TAMIL NADU, SOUTH OF INDIA



Arunachala, located in the southern Indian state of Tamil Nadu, is a mountain of great spiritual significance in Hindu culture. Its presence has been instrumental in the growth of Tiruvannamalai as a bustling hub for communities and commerce in the region. The site has been a revered destination for pilgrims from ancient Vedic times until today. However, the mountain has undergone several changes over the last century, due in part to online media and movies. This transition led to a controversy about whether Arunachala is a place of silence and solitude or a temple of pilgrimage, commerce, and celebration.

1. INTRODUCTION

There are many references to mountains as magical places with significant symbolism, whether mythological, cultural, religious, or political. For instance, Greek mythology features Mount Olympus as the divine residence of the gods and goddesses. It was believed to be the highest mountain in Greece and served as a place where the gods held their council and observed the mortal world. Another well-known example is Mount Kailash, located in the Tibetan Himalayas. It is considered sacred to Buddhists, associated with Guru Rinpoche (*Padmasambhava*), and to Jainists, who believe it is where Lord Rishabhadeva attained enlightenment. In these cases, myths are more than just stories, providing insight into humanity's creation, diverse cultural beliefs, and traditions.

According to Hindu mythology, Lord Shiva embodied his earthly presence in Arunachala. Located in Tiruvannamalai, this mountain is believed to be the personification of Lord Shiva himself and is, therefore, respected as a divinity and referred to as a sacred temple. Nowadays, Arunachala has transformed into a contemporary cultural and spiritual hub, allowing visitors to witness and even partake in ancient mythological narratives firsthand.

In this article, I will explore how Tiruvannamalai's cultural and social history influences the movement of people and communities between religious sites in the Tamil Nadu region. This reflection provides a comprehensive account of Arunachala across various narrative contexts spanning centuries: from its mentions in the *Vedas* (the earliest written accounts of Hinduism) to its pivotal role in the city's transformation into a revered pilgrimage site, the construction of the Arunachalesvara temple in the 9th century, and the customary use of the meditation caves, to its evolution into a popular tourist destination and its online presence today.

This paper is organized in four sections. In the first, I delve into the efforts of the community of Tiruvannamalai to preserve the city's heritage and find new and creative ways to manage the impact of the growth of tourism. The second section describes the historiography of the place. I will explore how Arunachala became a spiritual reference point and an essential place of pilgrimage in the South of India for centuries, in some ways equivalent to Varanasi in the North. I will continue by outlining how locals created a particular type of vernacular architecture in Arunachala to encourage retirement and self-examination. Several shelters and caves have been built inside and around the mountain and have become sacred temples and places of solitude and reflection. These dwellings, constructed on the slopes of the ancient hill, and the flock of devotees who use them, substantially impact the surrounding city. In the third section, I will describe how the city experiences these behavioral shifts in full-moon periods, especially during the *Karthigai Deepam* festival. In those days, millions of devotees flood the city to perform the holy procession (*girivalam*) around Arunachala. Tiruvannamalai, once known as a destination for pilgrims, has transformed into a bustling center for the production of media content, including movies, dance, and music. As social media platforms have emerged, personal spiritual journeys have evolved into immersive and captivating experiences heavily influenced by media and social networks. The last section of this paper seeks to illustrate the profound impact of the entertainment industry on the once-isolated pilgrimage site, now giving way to crowded and even virtual realities.

2. ARUNACHALA: TRADITION AND COMMUNITY

The community of Tiruvannamalai has a rich heritage rooted in ancient traditions, vernacular knowledge¹, and mythological literature, deeply embedded in their daily practices. This is evident, for example, in the program of the *Vedic* schools, the way they prepare and consume food, the variety of jewelry they wear, the beautiful flower arrangements, the iconic decorations, and the local architecture heavily relying on vernacular materials and techniques. Their daily routines seamlessly integrate transmission, adaptation, and preservation of traditional values in various areas of life. Some of these ancient practices are common in India, such as the *pujas* (prayers) and the *Vedic Chant* (sacred Hindu texts)². Others are more specific to the historical heritage of Tamil cultures, such as the daily paintings of the *kolams* (mandalas), the *Deepam* (light) celebrations, and the construction of rock-cut caves and intricately carved temples³. Tiruvannamalai offers a captivating experience beyond its symbolic significance; the intricate relationship between the natural surroundings, built structures, and the eclectic local community transformed the city into a living representation of its cultural legacy. Nevertheless, the cycle of tangible and intangible heritage transformation, familiar to most historical and heritage sites, takes Arunachala through the naturalization, adaptation, rejection, and creation of new cultural practices and representations.

The presence of cultural heritage has the potential to create a universe of opportunities, as well as provide protection and conservation⁴. However, it can also lead to negative socio-cultural changes and degradation of heritage resources⁵. Recently, there has been a notable shift in the discussion around cultural heritage, emphasizing places and people more than monuments and objects. This new approach considers numerous factors, such as community perceptions and attachments, cultural landscapes, non-linear histories, and intangible heritage⁶. This movement has led to the increased inclusion of heritage-related words and concepts in community development discussions, enabling local communities to engage with cultural heritage more directly⁷.

The research presented in this paper results from direct contact and observation of this reality over several years. Other documentation techniques, such as field notes, pictures, and audiovisual recordings, were used to collect primary data. Due to long periods of residence in *ashrams* and with the local populations, I was able to grasp how strong Arunachala's agency is inside the community⁸. The religious devotional demonstrations and a highly codified system of social rules concerning the *deities* (saints) mark the rhythm of daily life in Arunachala.

In this paper, I agree with the current notion that heritage is widely accepted as a multifaceted concept encompassing physical artifacts, historical sites, intangible cultural elements, traditions, and the collective memory of communities⁹. A holistic approach to heritage proposes an inclusive and comprehensive method that considers all tangible and intangible dimensions of heritage, including all physical, non-material, and virtual representations¹⁰. Assessing cultural interventions with a multidimensional approach can yield positive outcomes fostering long-lasting effects and encouraging active participation¹¹.

In Tiruvannamalai, local communities' projects play a vital role in safeguarding heritage and enabling a sense of ownership among inhabitants and visitors. Coming from a tradition¹² of community and collaboration that revolves around the preservation of Arunachala, these groups work with communities from various backgrounds, valuing and preserving the distinct traditions and practices that contribute to the rich tapestry of the city's heritage. Projects like the Marudam School, the Shantilamalia Trust, and the Anamalai Trust Fund empower the local communities through education, employment, and stimulating economic empowerment. The Forest Way Project is an organization that collaborates with the local district government to create green areas around the city, such as Thamarai Kulam Park on the southeast side of the city. They also work on maintaining and reforesting Arunachala in partnership with the government forest department, extending their work to local schools, such as Marudam. Other projects work on different causes. Some, like the Animal Sanctuary, work closely with agriculturalists, assisting their farms and domestic animals. Other projects focus on researching Tamil building materials and technology. Another organization, the Tiruvannamalai Heritage

Society, collaborates with the recently inaugurated Government Museum of Tiruvannamalai, showcasing the cultural and social history of the Tiruvannamalai district's landmarks.

These groups aim to change visitors' behavior in terms of littering, sanitation, and noise pollution. The significant overflow of spiritual seekers has placed a considerable strain on the resources available, such as water, electricity, and sanitation infrastructure. During and after their pilgrimage, many visitors leave behind waste, pollute water sources, and disrupt the local wildlife with noise, lights, and traffic. Whether Arunachala can effectively cater to the spatial needs of all the spiritual seekers who converge from various parts of the world is a pertinent question.

The community collaboration system in Tiruvannamalai has many notable agents, where the various *asbrams* in the city play a prominent role. Every day, over a thousand meals are served, significantly impacting the routine of countless pilgrims who rely solely on *prasad* (blessed food) for sustenance. Besides the *asbrams*, free-of-charge dormitories, and rest houses in different areas of the town provide a clean place for rest, meditation, and refuge from noisy crowds¹³.

There are concerns that the city's transformation into a global heritage site may have negative impacts despite the progress made by these local agencies. This transformation could harm the natural environment and the local community due to increased visitors and demand on infrastructure. Therefore, collaborative projects like these are crucial in creating open debates and raising local awareness of the changes that Arunachala is undergoing.

As an ancient African proverb wisely states, *a tree that bends in the wind will not be broken*. Similarly, cultural traditions deeply rooted in the fabric of society for centuries have developed a strong foundation that can withstand significant changes. In Tiruvannamalai, various winds of change (political, religious, cultural, economic) constantly blow through, influencing and shaping old and new ideas. However, these changes are not accompanied by resistance. Instead, like the tree in the proverb, traditions adapt and shift along with the shifting winds. This adaptability is the true strength of tradition, as it allows it to thrive in a constantly changing, subjective world. These active communities that embody deeply ingrained yet ever-evolving traditions are a vital component of these ongoing processes, where cultural and traditional practices are subjected to the ongoing evolution of debates, questions, and criticisms about the positive but also harmful or oppressive character of certain traditions. These projects are constituted by individuals who are a part of the local community, thus enabling them to possess a deep understanding of their needs and wants. As a result, they can assert and reflect upon what is appropriate and acceptable within the community and what is not.

3. ARUNACHALA: A MOUNTAIN, A PLACE OF WORSHIP, A RELIGIOUS HERITAGE SITE

As we delve into the essence of Arunachala, we embark not merely on a journey through its geological characteristics but also its role as a sacred worship site and the deep-rooted religious significance that has shaped the lives of countless devotees over the centuries (Fig. 1).

Arunachala¹⁴ rises alone from the surrounding plains to a height of 860m just outside the limits of the ancient part of Tiruvannamalai. This mountain represents a geological outlier of the Eastern Ghats, which run 40 kilometers long towards the west, forming the Javadhu Hills crust. The reddish color of the earth and stones creates a red mountain, from which Arunachala gets its name: mountain (*Achala*) of fire (*Arun*).

Older, drier, and lower than the Western Ghats, the different ranges of the East support various forest types, home to innumerable plant and animal species. Although Arunachala was once covered with abundant vegetation, as ancient Tamil poems from the 8th and 9th centuries attest¹⁵, years of wood-cutting and hand-made fires have left only pockets of stunted trees on a rocky hill covered predominantly in a single species of grass. Nowadays, as mentioned above, community work and joint international interest, in the form of volunteering and donations, have created a movement of reforestation, cleaning, and preservation of the landscape (Fig. 2).

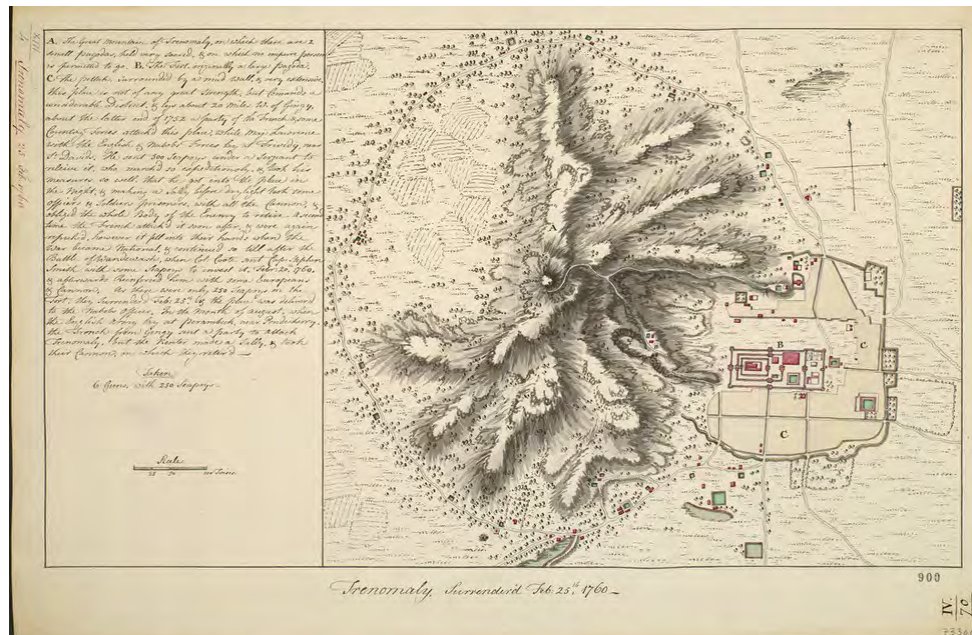


Fig. 1: A map of “Trenomaly” (Tiruvannamalai) by Captain Stephen Smith on February 25, 1760. Source: George III's Collection of Military Maps¹⁶.

Specific references to the account of Arunachala occur in various Sanskrit texts of antiquity, namely 2659 verses found in the ancient *Vedas* writings. The *Arunachala Mahatmya*, the collection of this Sanskrit text, was

translated into English and published in 1957 as *The Glory of Arunachala* by Sri Ramanasramam¹⁷. Apart from the compilation of Sanskrit verses in *Arunachala Mahatmyam*, contemporary literature is also familiar with *Arunachala Puranam*, the Tamil poetic work of Saiva Ellapa Navalar composed in the 17th century. The *Arunachala Puranam* is the *Sthala Purana* of Tiruvannamalai. A *Sthala Purana* is a compilation of legends about a holy place known as a *Sthala* in Tamil. Most *Sthala Puranas* were created recently, but the stories and myths they contain are part of a long-standing tradition that has evolved over thousands of years¹⁸. This tradition began with the *Vedas* and their commentaries, the *Brahmanas*. It peaked during the Puranic era, which included two great epics, the *Mahabharata* and the *Ramayana*, eighteen major *Puranas*, and many minor *Puranas*, also known as *Upapuranas*. The *Arunachala Mahatmyam* and *Arunachala Puranam*¹⁹ delve into the universe's history and Hindu society's perception of it. Despite their modest scope, reading them is like journeying through two millennia of Hindu society's evolving sensibility. The central narrative focuses on the greatness of the Tiruvannamalai *Sthala* and the story of the Arunachala, set against the epic backdrop of themes like the creation of the universe, and battles for supremacy between the gods and their enemies (*asuras*).



Fig. 2: Arunachala, 2009. Photo credit: Charlotte Block

The *Sthala Puranas* attract pilgrims by offering information about the spiritual benefits of visiting a particular location and providing details about its geography, temples, reservoirs, and other places of interest.

Additionally, these texts shed light on the holy festivals celebrated in Tiruvannamalai and recount the stories of the numerous saints who lived or spent extended periods in self-reflection or meditation there.

When examining various literary sources, it becomes clear that Arunachala's significance and its evolution in meaning are closely tied to Hindu mythology and its accounts. The shift in its perception from a mountain to a revered place of worship and, more recently, to a religious heritage site is intricately connected to the city's history and Tiruvannamalai's social and cultural transformations.

The *Sthala Purana* of Tiruvannamalai also gives an account of *Shiva's Abode* (Shiva's place of residence or Shiva's sanctuary). It is through this tale and her significance to Hindu culture that Arunachala stands as a religious heritage site. This myth recounts the following: Lord Shiva took the form of the Arunachala to settle a dispute between Lord Brahma and Lord Vishnu, both vying for supremacy. To end their argument, Lord Shiva appeared as a massive column of fire (the *Agni Linga*) between them. The fire took the form of Arunachala and extended both below the earth and high into the heavens, symbolizing Shiva's omnipresence and supremacy²⁰.



Fig. 3: Lake Samudram Arunachala, 2009. Photography Charlotte Block

The mountain's unique shape (Fig. 3) and mythological significance led to its veneration by devotees. In Hindu culture, Arunachala's upward and downward extension signifies that Shiva is both immanent and

transcendent, existing everywhere in the universe. The account of *Shiva Abode* demonstrates the Hindu trinity's essential unity – Brahma, Vishnu, and Shiva. It teaches that all three deities are manifestations of the same divine source, highlighting the interconnectedness of creation, preservation, and destruction. Moreover, several accounts indicate that pilgrims believe Arunachala's fiery form represents the burning away of ego, ignorance, and impurities within the human soul. As I was able to confirm during my fieldwork research, devotees believe that the sacred pilgrimage around Arunachala (*girivalam*) symbolizes self-realization and liberation from the cycle of birth and death, as circumambulating the mountain represents the soul's journey towards divine realization. Pilgrims come from all over India to walk the 14 km *girivalam* path barefoot on a full-moon night at least once in their lifetime. Devotees believe that Arunachala's intervention restores harmony in the universe, emphasizing the importance of cosmic equilibrium and the cyclical nature of creation and dissolution.

Thus, as the locals say, Tiruvannamalai is one of the cardinal points of a Tamil Hindu pilgrim's life:

“Birth in Thiruvavarur, Darshan from Nataraja, Thinking of Arunachala, Kashi by death, One attains mukti.”

Local Tamil proverb²¹.

The legend of Arunachala, in which Lord Shiva becomes the sacred fire mountain, encapsulates profound philosophical and spiritual teachings within Hinduism. Arunachala, as both a physical mountain and a symbol of the sacred, continues to be a place of deep reverence and spiritual significance for millions of devotees who seek to experience the transcendental truth it is said to embody.

The change in the perception of Arunachala from a mountain to a place of worship to a religious heritage site involves periods of great collective devotion and literary production such as the *Sthala Puranas*. As such, the socio-cultural dynamics and interpretive narratives surrounding Arunachala have continued to change. In the last half-century, the scale of visitors has increased massively, forcing the city to expand around Arunachala, trying to provide sufficient accommodation, food, and religious entertainment to all pilgrims.

3.1. ARUNACHALA MEDITATION CAVES: SANCTUARIES OF SPIRITUAL SOLITUDE

Tiruvannamalai has a rich history of cave-dwelling and meditation that dates to ancient times. The caves in this area served as sanctuaries for sages, ascetics, and spiritual seekers who yearned to tap into the depths of their consciousness and achieve self-realization. The caves on Arunachala's slopes hold a special place in the town's spiritual heritage. With their simple yet rugged appearance, the Arunachala caves provide a one-of-a-

kind blend of physical and spiritual shelter. The natural surroundings inspire contemplation, with Arunachala towering as both backdrop and observer.



Fig. 4: Arunachala from Tiruvannamalai train station. Photo credit: Charlotte Block, 2006

I have been traveling to Tiruvannamalai since 2006, and from the moment I stepped off the train, the mountain caught my eye (Fig. 4). At that time, I was unaware of its significance or history. One afternoon, during my first visit, I decided to climb the mountain. The village was bustling with religious celebrations that had taken place in the days prior, and my senses were overwhelmed by the sights and sounds. Walking up the hill, I noticed a sadhu sweeping small leaves over a pile of stones. I stopped to observe his movements, wondering about his purpose. Was he preparing a place to meditate? Enjoying the view? Giving blessings to visitors? Or setting up a shop? After watching him, I approached and asked why he was cleaning that area. He turned to me and replied, “Madam, this is the left side of the leg!” His answer took me aback, but I nodded and smiled to show my gratitude. This moment was my first physical contact with Shiva’s body and the first time someone had drawn my attention to the human character of the mountain. I continued up the hill despite the presence of trees, dogs, monkeys, tourists, and little shops selling carved stone statues and refreshments. As soon as I reached the first plateau, the view was breathtaking, and the sight of the Arunachalesvara temple was enough to quiet all my senses. At the time, I was unaware that many of the *sadhus* (religious men) who roamed the hill had made their homes in caves or within the mountain itself. For them, Arunachala was an extension of their living space, and they actively tended to it with the same care and

attention they would give to their *abode* (sanctuary). This blurring of lines between the sacred and the mundane, the private and public, and the personal and impersonal was something that I struggled to grasp initially. However, as time passed, I began to understand their perspective and joined the *sadhus* in their daily walks to Arunachala, exploring the caves they called home (*vedhi*).

The research on meditation caves in Arunachala is part of my ongoing Ph.D. project to create an atlas of all the caves and their uses and typology. So far, around 30 meditation caves have been documented, ranging from the most primitive types of construction to the most elaborate forms with reinforced concrete and vibrantly colored paintings by local devotees. These caves exhibit various architectural styles and designs, some simple and others elaborately adorned with intricate sculptures and artwork. In some cases, the caves are integrated into Arunachala's natural rock formations, creating a sense of harmony between human-made structures and the natural environment. Often built using leftover building materials or gathered resources that the *sadhus* can transport along the mountain's narrow, steep paths, the caves are intentionally hidden to provide privacy during meditation. Moreover, many of these caves are in remote mountain areas inaccessible to visitors due to designation as reserved forest areas guarded by authorities.

For this study, the caves were divided into three groups:

- a) excavated caves built into the mountain.
- b) natural caves made of stones and vegetation.
- c) caves using bricks, cement, and other building materials. Inside this last category, I also included the settlers near the bodies of water (*tirtams*) and some small *ashrams* at the foot of the hill (Fig. 5).

Most of these caves are small, dark, and cool, providing the perfect conditions for meditation and a feeling of safety and tranquility. The use of symbols and iconography within the meditation caves is significant. *Lingams* (symbols of the divine, commonly in stone), *yantras* (mantras in diagrammatic forms), and depictions of *deities* (saints) are strategically placed to enhance the spiritual experience of practitioners. The spatial organization of the caves caters to various aspects of spiritual practice, with some chambers designed for meditation and contemplation and others for rituals or group gatherings.

The interplay of light and darkness within the caves is also significant, as some caves have strategically placed openings that allow natural light to filter in. In contrast, others use oil lamps or candles to illuminate the interiors during rituals and meditation. Altars with sacred objects and offerings are standard features within the caves, serving as focal points for worship and meditation. The inscriptions and carvings found in some caves provide valuable insights into their origin, patronage, and historical context, contributing to a better understanding of their cultural and religious background.



Fig. 5: Excavated Cave (a); Natural Cave (b); Built Cave (c) Photo credits: Richard Arunachala

The first category of caves (a) appears to have been created by devotees who had a strong desire to connect with the divinity (Shiva) *lingam*. These caves were carved directly into Arunachala to get as close as possible to Shiva's beacon of fire, mentioned in the *Sthala Purana* as the mountain's sustainer force. However, there are still questions that need to be answered about the materials and tools used for such practices, the mountain's agency, and its geological composition. Despite the ban on cave excavation by the Forest Department, existing caves are still in use. The atmosphere inside these caves fosters a protective environment for meditation in nature because it blocks out external distractions. While physical discomfort may be present, caves can provide a source of mental solace. Entering a cave can feel like stepping into a new realm, allowing devotees to meditate close to the energy of *Shiva lingam* and the fire of Shiva. This experience, although intangible, can be a strong spiritual one.

The natural open-air caves (category b) have a unique and impermanent quality due to the lack of artificial structures or manipulation of materials. These caves are used in their natural state as they appear in the landscape. They offer comfortable shelter for short periods, whether open or closed, beneath stones or thick vegetation. While not particularly efficient in protecting against sun, heat, cold, or monsoon rain, they provide pleasant areas with fresh air and direct contact with nature. These caves do not involve altering the mountain or introducing new materials to the environment. They are primarily used for meditation or small ceremonies (*pujas*) and do not add or subtract any materials from Arunachala's *matter*.

The study's final section covers the built-in caves (category c), with the earliest documented cave dating back to the 15th century. Known as the *Virupaksha Cave*, this sacred space was created during periods of extensive meditation by Swami Virupaksha Deva. The caves are strategically located near a water source, and the ashram's devotees ensure a steady food supply. However, most swamis rely on *prana* (energy) during meditation and consume minuscule portions of food.

The caves of Arunachala hold special significance for the local community, as they are believed to transmit a feeling of embodiment and the energy of Lord Shiva. Several *swamis* (holy men) have meditated in these caves, and visitors who enter after them say that the spiritual energy of the meditation remains long after they have

left. Entering a meditation cave can symbolize a transition from the external to the internal world, representing a shift from distraction, noise, and worldly concerns to a state of solitude, stillness, and inner focus. This experience can be a time for introspection, meditation, and deep contemplation, which can be seen as a transitional phase, marking the boundary between the sacred and the mundane, the inner and the outer, the journey of self-discovery, and the return to daily reality. The psychological impact of these experiences can be profound, given the long periods of solitude and silence.

For Hindus, the experience of being inside a meditation cave is seen as a metaphor for a symbolic rebirth and a renewal of the self. Nevertheless, while the Arunachala caves have a rich history rooted in Hindu spirituality, they hold a universal appeal that transcends religious and cultural boundaries. Seekers from various spiritual traditions and backgrounds are drawn to the caves, recognizing them as divine spaces²².

4. THE CITY, THE TEMPLE, AND THE MOUNTAIN: A MEANINGFUL TRIAD

Tiruvannamalai has a rich socio-cultural history, shaped by diverse influences spanning centuries. From the ancient Tamil kingdoms to the colonial era, this city has served as a hub for cultural exchange, giving rise to a distinctive intangible heritage deeply intertwined with its physical surroundings (Fig. 6). This rich legacy has been diligently maintained through religious practices, rituals, traditions, and architectural landmarks that reflect the city's intricate and multifaceted authenticity.

The sacred mountain of Arunachala is a constant and influential presence in the city's life as a place of pilgrimage and devotion, a symbol of local culture, and an essential source of natural resources. As we descend from the quiet meditation caves of Arunachala, we encounter several streets with temples, *lingams*, and *ashrams*. All these elements are aligned with nothing more than stars and cardinal points, creating a particular geometric setting. Arunachalesvara Temple (Fig. 7) is the most significant representation of this tangible heritage. It is one of the most prominent Shiva temples in Southern India, associated with the *Five Pancha Bhoota Sthalas* tradition. These temples are located inside Tamil Nadu's²³ ancient borders, representing Lord Shiva's elements of nature: earth, water, fire, air, and space.

The Arunachalesvara Temple in Tiruvannamalai is associated with the element of fire, representing in Hindu culture the cosmic fire that sustains and transforms the universe. These temples are part of the Tamil Nadu pilgrimage route, as Shiva's devotees wish to visit all the temples to experience Shiva in all five forms. As in *girivalam*, here, the act of pilgrimage is critical to understanding the relationship of the devotees with the space and the social dynamics that shape the built environment. The relationship between Shiva, these temples, and his representation through these natural elements opens a debate about how different aspects of Hindu

philosophy and spirituality are represented and experienced. This article, however, will focus only on the relationship between Tiruvannamalai's spatial and social dynamics.



Fig. 6: Arunachalesvara Temple & Arunachala. Photo credit: Charlotte Block, 2019

Tiruvannamalai serves as the district headquarters and is a significant spiritual, cultural, and economic center. It has a high-density urban area, with a population of approximately 145,278 people living in an area of 13.00 square km²⁴. Most of the population is Hindu, but there are also several minority communities, including Islamic and Jain, represented by mosques and Jain temples located on the outskirts of the city. Since the second half of the 20th century, the number of tourists visiting Tiruvannamalai has increased, leading to the development of more urban infrastructure. The Arunachalesvara Temple is in the heart of the city and is one of its most prominent landmarks. According to Professor Vankatessen, the chief temple archaeologist, the temple's first visible inscriptions date back to the 9th century during the Chola period (between 850 and 1280). However, the presence of civilization and Shiva worship is believed to have existed several centuries prior to that. Tiruvannamalai has played a significant role both militarily and religiously in Tamil Nadu since the 9th century, experiencing different regimes, peace, chaos, and alternating between Muslim, French, British, and Hindu rule. In the 18th century, while the Mughal Empire persisted, the Arunachalesvara Temple underwent various changes due to demolitions and reconstructions, leading to alternating Muslim and Hindu celebrations and periods of worship. As European incursions advanced across the Indian continent, the

French took control of the city in 1757, followed by the British in 1760. In 1790, the city was reconquered by Sultan Tippu. However, during the 19th century, the city once again came under British rule, under which it remained until India's Independence on August 15, 1947.



Fig. 7: Arunachalesvara Temple, 2023 (Picture taken from Arunachala). Photo credit: Fátima Barahona

Tiruvannamalai is a vibrant city that surrounds a 25-acre temple complex. Its labyrinthine streets and bustling markets create a unique atmosphere that draws in pilgrims and tourists seeking the blessings of Lord Shiva. The city and the temple share a symbiotic relationship, with the former providing the necessary infrastructure and vibrancy to support the spiritual activities that take place throughout the year. The temple is accessible from all sides of the city, with four tower entrances (north, south, east, west), becoming a place of passage that interconnects different parts of the town markets and reinforces the presence of the constant religious rituals. Together, the city and the temple form a dynamic and thriving community.

As the sentinel of Tiruvannamalai, Arunachala watches over both the temple complex and the city. Its presence casts a spiritual aura over the entire region, transcending the city's boundaries. The temple, city, and mountain triad represent a harmonious coexistence of spiritual devotion, cultural richness, and natural beauty. Regardless of their religious affiliations, pilgrims are often captivated by the serenity and well-being that envelops Arunachala. The relationship between the pilgrims and the mountain invokes curiosity, wonder, and

sometimes transformation. Many visitors, initially drawn by the allure of the architecture of Tiruvannamalai's temple or the region's scenic beauty, find themselves touched by the profound energy of Arunachala, especially during the Festival of Lights, *Karthika Deepam* (Fig. 8), which culminates with the lighting of a fire on top of the sacred mountain.

Circulating the perimeter of Arunachala is believed to have spiritual significance and is considered an act of devotion and purification for devotees. This pilgrimage is especially popular during full-moon nights²⁵ when thousands of devotees gather to walk around the mountain in the moonlight. This event is known as full-moon *girivalam*. Along the path, pilgrims can stop at several shrines, *lingams*, and *ashtams* to pay their respects to Lord Shiva. The *Lingams*²⁶ around the path hold significance in the broader context of Hindu spirituality and mythology, and devotees may worship them based on their individual beliefs and needs. The pilgrimage concludes when pilgrims reach the Arunachalesvara Temple, where they can pray and seek blessings from Lord Shiva.



Fig. 8. Devotees gather around the *deity* for *pūja*. *Girivalam* March 2023. Photo credit: Fátima Barahona

The path is marked with several speakers playing the sound of “om na ma shivaya” repeatedly, and there are police stations along the way that act as security and information points. The route is also lined with stalls selling various items, such as pots, statues, bracelets, and fresh produce from local farmers. Pilgrims buy food and necessities to use during the day but also take the opportunity to shop for other items or souvenirs to take home. Every few meters, food stalls offer meals prepared by *ashtams* to all visitors and pilgrims.

Giving and receiving (*seva*) are essential aspects of Hindu culture, and all the temples and *ashtams* around the mountain are open during *girivalam* full-moon nights, celebrating *pūjas*, giving blessings to the pilgrims, and

providing freshly prepared meals (*prasad*) to all those devotees who decide to enter their facilities. Most people complete the journey in about 3-4 hours if they stop only at a few temples or *ashrams*. Others will stop and rest more often, arriving at the temple the following day. Along the way, several paid food stalls offer a wide range of options, including sugar cane juice, cooked vegetables, ice cream, and refreshments. Additionally, various events take place along the path, such as storytelling, card readings, hairdressers, concerts, all designed to capture the attention of pilgrims and encourage them to stop.

During the pilgrimage, various dormitories (*choldras*) are provided for those who have traveled from distant towns in India. These spaces are organized based on social caste or profession and are affiliated with either an *ashram* or the municipality. These dwellings play a crucial role in the movement of the pilgrims within the city, as many rely on free lodging to participate in the *girivalam*. However, both the city and the new dormitory areas are in high demand, and finding a place to spend the night during the festivities can take time and effort. The city is currently at total capacity to accommodate the influx of pilgrims. On the nights of festivities, it is common to see pilgrims and visitors sleeping on the floor and benches installed along the *girivalam* road. As *girivalam* entails a journey of self-reflection and heightened consciousness, it can also be a demanding trek through a crowded, noisy, bustling thoroughfare. With the construction of the road around Arunachala in recent years, certain establishments such as cafes and shops have secured permanent positions, confident in their steady profits. Meanwhile, dwellings and tents have taken on a more permanent stature as the city continues to expand around the mountain. While the city grew around the temple in the mid-20th century, it now radiates outwards from the mountain's base. Several apartments have been built, and new residential areas grow, reducing the amount of farmland around the city. Various open spaces serve as parking lots for the hundreds of buses that arrive every full-moon night. The renovation of the ring roads around the city improved access, but the main road passes right in front of one of the temple entrances, the access to the mountain, and the shopping areas. The constant coming and going of trucks supplying the city aggravates the already busy area.

5. ARUNACHALA ONLINE: FROM TIRUVANNAMALAI TO THE WORLD

Research has shown that digital media is undergoing a rapid cultural normalization process, becoming quickly integrated into local contexts and contributing to constructing local identities²⁷. This process can result in both homogenization and diversification. The cultural interplay, driven by an “on” and “off” status, movements away and towards the screen, and even an “online” and “offline” spatial connectivity, creates complex and often contradictory senses of space. The users of such virtual platforms and media usually find themselves at the halfway point to a tangible presence.

The anthropologist Daniel Miller²⁸ has suggested the existence of a cultural authenticity that predates digital media. According to Miller, some tourism studies have erroneously assumed that cultural authenticity is lost when local spaces are represented through media. On the contrary, cultural interactions have always occurred within mediated contexts, as people represent themselves to others. Digital techniques have diversified an existing cultural logic, whereby local spaces are subject to additional cultural work of self-representation. This work is part of the complex process of constructing identities and does not entail a loss of authenticity. In the age of digital connectivity, the spiritual significance of Arunachala transcends its physical boundaries and expands into the virtual realm. Arunachala has found a new home online, allowing its teachings, rituals, and transformative power to reach the far corners of the world. This narrative explores the journey of Arunachala from Tiruvannamalai to the global stage, highlighting the impact of technology on disseminating its spiritual wisdom.

As technology and the internet began to permeate every aspect of human life, including spirituality, Arunachala's reach expanded far beyond the boundaries of Tiruvannamalai. The digital age ushered in a new era of accessibility, enabling Arunachala's spiritual wisdom to transcend geographical limitations. The advent of websites, social media platforms, and online forums dedicated to Arunachala created virtual pathways for seekers worldwide. Devotees from diverse cultural backgrounds could now access information, teachings, and experiences related to Arunachala with a few clicks.

Arunachala's online presence encompasses a vast repository of spiritual wisdom, textual resources, and multimedia content. Websites dedicated to Arunachala offer a treasure trove of information on its history, significance, and associated practices.

One of the most significant developments in Arunachala's digital journey is the concept of the virtual *girivalam* (Fig. 9). While the physical *girivalam* involves circumambulating the base of Arunachala, the virtual version allows individuals to embark on a spiritual journey from the comfort of their homes.

Virtual *girivalam* is a guided online experience that replicates the physical practice. Seekers from around the world can participate in this virtual circumambulation, following a designated path on a digital platform. Directed by narrations, chants, and visuals, participants can immerse themselves in the spiritual energy of Arunachala despite being thousands of miles away.

This virtual practice has gained popularity, especially among those who cannot visit Tiruvannamalai or seek to deepen their connection to Arunachala due to their physical limitations. It underscores the transformative power of technology in bridging the gap between the material and the spiritual. As participants move along the digital route, they can listen to recorded narration describing each spot's significance and the spiritual

teachings associated with Arunachala. These visuals help participants connect with the physical landscape and architecture. High-quality images and videos of Arunachala, the temple complex, and the surrounding scenery are integrated into the virtual *girivalam* app.

Several *apps* have been developed to accompany devotees following the *girivalam* path in recent years²⁹. One such platform is the “Girivalam Guide,” which includes a movement tracker to record time and distance traveled and information on temples and ceremonial practices along the route. Users can access route maps, track remaining time, and distance, and receive notifications about nearby *lingams* and temples by customizing settings. In addition, the *app* provides information on Tiruvannamalai, including essential dates for *girivalam* and the timing of temple *pujas*. The Arunachala *girivalam* *app* is an easy companion for a convenient and comprehensive guide to Tiruvannamalai and *girivalam*, with live images of the mountain and a gallery of photos of the temple and the Karthigai Deepam festival. The *app* is available in Tamil and English for ease of use by locals and tourists.



Fig. 9. Girivalam Celebration (walking around the Arunachala), March 2023. Photo credit: Fátima Barahona

Virtual *girivalam* offers several benefits and holds great significance for seekers. One of its most significant advantages is accessibility. Individuals who cannot visit Tiruvannamalai or undertake the physical *girivalam* can now access the spiritual practice anywhere in the world with an internet connection. This inclusive practice welcomes seekers from all walks of life, regardless of their cultural or geographical backgrounds. Even though they are alone (or in a small group) using the *app* in the comfort of their homes, this experience is so engaging

that it fosters a sense of unity among participants as they collectively engage in a spiritual practice (Fig. 10). Also, the online format allows participants to undertake *girivalam* at their convenience. There are no restrictions on timing or location, enabling seekers to integrate the practice into their daily lives.

While, for obvious reasons, virtual *girivalam* does not replicate the physical experience entirely, it still allows seekers to establish a deep spiritual connection with Arunachala. Participants often report moments of deep introspection, spiritual insights, and a heightened sense of inner calm while virtually circumambulating Arunachala³⁰. The practice encourages them to reflect on the symbolism of *girivalam* and the timeless wisdom it represents, reinforcing their commitment to inner growth and self-discovery. This experience transcends the limitations of physical presence and transforms the act of circumambulation into a global, collective spiritual journey. In this case, the cyclical movement between transmission and adaptation is evident, with users absorbing traditional values and reformulating a new culture in these locations.

While already transformative, the concept of virtual *girivalam* holds the potential for further development. As technology advances, it may be possible to enhance the virtual experience. For example, VR technology could create an even more immersive experience, allowing participants to feel as though they are physically present at Arunachala. Other social media platforms have also become popular hubs for Arunachala enthusiasts and seekers. Facebook groups, online forums, Instagram accounts, and YouTube channels dedicated to Arunachala provide platforms for sharing experiences, photographs, and videos that capture the essence of the sacred mountain.

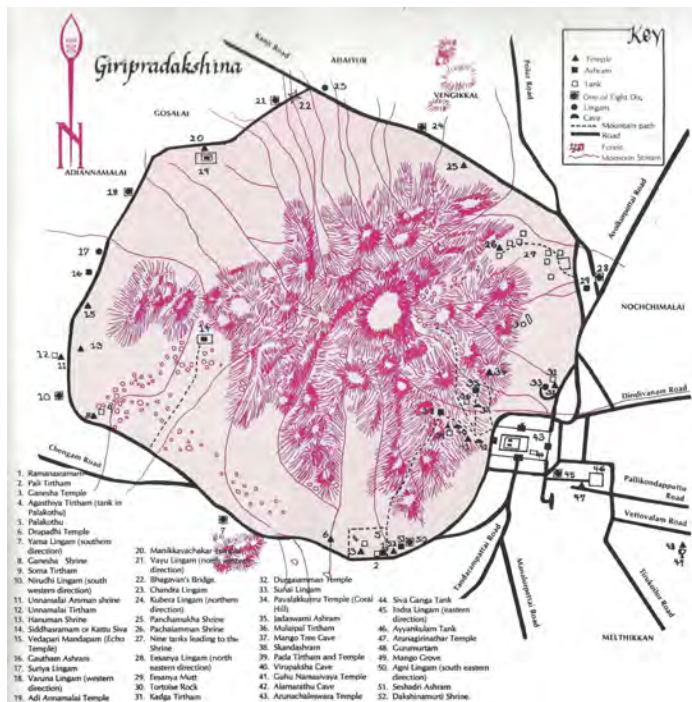


Fig. 10. Girivalam Map, showing the temples, *ashrams*, shrines, and *lingams*. Source: Sri Ramanassramam: Tiruvannamalai

Followers can explore the timeless teachings of spiritual luminaries as in the Ramana Maharshi Ashram, whose association with Arunachala left an indelible mark on its spiritual legacy. In this ashram, for example, it is possible to watch the meditation room 24/7 and virtually participate in the *pūja* (religious ceremonies). Online streaming allows users to sing the *mantras* and perform other daily routines in a simultaneous parallel. This digital congregation not only fosters a sense of unity among Arunachala devotees but also exposes a global audience to the spiritual magnetism of the sacred mountain.

The digitalization of Arunachala's spiritual teachings and practices has had a profound impact on individuals and communities around the world. Various multiplications of this influence are seen in several fields, for example, in the creation of Arunachala's online radio with a broadcast of the teachings of Bhagavan Ramana Maharishi³¹.

The migration of tradition to virtual culture practices has enabled seekers, regardless of their geographical location, physical limitations, or travel constraints, to access the timeless wisdom of Arunachala. Nevertheless, while the digitalization of Arunachala has brought its teachings to a global audience, it also raises specific challenges and considerations. Maintaining the authenticity and integrity of Arunachala's teachings in the online space is essential. Ensuring that accurate information is disseminated, and the spiritual message is preserved are paramount. Additionally, the online realm sometimes lacks the depth of personal connection and physical presence integral to spiritual practices. Striking a balance between Arunachala's virtual and physical experience is a challenge that non-virtual and online communities must navigate. As technology continues to evolve, Arunachala's reach is likely to expand further, enriching the spiritual journeys of individuals across the globe and perpetuating its legacy of self-realization and divine grace.

5.1 The Impact of the Tamil Movie Industry on Tiruvannamalai's Social and Cultural Landscape

The Tamil movie industry, known as *Kollywood*, is a major player in Tiruvannamalai's transformation, greatly influencing the town's cultural landscape. *Kollywood's* impact on the community has been significant, shaping its identity and affecting various aspects of life in Tiruvannamalai.

The people of Tamil Nadu have a deep appreciation for cinema, which holds a special place in their hearts. It goes beyond mere entertainment and has the power to reflect, shape, and challenge societal norms. The Tamil cinema industry (*Kollywood*) explores complex social issues, challenges traditional norms, and sparks conversations about gender equality, caste discrimination, and family dynamics. The movies shown in Tiruvannamalai's theaters and available through various media platforms have brought these issues to the forefront of public discourse.

As a result, the town has experienced a shift in social consciousness. The debate about gender roles, relationships, and social justice has become more open and progressive. This change is particularly noticeable in the younger generation, which is increasingly influenced by the evolving narratives in Tamil cinema. Tamil cinema has gained a reputation for its diverse portrayal of cultural elements, such as music, dance, and festivals. This cinematic representation has also led to cultural integration and fusion of eclectic influences in Tiruvannamalai. Traditional Tamil festivals, including Pongal and Deepavali, are now celebrated with a contemporary twist, blending the richness of tradition with more recent ideas and sensibilities. The influence of cinema is also evident in the town's art forms. Dance academies and music schools have adapted their curriculum to incorporate popular film songs and dance routines, resulting in a dynamic cultural exchange. This integration of cinema into the local arts has allowed Tiruvannamalai's artists to gain recognition in the broader Tamil cultural scene.

Not only has the Tamil movie industry impacted Tiruvannamalai culturally, but it has also made a significant economic impact. The town's scenic landscapes and spiritual ambiance make it a preferred location for film shoots as scenes for numerous movie productions. This influx of filmmakers, actors, and production crews has boosted the local economy, and driven tourism.

Moreover, the presence of film sets and shooting locations has drawn tourists interested in experiencing the magic of cinema. Visitors come to explore the town's film-related landmarks, visit famous shooting spots, and sometimes even catch a glimpse of their favorite actors during shoots. The interaction between cinema and tourism has contributed to the city's economic growth.

The town of Tiruvannamalai is indebted to Tamil cinema for its crucial role in preserving, promoting, and reinventing the local cultural heritage. Several films have brought attention to Tiruvannamalai's temples, festivals, and rituals by showcasing the town's spiritual significance and rich history. The dissemination of these cinematic products helped preserve the town's customs and created new traditions that reflect its ever-changing, unique identity and rich cultural heritage. The cultural diversity displayed is of immense value to the tourism industry.

One movie, *Athanda Ithanda Arunachalam*³², released in 1997, significantly impacted the town's dynamics and behavior. The film's popularity among Tamil cinemagoers and its box-office success drew many tourists to the city. While this led to the massification of certain celebrations and festivals, it also brought greater recognition to Tiruvannamalai's cultural richness and spiritual significance. *Arunachalam* won three Tamil Nadu State Film Awards in 1998, including Best Film. The lead actor and film producer, Gopi Kanth, a celebrity in Tamil Nadu, also won the award for Best Art Director. After the film's public release, there was a significant increase of visitors from different areas of India.

The movie's popularity in Tamil regions and other neighboring communities catapulted the scenery of Tiruvannamalai to their home screens and shifted cultural values in a very immediate and visual way. As a result, a more prominent flow of devotees is evident; since the late 1990s, the girivalam ritual has become a daily occurrence, regardless of whether it is a full-moon night. Tarmac roads replaced the dirt paths around Arunachala, lighting, checkpoints, and permanent vendors and shops were installed. Pilgrim houses (*choldras*) were renovated to accommodate devotees daily, not just during festivals. After completing a series of interviews in the field, I can conclude that, for some urban dwellers, the film has profoundly impacted their daily lives. On the other hand, for others, it was only a matter of time before globalization made its way to this corner of the world.

7. CONCLUSION: A DYNAMIC CULTURAL TAPESTRY

The significance and meaning of Arunachala are deeply rooted in Hindu mythology and its accounts. The mountain's unique shape and mythological importance have led to its veneration by devotees, who believe that circumambulating the mountain represents the soul's journey towards divine realization. Over the years, community work and joint international interest have created a movement of reforestation, cleaning, and preserving the landscape, enhancing its importance as a religious site.

The *Sthala Purana* of Tiruvannamalai offers an account of the spiritual benefits of visiting the location and details its geography, temples, reservoirs, and other places of interest. Arunachala represents the interconnectedness of creation, preservation, and destruction, highlighting the essential unity of the Hindu trinity – Brahma, Vishnu, and Shiva. Overall, Arunachala is a remarkable national *temple-mountain* that continues to inspire and attract pilgrims from all over India, making it an important cultural and religious symbol.

Tiruvannamalai represents a melting pot of diverse influences that have shaped its cultural heritage over the centuries. The relationship between the city and Arunachala, as well as the temples and natural elements, is a unique and harmonious coexistence of spiritual devotion, cultural richness, and landscape. Tiruvannamalai's labyrinthine streets and bustling markets reflect the vibrant culture around the temple, making it a hub for tourist activities and economic growth. However, Arunachala's spiritual energy captivates pilgrims and tourists from around the world, providing a sense of serenity, well-being, and transformation. In this sense, Tiruvannamalai represents a holistic heritage site, encompassing the interdependent relationship between cultural, artistic, and natural heritage, making it an essential case study for future heritage conservation interventions and management research.

Arunachala and Tiruvannamalai's cultural and spiritual significance cannot be overstated, and their potential for tourism growth offers opportunities for economic development and cultural exchange. However, it is crucial to recognize and address the potential drawbacks of such growth, like environmental degradation, loss of cultural authenticity, and conflicts over heritage management. Preserving the natural environment and cultural heritage while reaping the benefits of tourism is a complex challenge that requires the active involvement of local communities, authorities, and responsible tourism practices.

Virtual platforms suffer the same quest for authenticity due to a need for more personal connection and physical presence. Digital media significantly impacts cultural identities and local contexts, creating homogenization and diversification. Arunachala and Tiruvannamalai are no exception, with their spiritual significance transcending physical boundaries and expanding into the virtual realm. As the visitors of the temples and caves transform, so do the representations and practices of traditional culture: the virtual *girivalam* and other online platforms offer accessible ways to experience the “virtual spiritual energy” of the sacred mountain.

In conclusion, the triad of helpfulness, fairness, and safety, along with the dynamic process of transmitting, adapting, renovating, and creating new practices, is crucial to support the evolving *contemporaneous-traditional* culture surrounding Arunachala. The personal and collective experience of exploring the mountain and connecting with its values and culture through the built and landscape environments further strengthens the transmission of traditions. These changes have a global significance at a religious, social, cultural, and virtual level, while some traditions stand resilient and new cultural practices remain authentic. As visitors continue to engage with Arunachala, the dialogue between the preservation and renewal of traditions will continue to evolve, creating new perceptions of the historical and cultural heritage environments that are transmitted to the surrounding communities.

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¹² The Danish Mission Higher Secondary School, located in Tiruvannamalai since early 1925, was the first organization to promote cleaning and maintenance of Arunachala.

¹³ There are sleeping houses around Arunachala and the Arunachalesvara Temple. They are mainly used during the *Girivalam* Procession and *Deepam* festivities. These houses are designated according to each pilgrim’s caste or social position.

The city center has a free-of-charge hospital exclusively for the *sadhus* and *swamis*. In addition, the Ramana Maharishi Ashram has an open-access medical clinic for all visitors and devotees.

¹⁴ Annâmalai is the Tamil name given to Arunachala; the word combines “mountain” (*malai*) and *Anna*. According to the Tamil Lexicon, it is equivalent to the Sanskrit name Arunacala, also known as Arunagiri, in certain inscriptions. *Arunagiri* means “the immovable” (*acala*) and “the red” (*aruna*) “mountain” (*giri*), although Tamil *anna* does not carry the same meaning as *aruna*. Other Sanskrit forms include *Sonâcala* or *Sonagiri*, which

translates to “the red” or “golden mountain” (*sona*), and *Svarnamava-isvara*, which means “the master made of gold.” Regardless of the name, red or gold is always associated with Fire and the Shiva *lingam*, particularly in this location, through the myth of *Lingodbhava*. The Shiva *lingam* of other South Indian holy places are respectively associated with each of the other four primary elements: Earth (*bhumi*) at Kanchipuram, Water (*varuna*) at Tiruvanaikka, Wind or air (*vayu*) at Kalahasti, Ether (*akasa*) in Chidambaram.

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அருணையை நினைக்க முக்தி, காசியில் இறக்க முக்தி

Rough translation to English: By being born in Tiruvavarur; Receiving blessings (*darshan*) in Chidambaram; Dying in Varanasi (Kasi); and simply remembering Arunachala; One can obtain liberation (*Mukti*).

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²⁴ <https://www.census2011.co.in/census/district/26-tiruvannamalai.html>

What is the population of Tiruvannamalai district in 2023? The question, though important, has no correct answer. The last census of Tiruvannamalai was done in 2011, and the next census of 2021 has been postponed or canceled.

²⁵ *Girivalam* Dates in 2023: January 6; February 5; March 7; April 6; May 5; June 4; July 3; August 1; August 31; September 29; October 28; November 27 (Tiruvannamalai Maha Deepam); December 26,

²⁶ During the *girivalam* path there are eight lingams named *Ashta lingams*, each representing a cardinal direction. Praying to each *lingam* brings different benefits bestowed by the respective *Navagraha* (God). The *Indra lingam* blesses devotees with long life and prosperity; *Agni lingam* helps maintain good health; *Yama lingam* relieves financial burdens; *Niruthi lingam* frees devotees from problems; *Varuna lingam* protects from illness and elevates social development; *Vayu lingam* gives strength to fight ailments, *Kupera lingam* helps achieve prosperity; and *Esanya lingam* gives peace of mind and a positive attitude.

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³² See the trailer here: <https://www.youtube.com/watch?v=zRG0z-x6iQQ>

Traditional Dwellings and Settlements

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THE IMPACT OF CROWD MANAGEMENT APPROACHES ON CROWD BEHAVIOR AND EXPERIENCE DURING MEGA-EVENTS: A CASE STUDY OF HAJJ

Abdulrahman Kadi

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THE IMPACT OF CROWD MANAGEMENT APPROACHES ON CROWD BEHAVIOR AND EXPERIENCE DURING MEGA-EVENTS: A CASE STUDY OF HAJJ



This paper investigates the complexities of managing crowd movements during the Hajj pilgrimage, a large-scale religious event. Utilizing User Journey Mapping (UJM) as an analytical tool, the study explores the collective experience of participants, focusing on religious rituals, spiritual dimensions, and practical challenges like transportation and wayfinding. The paper identifies key gaps and opportunities in current crowd management strategies and discusses their integration into urban management frameworks. By synthesizing academic literature and empirical findings, the study contributes to the growing body of knowledge on crowd movement in large-scale religious events, aiming to enhance safety, efficiency, and participant experience.

1. INTRODUCTION

This paper examines the dynamics of crowd formation in mass gatherings and mega-events, focusing on the Islamic Pilgrimage of Hajj, one of the most intricate religious events globally. It underscores the complexities inherent in crowd movements and critiques the limitations of prevailing top-down management strategies. The study advocates for a shift towards a user-centric, bottom-up approach that prioritizes the needs and expectations of attendees over the organizational capabilities. The paper employs User Journey Mapping (UJM) as a methodological approach to explore the behavioral nuances of individual and collective participants. Data for the UJM is gathered through surveys, interviews with key stakeholders, and on-site observations throughout the pilgrimage. The paper concludes by presenting the UJM findings, identifying a series of gaps and opportunities related to the main touchpoints of the journey.

Mass gatherings, such as mega-events, religious pilgrimages, and sporting events, present unique challenges in management approach, particularly in crowd movement and control. These events often attract large numbers of people, straining the planning and response resources of the host community^{1,2}. Definitions of crowds and mass gatherings vary, but they generally involve a large number of people congregating for a shared purpose^{3,4,5}. The pilgrimage of Hajj serves as a critical example of a religious mega-event that demands meticulous planning and crowd management strategies.

Among the other religious mass gatherings, the pilgrimage of Hajj is a unique and complex mega-event, attracting approximately 3 million pilgrims annually for a duration of 5 to 6 days (Table 1). The event is not merely a logistical challenge but also a deeply spiritual journey for participants, adding layers of complexity to its management. The current management approach is fragmented, involving multiple urban systems run by different entities, often resulting in uncoordinated efforts, and overlapping responsibilities.

RELIGION	PILGRIMAGE EVENT	LOCATION	APPROX. NUMBER OF PARTICIPANTS	APPROX. DURATION
ISLAM	Hajj	Makkah, Saudi Arabia	3 million in 2019 ⁶	5-6 days
ISLAM	Umrah	Makkah, Saudi Arabia	Over 19 million in 2019 ⁶	Varies
Judaism / Christianity	The Holy Land The Western Wall, Temple Mount, and Old City of Jerusalem	Jerusalem, Israel	2.18 million in 2010 ⁷	Varies
Christianity	Camino de Santiago	Santiago de Compostela, Spain	Over 300,000 annually ⁸	5-7 weeks (walking)
Christianity	Lourdes	Lourdes, France	Over 5 million annually ⁹	Varies
Hinduism	Kumbh Mela	Allahabad, India	Over 50 million in 2019 ¹⁰	55 days
Hinduism	Amarnath Yatra	Amarnath, India	Over 600,000 in 2019 ¹¹	45 days
Hinduism	Char Dham Yatra	Uttarakhand, India	Over 2.5 million annually ¹²	Two weeks
Buddhism	Bodh Gaya	Bodh Gaya, India	Over 2 million annually ¹³	Varies
Buddhism	Lumbini	Lumbini, Nepal	Over 200,000 annually ¹⁴	Varies

Table 1: Multiple pilgrimages or religious mega-events associated with the most prominent faiths in the world.

2. FORMATION AND MANAGEMENT OF MASS GATHERINGS AND CROWD MOVEMENTS

Mega-events are usually organized internationally and attended by mass gatherings, creating high-density crowd movements. Mass gatherings are an occurrence where the number of people attending is sufficient to strain the planning and response resources of the host. Mass gatherings may include sports events such as the Olympic Games or FIFA World Cup, religious events such as the Islamic pilgrimage of Hajj, World Youth Day or Kumbh Mela pilgrimage, as the largest mass gathering in the world¹, as well as cultural and music festivals. Mass gatherings can also occur at train stations, shopping complexes, business precincts and tourist attractions². Ozenc¹⁵ defined a group as two or more people interacting with, influencing, and perceiving one another as us. In comparison, when many people congregate in the same place simultaneously, they are referred to as a gathering¹⁶. The World Health Organization defines an event as a mass gathering if the number of people it brings together is so large that it has the potential to strain the planning and response resources of the health system in the community where it takes place. At the same time, Nieto, González-Alcaide, & Ramos⁴ stated that the concentrations of more than 1,000 people in a specific location and for a particular purpose are considered a mass gathering. Also, they noted that most of the literature refers to multitudinous acts that exceed 25,000 people as mass gatherings.

In contrast, Musse & Thalmann⁵ define a crowd as a large group of people sharing a common space and intent. Based on that, a crowd can be understood as a consistency of several groups gathered to fulfil a shared objective, resulting in a mass gathering. Thus, a crowd can be defined as a large number of people collected into a compact body without a particular order; in other words, crowds contain a large number of faceless individuals who follow a specific lead. However, it is essential to understand that no two crowds are alike. Generally speaking, crowd control represents the steps and procedures that should be taken once a crowd has lost control. A successful crowd control plan involves measures that should be implemented at certain event stages.

Hence, the formation of crowd movements requires a shared goal, a group of gathered individuals, and a specific destination(s), which are the main components of any crowd movement¹⁷. The authors argue that crowd movements are often driven by a shared goal or purpose, such as attending a protest or sporting event. This goal helps bring individuals together into a cohesive group. They also discussed the vital role of destination in mass movements, with individuals or small groups moving towards a particular location or endpoint to achieve their shared goal as a crowd.

Crowd science is an interdisciplinary field that provides valuable insights into crowd behavior, dynamics, and management, combining principles from sociology, psychology, and computer science. Effective crowd management involves planning, organizing, and implementing strategies to ensure safety, security, and smooth functioning in crowded settings¹⁸. Movement conditions and patterns are pivotal in orchestrating mass gatherings and mega-events, such as the pilgrimage of Hajj. These conditions refer to the physical and environmental factors, including the event space layout, barriers, and the availability of entrances and exits, that influence how individuals navigate the event¹⁹. On the other hand, movement patterns are shaped by collective behaviors and various factors like event programming, crowd dynamics, and individual motivations²⁰.

The density of the crowd is a significant variable affecting movement patterns. In high-density areas, movement is often slower and more constrained, whereas in less-dense areas, individuals can adopt varied movement patterns (Helbing et al., 2005)²¹. Effective management of these conditions and patterns is crucial for ensuring safety, security, and a positive attendee experience. Crowd management techniques and simulation models can help organizers optimize event layouts, establish clear pathways, and implement measures to regulate crowd movement, enhancing the overall event experience^{22,23}. However, even well-planned events can face challenges, such as transportation bottlenecks experienced during the Summer Olympics in various cities²⁴. Tragic incidents (Table 2), like the stampede at the Love Parade music festival in Duisburg, Germany, underscore the potential dangers of poor planning and crowd management²⁵.

EVENT	LOCATION	YEAR	DAMAGE/DISRUPTION
Hajj	Mina, Saudi Arabia	1990	1,426 killed, 800 injured in a stampede ²⁶
Hajj	Mina, Saudi Arabia	2006	380 killed, 289 injured in a stampede ²⁶
Love Parade	Duisburg, Germany	2010	21 people were killed, and more than 500 were injured in a stampede ²⁷
Kumbh Mela festival	Allahabad, India	2013	36 killed, 30 injured in a stampede ²⁸
Hajj	Mina, Saudi Arabia	2015	Over 2,400 people were killed, and over 427 were injured in a stampede ²⁹
Mount Meron	Meron, Israel	2021	45 killed, 112 injured in a crowd crush ³⁰
Halloween	Seoul, South Korea	2022	156 people were killed and 170 injured in a stampede ³¹

Table 2: Examples of mega-events stampedes

Over the years, several tragic stampedes have occurred during the pilgrimage of Hajj, highlighting the urgent need for effective crowd control measures^{32,33}. These incidents have led to a shift towards a highly controlled management approach, often at the expense of other factors like user experience (Table 3).

YEAR	DEATHS / INJURIES DURING THE CROWD STAMPEDES DURING HAJJ
1998	Over 118 pilgrims were killed, and over 180 injured
2001	35 deaths
2003	14 deaths
2004	251 deaths
2005	Three deaths
2006	364 deaths

Table 3: Crowd Trample accidents in Mina³³.

Therefore, an effective management approach must integrate both the social behavior of attendees and sound management practices to ensure the safety and well-being of all participants^{34,35}. This calls for a holistic approach that considers the complex interplay of various elements, such as crowd movements, transportation, and service distribution, to mitigate risks and enhance the user experience.

3. RETHINKING THE MANAGEMENT OF HAJJ IN LIGHT OF CROWD MOVEMENT COMPLEXITIES AND EVENT THEMES

Since the early 1930s, the Saudi government has successfully managed the Hajj with an average number of 50,000 pilgrims a year. Nowadays, the average number of pilgrims has increased to reach over 2.5 million yearly, which obviously requires further studies and development³⁶. During the Hajj journey, there are many challenges regarding crowd movements and the safety of pilgrims, such as the risks of crowd clashes, run-

over accidents, dehydration, and exhaustion. Even though crowd management techniques and urban development plans are being enhanced yearly in Saudi Arabia, over the past decades, multiple crowd trampling accidents occurred during the pilgrimage's rituals, resulting in several injuries and deaths. The annual Hajj is one of the most difficult crowd movement challenges to manage due to the large number of participants performing their rituals simultaneously, resulting in high-density movements requiring an additional layer of control to ensure public safety. This has led to a strict crowd-control management approach.

However, when a top-down management approach pursues a strict crowd control policy that generalizes and limits the movement patterns based on the managing entities' capabilities and operational functions rather than revolves around the users' needs, it detrimentally affects their movement conditions and experience. At the same time, the increasing number of pilgrims and the limited capacity of Makkah and the Holy Sites made planning and managing such an event challenging. In addition, the complex urban fabric of Makkah City requires reallocation and utilization of spaces within a consolidated urban system to achieve a sustainable urban solution to enhance the crowd movement conditions and, subsequently, the user experience.

The pilgrimage involves movement between key locations -Al-Masjid Al-Haram, Mina, Arafat and Muzdalifah- each presenting its own set of logistical and crowd management challenges (Fig. 1). For example, the route between Al-Masjid Al-Haram and the Jamarat Bridge in Mina is particularly complex due to varying crowd densities and the spiritual significance of the journey for the pilgrims. Moreover, the absence of well-designed routes, especially between Jamarat Bridge and Al-Masjid Al-Haram, exacerbates the problem, forcing pilgrims to navigate through less-than-ideal conditions, especially after long hours of ritualistic activities.

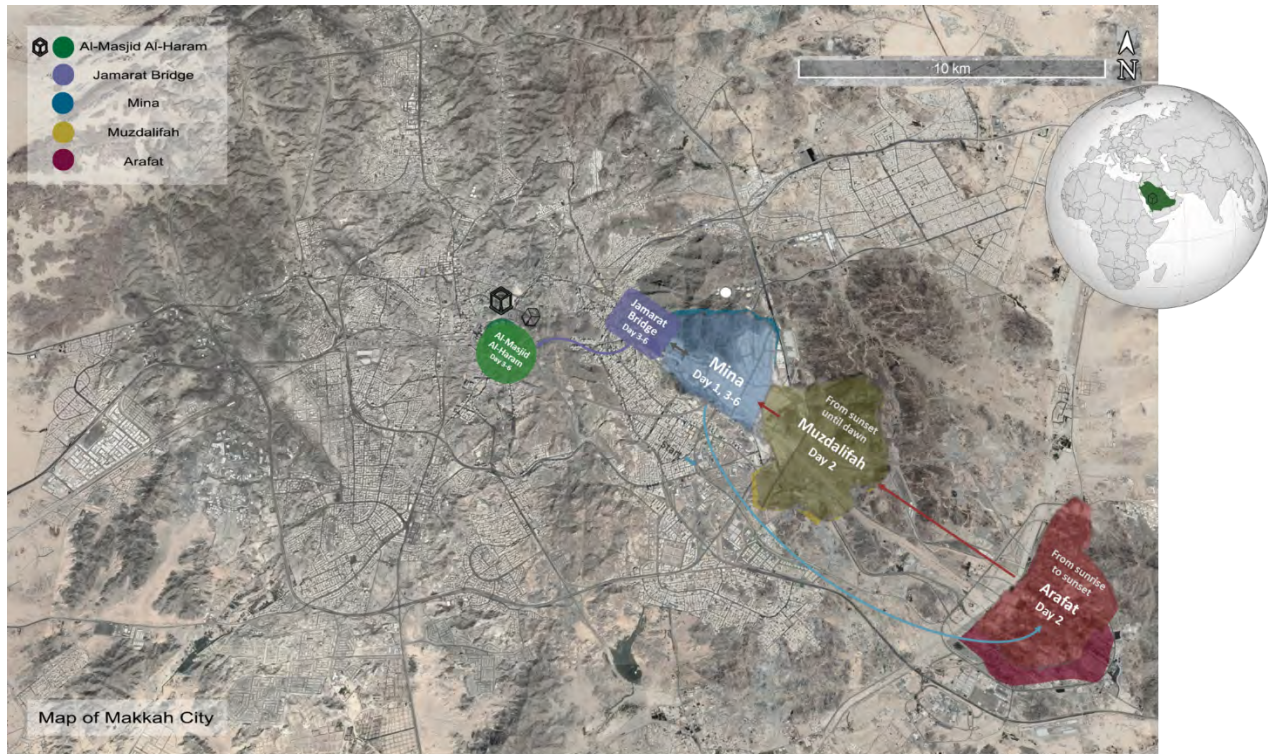


Fig. 1: A map of Makkah City illustrating the Holy Sites journey of Hajj (Google Earth, 2020; modified By author)³⁷.

To fully understand the challenges of the current system, some factors must be considered regarding the pilgrims' movements and experience. For instance, the movement between Jamarat Bridge and Al-Masjid Al-Haram comes after 24 hours of movement from one point to another while performing certain rituals. This comes after the pilgrims are exhausted and drained of energy that could enable them to perform the last remaining act to complete their journey and finally rest in Mina for two or three days. Also, the demographic differences among pilgrims will likely create many challenges, especially for disabled, weak, or elderly individuals. For instance, if one walks throughout the journey, the total distance might reach 25 to 30 km. This trip can be made in 30 continuous hours, accompanied by the feeling of anxiety about getting lost and the fear of not completing the ritual.

Moreover, the routes toward Al-Masjid Al-Haram vary in width and capacity, are overcrowded, and suffer from a lack of services. Nevertheless, event themes and restrictions play a crucial role in shaping and setting the movement conditions and patterns during the formation of mass gatherings and crowd movements at mega-events. These elements directly impact the crowd's behavior, organization, and dynamics, influencing how individuals move and interact within the event space. Event themes provide a conceptual framework and guide for the mega-events' overall design, content, and activities. The theme sets the gathering's tone, atmosphere, and purpose, often reflecting a specific concept, message, or cultural identity³⁸.

Restrictions, on the other hand, establish boundaries, rules, and regulations that guide the behavior and movement of attendees. These restrictions can range from security measures and crowd control protocols to limitations on certain activities or access to specific areas³⁹. The combination of event themes and restrictions influences crowd movement in several ways. Firstly, event themes can create focal points or attractions within the event space, directing the flow of the crowd towards specific areas or stages aligned with the theme. Secondly, restrictions can influence movement patterns by channeling the crowd along predetermined paths or designated zones, controlling the distribution and density of attendees¹⁷.

In the pilgrimage of Hajj, understanding these conditions and patterns is essential for developing a management approach that ensures the pilgrims' safety and security and enhances their overall experience. Given the unique challenges posed by the high-density crowd movements in Hajj, particularly between key locations like Jamarat Bridge and Al-Masjid Al-Haram (Fig. 2), a nuanced understanding of movement conditions and patterns can significantly improve crowd management strategies and the pilgrims' experience.

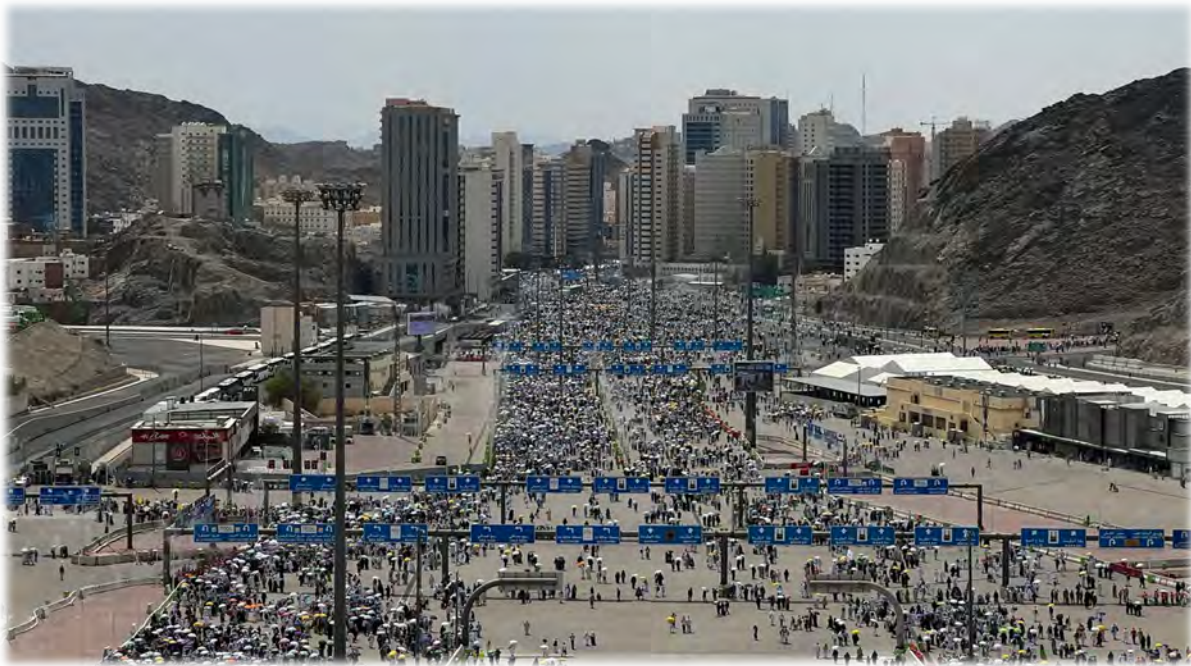


Fig. 2: The movement between Jamarat Bridge and toward Al-Masjid Al-Haram (by Author, 2022).

The pilgrimage management of Hajj presents a compelling case study for rethinking the management approach of mega-events, particularly those involving complex crowd movements and high emotional and spiritual stakes for the participants. There is a pressing need to re-evaluate and adapt existing management strategies to better align with the complex and varied needs of the pilgrims, ensuring both their safety and a more fulfilling pilgrimage experience.

3. BEHAVIORAL DYNAMICS: USER JOURNEY MAPPING (UJM): A METHODOLOGICAL APPROACH

Managing crowd movement in mega-events like the Hajj pilgrimage necessitates a comprehensive understanding of various interrelated factors, both physical and behavioral. On the physical side, crowd characteristics such as size, density, and demographics are pivotal in shaping movement conditions and patterns^{21,23}. For example, larger crowds often result in higher density, affecting the speed and flow of movement. Conversely, smaller crowds may offer more freedom and less congestion. Effective management of these conditions is crucial for ensuring safety, security, and a positive attendee experience²². On the behavioral side, influences like social norms, emotional contagion, and collective identity significantly shape crowd dynamics^{40,41}. Theories such as Emotion Theory⁴², Emergent Norm Theory⁴³, and Collective Behavior Theory provide valuable frameworks for understanding these dynamics. These theories inform event planning and crowd management strategies, helping to design engaging and safe experiences for participants^{20,20}.

Moreover, the study of individual behavior, focusing on unique characteristics and psychological processes, contrasts with crowd behavior, which considers the interactions and influences among individuals within a crowd^{44,45}. Understanding both individual and collective behavior is essential for effective crowd management². For instance, incentives, rewards, and penalties can significantly influence user behavior and the overall experience during mega-events^{46,47}. These could range from material benefits to spiritual fulfilment, thereby affecting movement patterns and crowd dynamics⁴⁸. The User Journey Mapping (UJM) aims to integrate these multifaceted aspects- physical conditions, behavioral influences, and individual motivations- to develop a holistic, user-centric management strategy. This approach aims not only to ensure the safety and security of attendees but also to enhance their overall experience. By understanding the interplay between these elements, event managers can develop more effective strategies sensitive to crowd movement's physical and behavioral dimensions. This ensures both the safety and well-being of attendees while also enhancing their overall experience^{43,49}.

UJMs have emerged as crucial instruments for capturing and analyzing the sequence of user interactions and touchpoints across various contexts. These maps provide an exhaustive overview of the user experience, aiding in the extraction of critical insights into user expectations, gains, and pains at different stages of their journey. In the realm of mega-events like the Islamic pilgrimage of Hajj, UJMs offer a unique lens through which to explore the intricacies of user experience, movement planning, and crowd management on an

unparalleled scale. This not only enriches our understanding of the event itself but also offers transferable lessons for other similar large-scale gatherings.

The study conducted twenty-nine observation visits in ten locations on the pilgrims' routes throughout the Holy Sites and towards Al-Masjid Al-Haram (Fig. 3). This observational phase aimed to document the user experience and fundamentals of the crowd's movements through conducting a series of interviews among pilgrims and main stakeholders over the complete journey of Hajj to map the users' collective experience in relation to the journey's touchpoints. The data collection occurred at the following sites:

Site (A) is located at the exit of the Jamarat Bridge, where the journey towards Al-Masjid Al-Haram starts. Site (B) is located at King Abdulaziz Road, which links the Jamarat Bridge and Al-Masjid Al-Haram. Site (C) is an arrival point at Al-Masjid Al-Haram in the northern area, linked with Site (A), which is a mixed-use route that accommodates the city's regular traffic and is only equipped for vehicle mobility. Site (D) is an arrival point at Al-Masjid Al-Haram in the eastern area, linked with Sites (A&B). On this route, multiple movement options vary among walking, limited bus shuttling and private vehicles. However, it is the shortest, most crowded, and most desirable since it is the fastest and most direct way to reach Al-Masjid Al-Haram. Site (F) is located at the beginning of the Jamarat Bridge on King Abdulaziz Road in Mina, which links the Holy Sites and Al-Masjid Al-Haram. The significance of this location lies in its proximity to both the Jamarat Bridge and the Jamarat train station, where the crowd movements are at their highest density. Similarly, Site (G) is located in the middle of Mina on The King Fahad Road pedestrian pathway, which links the Holy Sites and Al-Masjid Al-Haram, where pilgrims head to the Jamarat Bridge or Al-Masjid Al-Haram. Next is Site (H), which represents a mass gathering in Masjid Al-Mashaar Al-Haram, Muzdalifah and overlooks the connecting routes for pedestrians and buses between Arafat and Muzdalifah. Lastly are Site (I) Masjid Namirah and Site (J) Jabal Al-Rahmah, representing mass gathering locations in Arafat. The following (Table 4) shows the dates and times of the site visits and the frequency of the observation repetition.

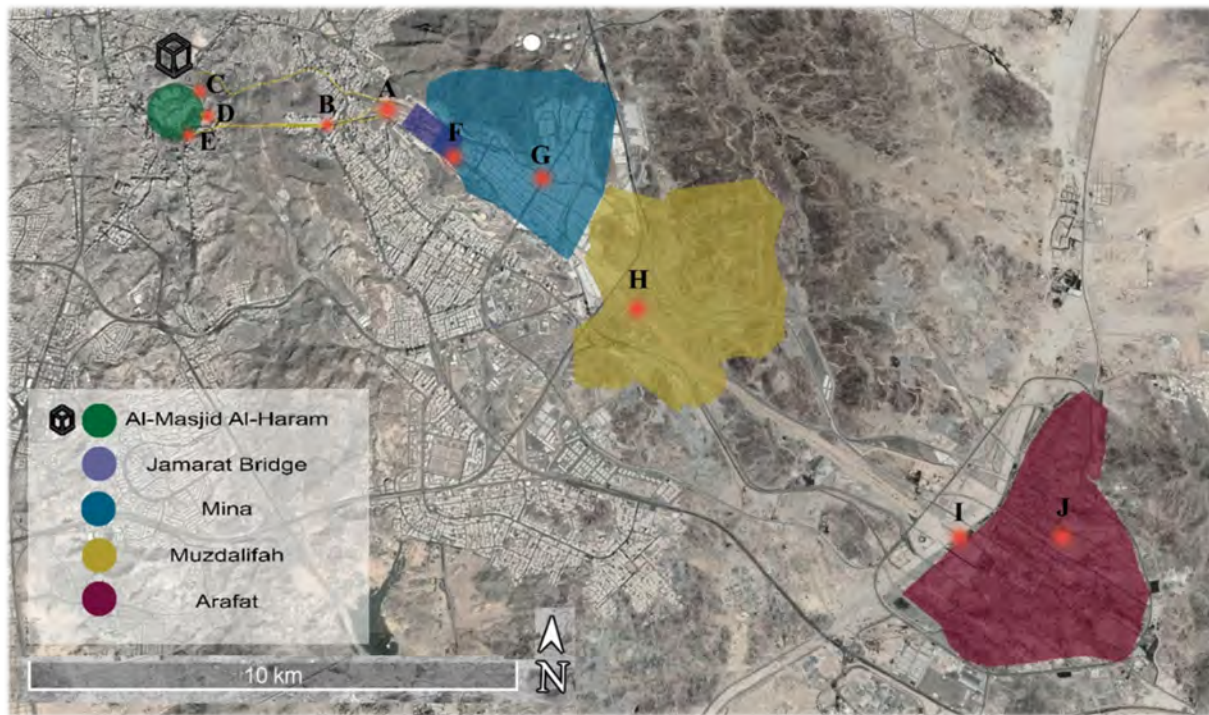


Fig. 3: Observation sites on the pilgrim's routes; Hajj of 2022 (Source: Google Earth; Modified By Researcher)³⁷.

OBSERVATION SITE	VISITS	DATE & TIME	DATE & TIME	DATE & TIME	DATE & TIME	SITE DESCRIPTION
Site A	3		09/07/2022 08:00 - 10:00	11/07/2022 17:00 - 18:00	12/07/2022 13:00 - 15:00	This site is the exit point of the Jamarat Bridge, where the journey towards Al-Masjid Al-Haram.
Site B	4	28/04/2022 16:00 - 17:00	09/07/2022 10:00 - 11:00	11/07/2022 18:00 - 22:00	12/07/2022 16:00 - 20:00	This is the King Abdulaziz Road, which links the Jamarat Bridge and Al-Masjid Al-Haram.
Site C	4	28/04/2022 17:00 - 11:59	09/07/2022 11:00 - 13:00	11/07/2022 18:00 - 22:00	12/07/2022 16:00 - 20:00	This is the arrival point at Al-Masjid Al-Haram in the northern area.
Site D	4	28/04/2022 17:00 - 11:59	09/07/2022 11:00 - 13:00	11/07/2022 18:00 - 22:00	12/07/2022 16:00 - 20:00	This is the arrival point at Al-Masjid Al-Haram in the eastern area from King Abdulaziz Road.
Site E	4	28/04/2022 17:00 - 11:59	09/07/2022 11:00 - 13:00	11/07/2022 18:00 - 22:00	12/07/2022 16:00 - 20:00	This is the arrival point at Al-Masjid Al-Haram in the southern area from King Fahad Road.
Site F	3	07/07/2022 12:00 - 16:00	09/07/2022 16:00 - 22:00	11/07/2022 16:00 - 17:00		This is the King Abdulaziz Road in Mina, which links the Holy Sites and Al-Masjid Al-Haram.
Site G	3	07/07/2022 12:00 - 16:00	09/07/2022 07:00 - 08:00	11/07/2022 12:00 - 13:00		This is the King Fahad Road in Mina, which links the Holy Sites and Al-Masjid Al-Haram.
Site H	2	08/07/2022 19:00 - 22:00	09/07/2022 06:00 - 07:00			This is a site of mass gatherings, Masjid Al-Mashaar Al-Haram, Muzdalifah.
Site I	1	08/07/2022 14:00 - 15:00				This is a site of mass gatherings, Masjid Namirah, Arafat.
Site J	1	08/07/2022 16:00 - 18:00				This is a site of mass gatherings, Jabal Al-Rahmah, Arafat.

Table 4: Observation sites, dates and times, Hajj of 2022.

The pilgrimage of Hajj serves as a profound example of how user experience significantly impacts crowd management strategies and overall event success. Hajj's spiritual and emotional dimensions deeply influence pilgrims' behavior, shaping their interactions with the crowd and affecting the overall management strategy^{50,51}. A positive user experience, often linked to spiritual fulfilment, leads to better compliance with crowd management measures, thereby reducing risks and enhancing safety^{50,51}. Conversely, negative experiences can result in disruptive behaviors, posing challenges to crowd management⁵².

The concept of user experience extends beyond immediate emotional responses to include broader aspects like expectations, which tend to rise annually due to the accumulative experiences of previous pilgrimages. This makes the management of Hajj a regenerative process of expectation management and control. Authorities have recognized the importance of user experience and have been striving to enhance the overall journey of pilgrims, considering factors like spirituality and exclusivity that are unique to Hajj^{50,50}. Moreover, the study of user personas, representing idealized users with specific traits and goals, provides a nuanced understanding of the diverse range of individuals participating in mass gatherings like Hajj⁵³. This user-centered approach enables event planners and urban managers to design spaces and services catering to different user groups, creating a more inclusive and satisfactory experience while ensuring safety and comfort.

Understanding the user experience (Fig. 4) is crucial for shaping effective management strategies in mega-events like Hajj. A positive user experience contributes to cooperative crowd behavior and facilitates the implementation of effective crowd management strategies. On the other hand, negative experiences can lead to disruptive behaviors, posing challenges to crowd management. By adopting a user-centered approach, including the study of user personas, event organizers can create a more inclusive, safe, and satisfactory experience for all attendees. User experience has emerged as a pivotal element in mega-events success, influencing participants' perceptions and overall satisfaction. The formation of the user experience is a complex, dynamic process that involves multiple interactions with various touchpoints throughout the event journey. These touchpoints can range from physical objects and environments to virtual platforms and social interactions, each impacting the user's overall experience⁵⁴, which can be captured by constructing a UJM.

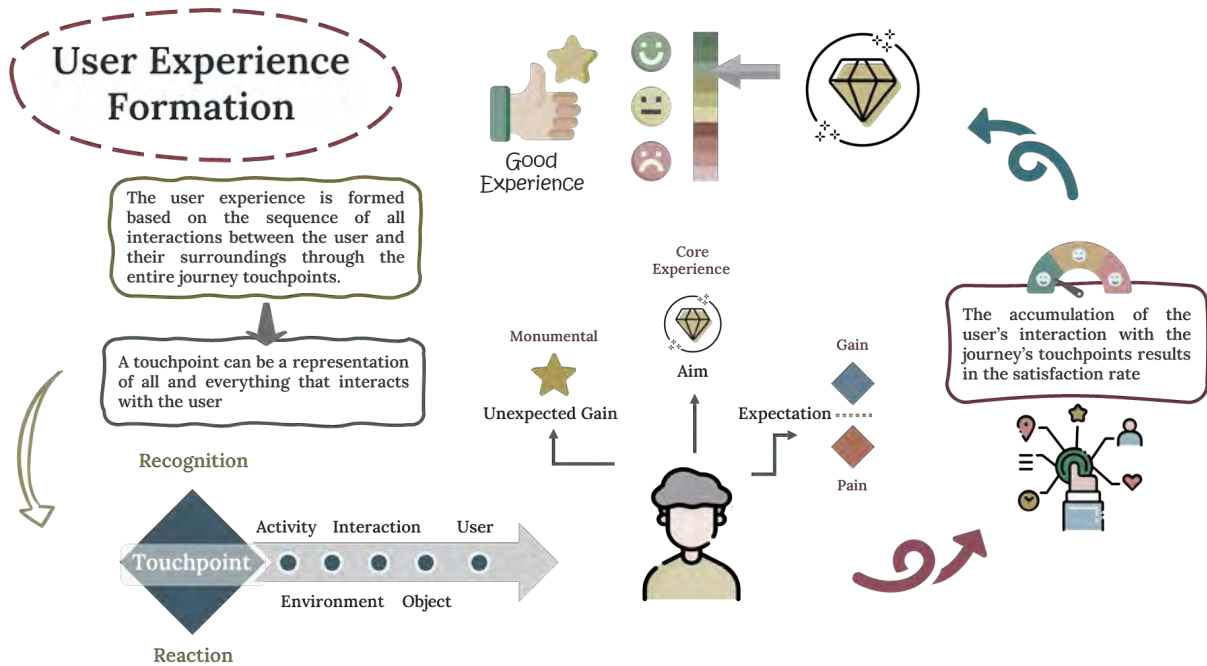


Fig. 4: The user experience formation (by Author)

The UJM serves as a structured, visual methodology for capturing the sequence of user interactions, touchpoints, and emotional responses within a given context, such as a product, service, or event⁵⁵. The primary objective of this approach is to offer a comprehensive understanding of the user's perspective, thereby enabling organizations to pinpoint areas for improvement, as well as moments where user expectations align or diverge from actual experiences.

The foundation of UJM lies in empirical research methods, including but not limited to interviews, surveys, focus groups, and observations⁵⁶. These methods facilitate the collection of data on user perceptions, needs, and emotional states. Complementary tools like Empathy Mapping (EM) and the AEIOU framework further enrich the data by providing insights into users' thoughts, feelings, and contextual interactions^{53,57}. The UJM consists of nine key elements:

- 1) **User Personas:** The creation of user personas enables a nuanced understanding of diverse user segments, their motivations, and unique expectations⁵⁸. These personas are instrumental in tailoring strategies to meet specific user needs across various touchpoints⁵⁹.
- 2) **Journey Stages:** These represent the critical milestones in a user's interaction with a service or event. Understanding these stages allows for a structured analysis of user experiences, thereby identifying opportunities for optimization⁵⁶.

- 3) Activities/Rituals: These are specific actions or engagements that occur at particular touchpoints. Mapping these activities provides a granular view of the user experience, enabling targeted interventions for improvement⁵⁵.
- 4) Needs and Promises: This element aligns organizational commitments with user expectations. Effective delivery of these promises is crucial for building trust and ensuring a consistent user experience⁶⁰.
- 5) User Expectations: These are shaped by various factors, including prior experiences and external influences. Managing these expectations is vital for achieving higher user satisfaction rates.
- 6) Touchpoints: These represent the interfaces where users interact with the service or event. Effective management of these touchpoints is crucial for shaping the user's overall experience⁶¹.
- 7) User Gains and Pains: These terms refer to user interactions with touchpoints' positive and negative outcomes. Understanding these can provide valuable insights into service quality and areas for improvement^{57,62}.
- 8) Collective Experience: This is shaped by the cumulative effect of individual interactions, gains, and pains. It measures overall user satisfaction and can influence crowd dynamics⁶³.
- 9) User Emotions and Satisfaction: The sum of user gains, pains, and fulfilling needs and expectations leads to specific emotional responses⁵⁷. These emotions, in turn, shape the overall user satisfaction rate, which is a key performance indicator for any service or event.

User expectations play a crucial role in shaping the perception of touchpoints (Fig. 5). These expectations are often influenced by prior experiences, marketing campaigns, and external factors like word-of-mouth⁶⁴. For example, an event attendee's preconceived notion of a vibrant musical performance can significantly impact their overall experience. Interactions with touchpoints can result in either gains or pains, depending on how well they align with user expectations. A gain occurs when a touchpoint exceeds expectations, producing a positive emotional response. Conversely, a pain point results when a touchpoint falls short, causing dissatisfaction^{65,66}.

Occasionally, monumental gains can occur unexpectedly, extraordinary experiences dramatically elevating user satisfaction⁶⁷. The formation of the user experience is also influenced by organizational promises, which represent the commitments made by event organizers about the quality of services and overall experience⁶⁸. Effective communication of these promises can shape user expectations even before the event begins. External factors like media coverage and social media can either elevate or dampen expectations⁶⁹.

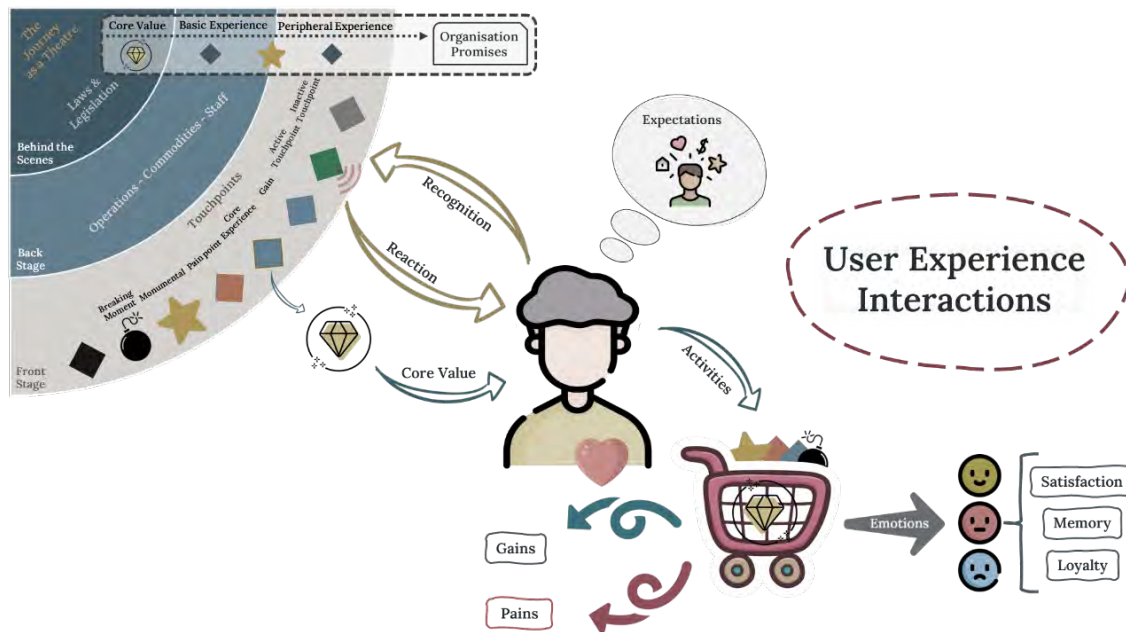


Fig. 5: User interactions with the journey's touchpoints.

A complex interplay of touchpoints, expectations, gains, pains, organizational promises, and external influences shapes the user experience. This intricate web of interactions culminates in forming the user's collective experience, ultimately determining their satisfaction and loyalty to the event⁶⁸. The notion of collective experience, as explored by Henriques⁷⁰, provides a framework for understanding shared user interactions within specific contexts. This concept suggests that individuals with similar attributes are likely to share analogous experiences, offering valuable insights for event planners and urban managers.

Recognized for their utility in assessing service quality and customer satisfaction, UJMs visually synthesize user interactions and experiences, offering a holistic perspective of the emotional journey and collective user experience^{58,59}. This comprehensive understanding empowers organizations to formulate user-centric strategies, enhancing overall satisfaction and engagement. For example, in the context of pilgrimages or religious events, a nuanced understanding of the unique needs and expectations of different user personas can significantly inform more effective planning and execution, ultimately elevating the overall user experience. Therefore, UJM serves as an all-encompassing tool for understanding and improving user experience. By concentrating on essential elements such as user personas, journey stages, and touchpoints and utilizing empirical methods for data collection, UJMs furnish invaluable insights. These insights enable organizations to customize their services more effectively, leading to enhanced user experiences and the event's overall success.

4. COLLECTIVE EXPERIENCE: INFLUENTIAL FACTORS AND MANAGEMENT IMPLICATIONS

The collective experience of pilgrims during the Hajj pilgrimage is a complex interplay of various factors, including but not limited to shared persona characteristics. Unique religious constraints and rituals precisely define the Hajj, guiding pilgrims' interactions and movements throughout the journey. Pre-existing knowledge, encompassing communication skills, wayfinding awareness, and leadership capabilities, also significantly impacts the collective experience.

Additionally, amenities and services provided during Hajj also reflect the influence of collective experience. Pilgrims with prior knowledge of the journey's routes and conditions are better equipped to navigate the pilgrimage, contributing to smoother crowd movements and cooperation among participants. Although not overtly visible, spirituality profoundly influences the collective experience. It amplifies emotional responses, deepens connections to faith, and impacts crowd behavior. A spiritually enriching experience promotes harmony and cooperation among pilgrims, enhancing the conditions for crowd movement and fostering a sense of spiritual unity.

To gain a comprehensive understanding of crowd management during Hajj, the UJM captures common user perspectives in relation to their personas, identifies key gaps and opportunities, and sheds light on the primary activities and needs of pilgrims at each stage of the journey (Fig. 7). A foundation is laid through systematic mapping and analysis for refining crowd control strategies, aiming for a safer, more efficient, and spiritually fulfilling experience for all participants.

The UJM reveals pilgrims' primary activities and needs at each journey stage, shedding light on the factors that significantly shape their experience. During the pilgrimage journey, three main stages of movement are divided across the Holy Sites and Al-Masjid Al-Haram (Fig. 6). Each stage has its own unique activities and movement conditions, including travel timeframe, available transportation and movement pattern. These activities will later represent the main touchpoints of the pilgrimage journey.

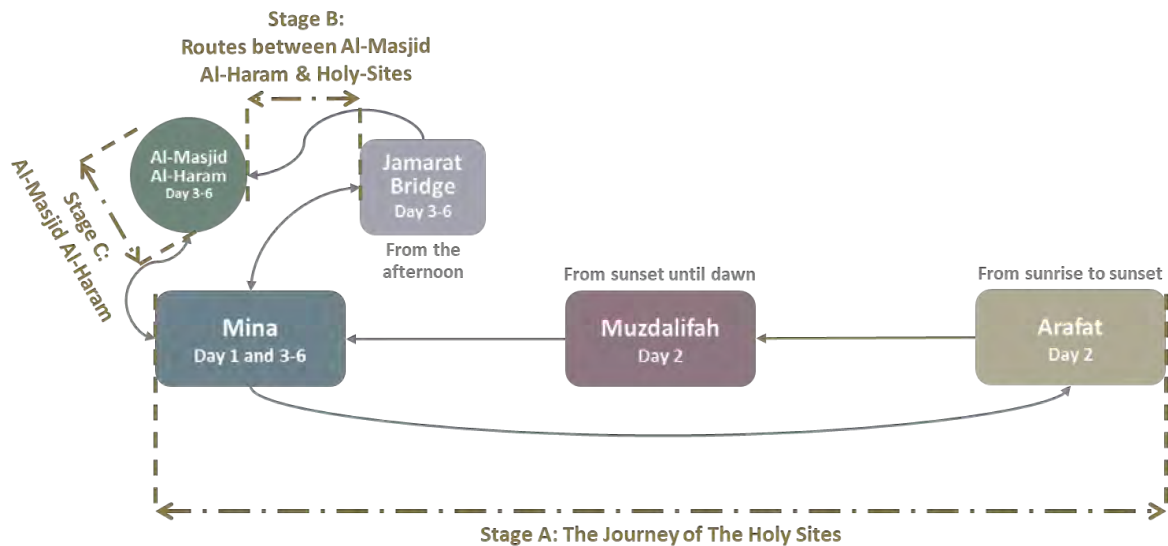


Fig. 6: Stages of the Pilgrims' Journey of Hajj

Stage A, The Journey of Holy Sites: This stage involves transit and movements between the Holy Sites, mass gatherings in Mina, and movements within the location. Most common pilgrims' needs include completing rituals, direct communication, essential services, and spatial guidance. They expect mobility, an enriched experience, movement flexibility, and easy access to services and ritual sites. Their gains include well-defined transit routes, synchronized movement schedules, and an overwhelming sense of spirituality. On the other hand, pain points included a lack of services and rest areas, long walking distances, exhaustion, crowdedness, and restricted movements.

Stage B, Routes between Al-Masjid Al-Haram & the Holy Sites (Makkah City): In this stage, pilgrims' main needs are universal access, ensuring accessibility to services and ritual locations for all, including disabled users. Expectations include service accessibility, clear directions, and easy instructions. Pilgrims gain from the variety of available services and transit modes and benefit from having a guide person with each group. However, they may experience pains due to long waiting times, high prices, and interwoven pedestrian and vehicle movements.

Stage C, Al-Masjid Al-Haram: The final stage involves movement within Al-Masjid Al-Haram and the arrival & departure from the location. Pilgrims need access to Al-Masjid Al-Haram, including Mataf and Kaaba. Their expectations include spirituality, satisfaction, options availability, and quality of service and facilities. Gains consist of a track for the elderly and people with special needs, multilingual guides, and specific paths linking transit stations and Al-Masjid Al-Haram's premises. The pilgrims may face difficulties due to slow and dense crowded movements, multiple security checkpoints, and confusion with entry and exit doors. Understanding the user persona and characteristics and the additional factors that impact the collective

pilgrims' experience during Hajj provides valuable insights for crowd movement management. By considering these elements, authorities can enhance crowd control strategies and create a more spiritually fulfilling and safe pilgrimage experience for all participants.

Summary of the User Journey Map of Hajj 1443H (As Is)

Costumes & Habits

Persona

The research persona included the category of pilgrims coming from Europe, North America and Australia as based on the existing classification in the Hajj system. Ignited by the launch of a new reservation and grouping system, an electronic platform called "Mutawaf", following the approach of direct dealing with the client (B to C).

Stages

A. The Journey of Holy-Sites

B. Routes between Al-Masjid Al-Haram & the Holy-Sites (Makkah City)

C. Al-Masjid Al-Haram

Activities	Day 1&2 Transit / Movement between the Holy-Sites	Day 2 Mass Gathering	Day 3,4,5&6 Movement in, out and within Mina	Day 3,5&6 Transit / Movement toward Al-Masjid Al-Haram			Day 3,5&6 Movement within Al-Masjid Al-Haram	Day 3,5&6 Arrival & Departure (Transit / Movement)
Needs	<ul style="list-style-type: none">•Ritual completion•Direct communication	<ul style="list-style-type: none">•Ritual completion•Essentials services	<ul style="list-style-type: none">•Spatial Guiding System	<ul style="list-style-type: none">•Direct communication•Universal access	<ul style="list-style-type: none">•Targeted services	<ul style="list-style-type: none">•Spatial Guiding system	<ul style="list-style-type: none">•Ritual completion•Accessibility	<ul style="list-style-type: none">•Universal access•Spatial Guiding system
Expectations	<ul style="list-style-type: none">•Mobility•Enriched Experience•Movement flexibility according to their Belief	<ul style="list-style-type: none">•Easy access, short walking distance and spatial guidance•Availability of service facilities, rest areas and transportation	<ul style="list-style-type: none">•Availability of transportation•Easy access in/out of Mina	<ul style="list-style-type: none">•Mobility & availability of transportation•Easy access and short walking distance	<ul style="list-style-type: none">•Service Accessibility & Affordability	<ul style="list-style-type: none">•Clear directions•Easy instructions	<ul style="list-style-type: none">•Spirituality & Satisfaction•Enriched Experience	<ul style="list-style-type: none">•Options Availability•Service Quality
Touchpoints	<div><div>Buses</div><div>Trains</div><div>Walking</div></div>	<div><div>Jabal Al-Rahmah</div><div>Jamarat Bridge</div></div>	<div><div>Walking</div></div>	<div><div>Buses</div><div>Cars</div><div>Walking</div></div>	<div><div>Routes & Services</div></div>	<div><div>Way Finding</div></div>	<div><div>Mosque Precincts</div><div>Tawaf & Sa'i</div></div>	<div><div>Arrival</div><div>Departure</div></div>
Gains	<ul style="list-style-type: none">•Transit routes defined, clear and easy to use.•Movements Scheduling are aligned with the users' belief	<ul style="list-style-type: none">•The spirituality of the place overshadows the fatigue	<ul style="list-style-type: none">•Unique and enriched experience	<ul style="list-style-type: none">•Availability of transportation•Pedestrian roads are wide and well lit	<ul style="list-style-type: none">•Variety of available services	<ul style="list-style-type: none">•Having a guide with each group	<ul style="list-style-type: none">•A track dedicated to the elderly and people with special needs•Guides speak several languages	<ul style="list-style-type: none">•Specific paths linking transit stations and Al-Masjid Al-Haram
Pains	<ul style="list-style-type: none">•Lack of places to rest•Walking long distances•Limited signage	<ul style="list-style-type: none">•Exhaustion of long walking distances and the Sun heat•Crowdedness and limited exits destinations	<ul style="list-style-type: none">•Limited signages•Restricted movements	<ul style="list-style-type: none">•Long waiting time and walking distance•High prices and random loading of passengers	<ul style="list-style-type: none">•Interwoven pedestrian and vehicle movement	<ul style="list-style-type: none">•Limited signages•Restricted movements	<ul style="list-style-type: none">•Slow and dense movement•Entry & exit doors are different•Prevented access to Mataf	<ul style="list-style-type: none">•Exhaustion of long walking distances, crowdedness and restricted movements•Absence of movements updated information
Satisfaction	75%	79%	72%	63%	N/A	N/A	73%	73%
Emotions	<ul style="list-style-type: none">•Happiness with arriving at the ritual area	<ul style="list-style-type: none">•Joy of the spiritual experience of the place	<ul style="list-style-type: none">•Fear of violating regulations in light of the heavy security deployment	<ul style="list-style-type: none">•Anger at the closure of some roads and the lack of knowledge of alternative ways	<ul style="list-style-type: none">•Annoyance about the movement routes lack of readiness	<ul style="list-style-type: none">•Fatigue due to long walking distances•Fear of being lost	<ul style="list-style-type: none">•Happiness of the ritual completion overwhelmed by the sense of spirituality of Al-Masjid Al-Haram	<ul style="list-style-type: none">•Resentment of the long walking distance and the limited space for movement•Afraid of getting lost

Fig. 7: Summary of the User Journey Map of Hajj 1443H (As Is).

The planning of movements and crowd management during Hajj is of critical importance, given the event's large scale. Lessons from past collective experiences, particularly those marred by unfortunate incidents like stampedes, have significantly shaped current planning strategies. Organizers and planners meticulously study past events to make informed decisions about optimal pathways, site capacities, and effective crowd control mechanisms⁷¹. For example, the construction of the Jamarat Bridge in Mina is a testament to the application of insights gained from previous experiences. This multi-level structure, equipped with advanced crowd management technologies, aims to alleviate overcrowding and enhance safety during the ritual of symbolic stoning⁷². Mapping the user journey can identify key gaps and opportunities affecting crowd movements during Hajj. This process reveals collective behavioral patterns that significantly influence planning strategies. One notable challenge is restricting free movement due to crowd congestion and bottlenecks, leading to participant delays and frustration⁶². This issue presents an opportunity for designing movement pathways incorporating wider passages and strategically placed amenities to alleviate congestion.

Transportation limitations are another significant gap. The high demand for transport often outstrips available resources, resulting in overcrowding and breakdowns⁶³. Effective planning could leverage technology to offer real-time transport information, alternative modes of transport, and advanced scheduling systems. Wayfinding is another challenge; the complexity of the pilgrimage sites can be overwhelming, causing confusion and disorientation among participants⁵⁶. Clear signage and digital wayfinding tools are needed to guide pilgrims effectively through the journey (Fig. 8).

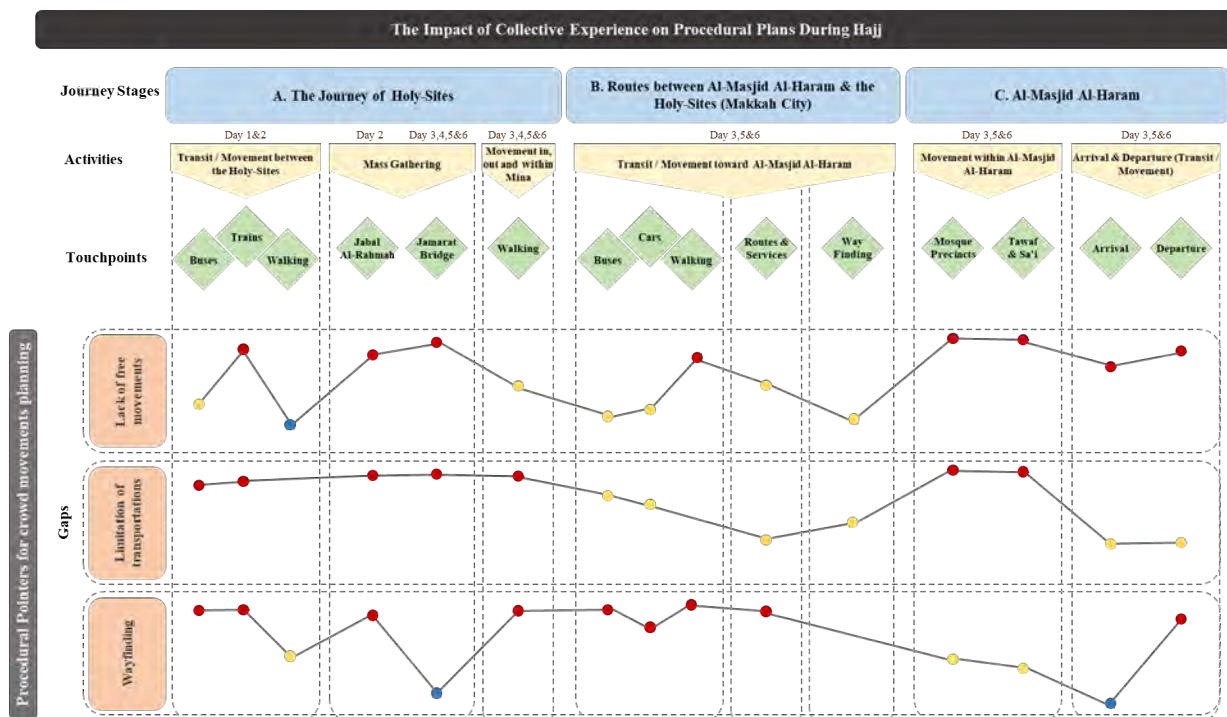


Fig. 8: The main gaps affecting the crowd movements.

Conversely, the collective experience also uncovers opportunities to enhance movement planning. Allowing multiple destinations within the pilgrimage journey offers participants diverse experiences while distributing the crowd load⁷³. This approach mitigates congestion at popular sites and encourages even movement distribution. Utilizing rest areas strategically to fragment crowds provides participants with designated spaces to rest, pray, and engage with minimal disruption to the overall movement⁷⁴. Moreover, introducing bookable time slots for group or individual movements optimizes crowd distribution, preventing overwhelming influxes of participants at any given time. (Fig. 9) shows the main opportunities that can be applied to the movement environment concerning the journey's touchpoints during Hajj. It indicates the opportunity's significance based on its ability to be implemented in the current conditions.

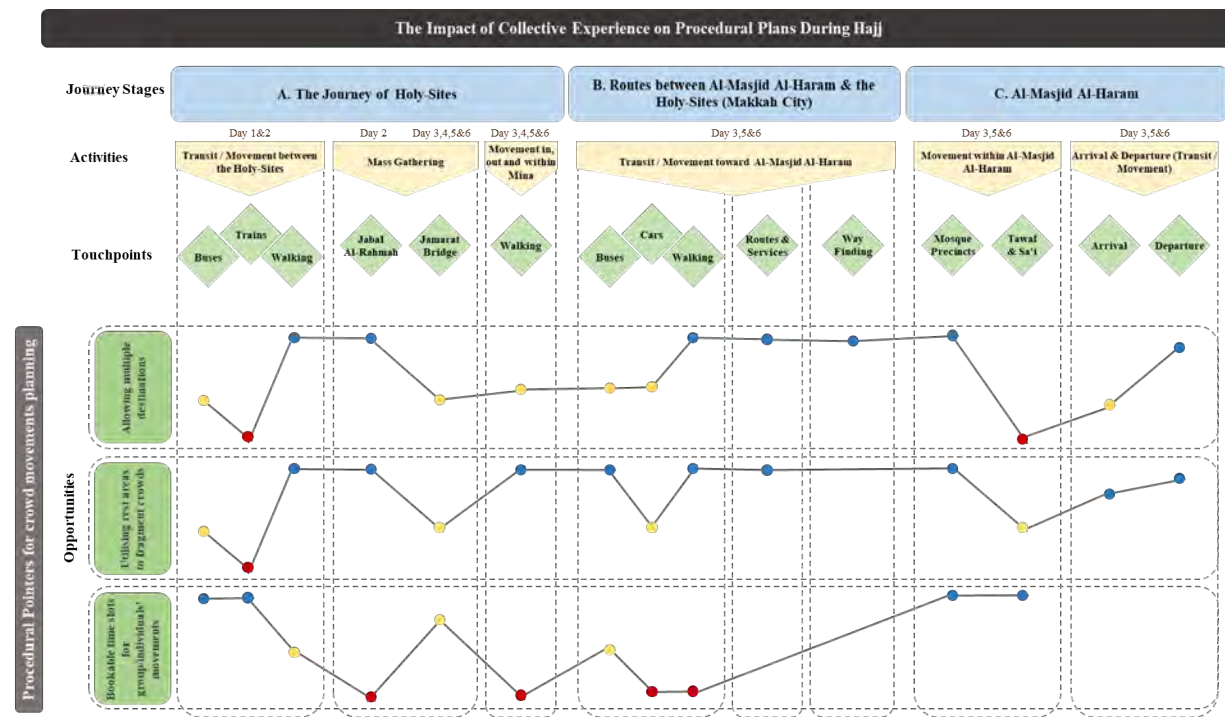


Fig. 9: Opportunities can affect the movement environment.

Nevertheless, the collective experience also reveals opportunities for improvement. Allowing for multiple destinations within the pilgrimage can distribute crowd load more evenly⁷³. Strategic placement of rest areas can provide designated spaces for rest and prayer without disrupting overall movement⁷⁴. Bookable time slots for group or individual movements can further optimize crowd distribution (Fig. 10).

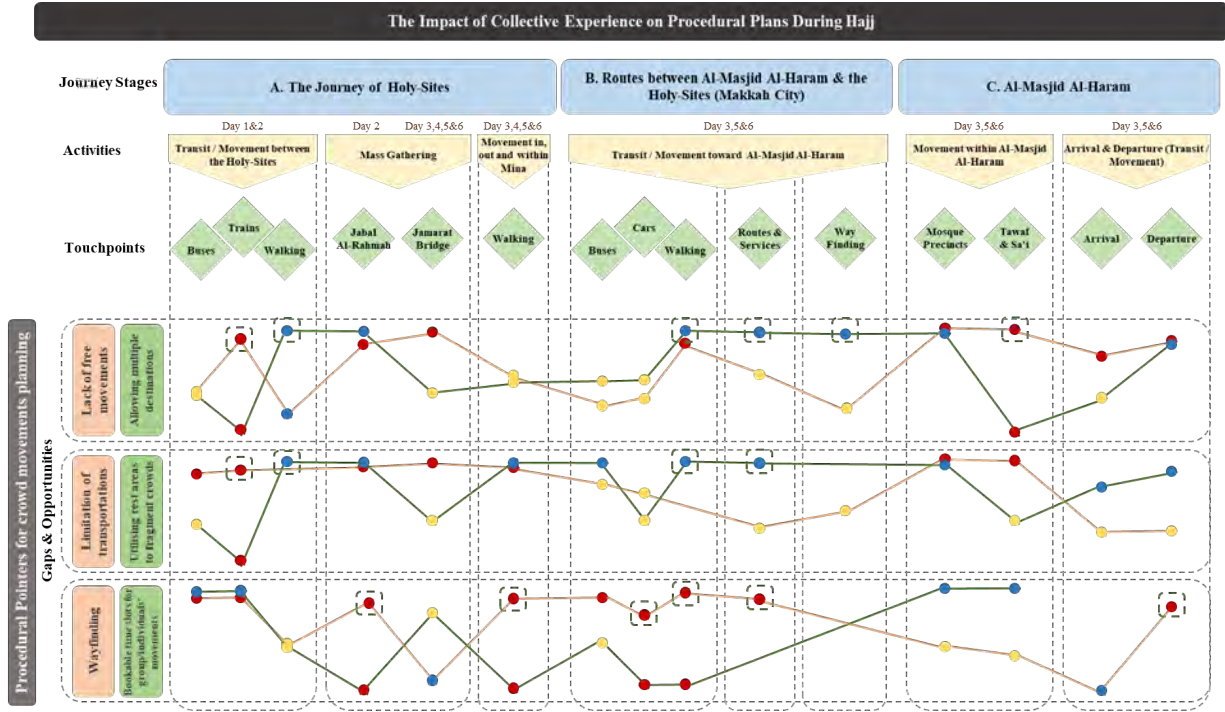


Fig. 10: The correlations of Gaps and opportunities of crowd movements during Hajj.

Two scenarios emerge when comparing the significant gaps at each touchpoint with available opportunities. Either the opportunity aligns with the identified gap, suggesting a viable solution, or it does not, indicating that the gap may persist to some extent. Some gaps may not have corresponding opportunities due to the inherent nature of the activity or existing conditions at the location. In summary, the collective experience gleaned from user journey mapping substantially impacts movement planning for large-scale events like Hajj. By identifying these gaps and opportunities, organizers can develop targeted strategies to improve crowd movement, enhance participant satisfaction, and successfully manage such complex gatherings.

5. CONCLUSION

In conclusion, the paper has illuminated the intricate challenges and considerations in managing crowd movements during large-scale events, focusing on the Hajj pilgrimage. By utilizing UJM as a foundational analytical tool, the study has delved into the multifaceted elements that contribute to the collective experience of participants. These elements range from the unique religious and spiritual dimensions of the Hajj to more pragmatic aspects like transportation and wayfinding. The study has identified key gaps in current management strategies, such as limitations in transportation options and wayfinding challenges, which can hinder smooth crowd movement and lead to bottlenecks. On the other hand, it has also highlighted opportunities for improvement, such as the strategic placement of amenities and the use of technology for

real-time information dissemination. These insights are crucial for establishing management frameworks aiming to optimize crowd movements, enhancing safety and the overall user experience.

Moreover, the paper has underscored the importance of aligning these insights with existing urban management frameworks to create more effective and responsive crowd management strategies. By mapping out the correlations between existing opportunities and current gaps, the study provides a nuanced understanding that can guide targeted interventions. This is particularly important for improving both safety measures and participant satisfaction, two key metrics in the successful execution of complex mass gatherings like the Hajj. The findings contribute to the growing body of knowledge on effective crowd management during mega-events. They serve as a foundation for future research and practical applications to enhance the safety and efficiency of such events and enrich the participants' spiritual and emotional experiences. Therefore, as religious gatherings like the Hajj continue to attract millions from around the world, the need for crowd management strategies that are both effective and considerate of the collective experience becomes increasingly vital.

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Traditional Dwellings and Settlements

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THE DYNAMIC TRADITION OF A MODERN EXOGENOUS URBAN MODEL: CASE OF HOUSING URBANIZATION IN IRAN 1945-1979

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THE DYNAMIC TRADITION OF A MODERN EXOGENOUS URBAN MODEL: CASE OF HOUSING URBANIZATION IN IRAN 1945-1979



While Western modernity raises the question of International Style, non-Western modernity raises that of International Modernism, which focuses on a variation of modernities rather than proposing one authentic and integral way of being modern. Non-Western modernist history is about the moment of enculturation. This is when culture and context play the main role in the adaptation and translation of imported modernity and formulate the indigenous version. In these contexts, Tradition is not a dead or passive pattern, but it is rather a dynamic and presence flow that reshape itself within the modern world. In terms of cities, one could say the "Tradition of Urbanism" is a dynamic tradition that while has a foot in ancient time, modernize itself constantly based on the era it lives.

*This "Tradition of Urbanism" reproduce itself through different sorts of archetypes. The pattern of urban development in Tehran, for example, inherited the ancient models formerly used by Iranians, namely Persian garden; however, with modernity this archetype has merged with new elements such as standard urban planning rules or the grid logic. Nevertheless, the presence of the archetype of the Persian garden is evident on three scales: land division, green boulevards, and the development of courtyard houses. In Jungian theory archetype is a primitive mental image inherited from the earliest human ancestors and supposed to be present in the collective unconscious. Archetype, a mid-sixteenth century word, was originally a Latin term deriving from the Greek *arkhetupon* and it means "the original model." This original model however, though it might no longer have a dominant role, can still be seen as a continuing and inspiring stimulus. A collective representation or symbolic figures from a primitive view of the world that could easily be applied to the subconscious content as well since it means practically the same thing. Thus, one can argue, that designing the land as if it were a garden is an approach and concept that is ingrained in the minds of Iranians.*

In the case of Tehran, the archetype of Persian garden subconsciously formed the modern neighborhoods and continued to exist through modernized courtyard housing. In fact, while Iranian architects were applying the standards for the modern house and were following the international styles in designing fully equipped neighborhoods, the archetype of the Persian garden as a primitive image, guided architects to reproduce the Iranian courtyard house as a series of modernized-standardized courtyard houses each time with different compositions structuralized by a grid and therefore providing new urban blocks.

This article is aiming to elaborate how dynamic tradition of Persian urbanization domesticized the modern principles of international housing. This article will focus of series of case studies within different neighborhoods of Tehran which have built from 1945 till 1979 and will illustrated the multiple radical morphosis that they went through till now.

1. IRANIAN TRADITION OF URBANISM: SCHOOL OF ISFAHAN

The School of Isfahan was a Persian philosophy and ideology that emerged in 16th-17th century. It involved a group of architects, philosophers, artists, and poets who collaborated closely with the Safavid Kingdom¹. They significantly influenced the urban development of Isfahan, the capital city of the Safavid era, as well as other key cities along the Silk Road such as Tabriz and Qazvin². The School of Isfahan is a skillful synthesis of ancient art, architecture, and urbanism, presenting a revolutionary model for expanding the existing cities. The master architect of this school of thought was Sheikh-e Bahai, who was a skilled craftsman and a Sufi, possessing a conscious understanding of the principles governing his art. In ancient Iranian architecture, the master architect believed that the city and architecture must reflect the Divine world³. In School of Isfahan

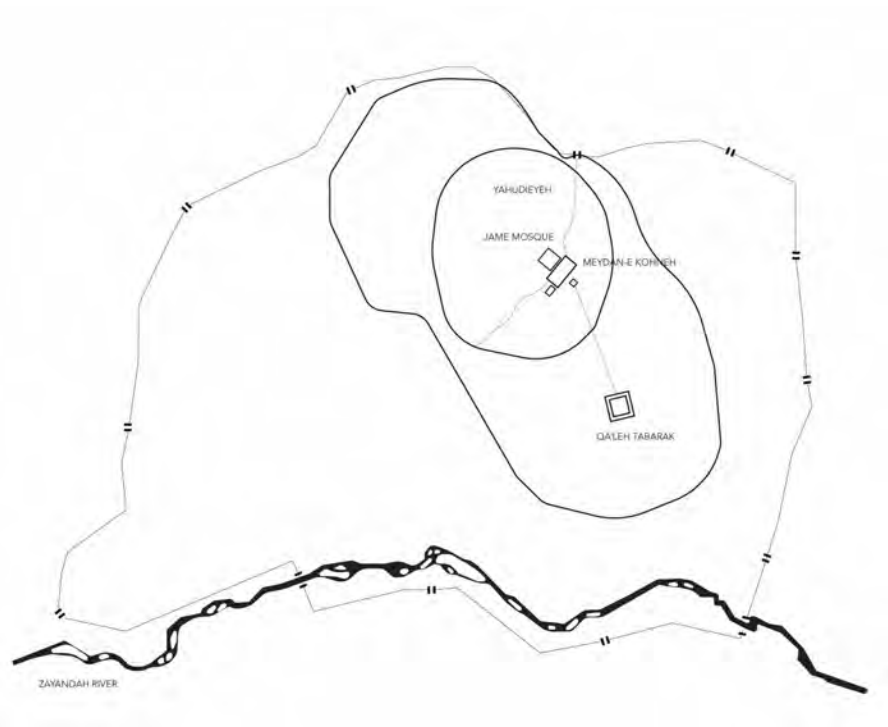


Fig. 1: Isfahan in the 8th Century: the emergence of School of Isfahan
(Source: Rana Habibi, based on Isfahan map of Nader Ardalan & Laleh Bakhtiar and Mohsen Habibi, 2023)

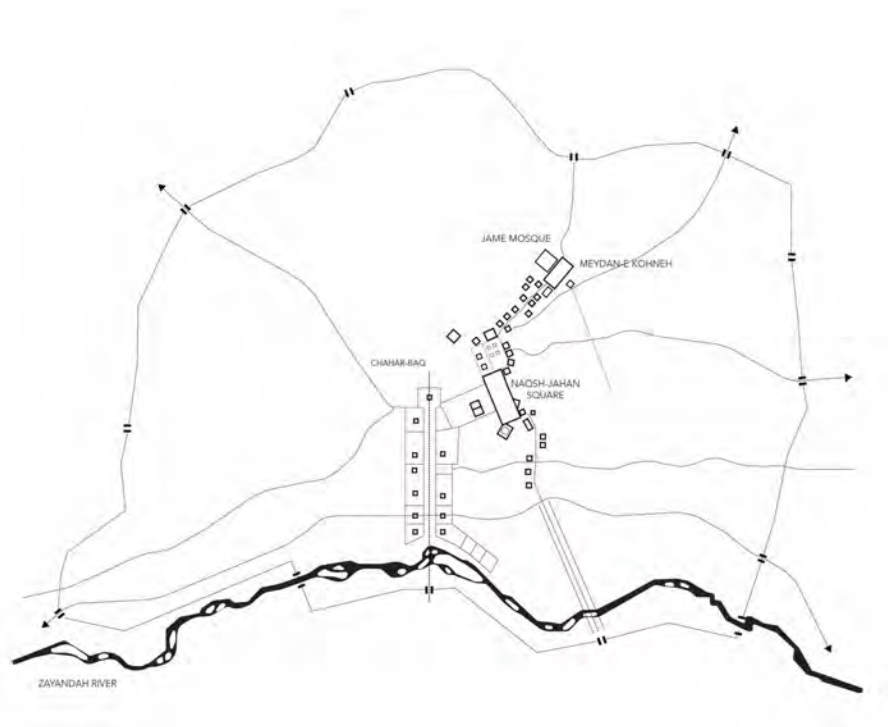


Fig. 2: Isfahan in 16th Century: the emergence of School of Isfahan
(Source: Rana Habibi, based on Isfahan map of Nader Ardalan & Laleh Bakhtiar and Mohsen Habibi, 2023)

city and architecture were a journey from Macrocosm to Microcosm world with a specific transition: Divine Essence, Divine Nature, the world beyond form, the world of imagination, the world of spiritual perception, the world of forms, the world of nature/human. The city's language structure for urban design represented this journey through series of archetypes, natural and geometrical forms.

Mohsen Habibi, an urban design professor, urban theorising and historian (1947-2020), and was the pioneer who introduced the Isfahan School of urbanism in Iranian cities for the first time in 1996. Mohsen Habibi was a follower of Françoise Choay's urbanism philosophy. While pursuing his doctoral thesis (1975 -1980) at the Institut Français d'Urbanisme (IFU) at the University of Paris 8, he received lectures and guidance from Françoise Choay, a French urban thinker and historian. Habibi adopted an analytical-historical approach to Iranian urban design thinking, which can be seen in his numerous publications on Iranian urbanism.

He wrote his thesis and first book, "delà cité à la ville," in 1981, which analyzed the historical aspects of urban conceptions and their physical features. In 1996, he introduced the concept of the School of Isfahan as an Iranian urban design language that could be replicated in modern urbanism in a short article "Isfahan the School of Urbanism". Later, he collaborated with his doctoral student and later his colleague, professor Zahra Ahari, to publish a book in 2011 titled "School of Isfahan: The Language of Iranian Urban Design⁴."

Habibi and Ahari explained extensively in their book that, in the School of Isfahan, the city characteristic transformed into a symbol, a physical embodiment, and a manifestation of the powerful central government's political, ideological, cultural, social, and economic concepts. It is not a transient incident but rather a commemorative event that leaves a lasting impact, reflecting the profound changes that occurred in the economic, social, and cultural aspects of the era. The essence of the School of Isfahan in the Safavid government is the fusion and amalgamation of political-ideological concepts with mystical, poetic, and religious elements. It represents the embodiment of social unity and also encompasses the concepts of "city-power," "city-performance," and "city-vision⁵." By encompassing all these concepts, it expands as the "city-region" and defines and accepts the region itself. This was the first instance where urban development in Iran involved rational regional thinking for the city's expansion based on organic and rational approaches.

Organic elements such as rivers and underground qanat systems became the core of the city expansion, and rational yet archetypal features such as chaharbaq (geometrical linear parks) and geometrical new center made a tangible structure to bridge the new and old city of Isfahan.

In this synthesis, the two approaches of organic and rational/geometrical design are blended together, offering a new conceptualization of urban planning and spatial design through agreement, coordination, and harmony. In Isfahan, without any heavy intervention in the historical fabric and spatial organization, the

development and expansion of the city were defined in a logical and prudent manner. The chaharbaq axis, as a linear natural link between the old and new spatial organization, traverses the Zayandehrud River (as a natural and vital axis), effectively presenting a combination of natural and man-made, organic and rational, order and disorder elements in urban design.

The Naqsh-e Jahan Square, as the new city center and a symbol of the powerful Safavid government, draws inspiration from the ancient squares of Isfahan⁶. However, it imbues this ancient pattern with a completely logical order and unparalleled attention to the combination and spatial arrangement of its surrounding and internal elements such as mosques, entrance of bazar and the king palace.

What is added to the previous form of the city in this School is the emergence of the concept of the street. A city element that either leads to the city's main square or runs parallel to it. Depending on the climatic conditions, this street is lined with numerous trees on its sides, which are named based on their placement in the surrounding environment, such as chaharbagh or chinarstan.

The design of a new and extensive urban axis (chaharbaq) that had no precedent in Iranian urban planning and design as a structural role, along with the creation of a wide and expansive square with a clear and explicit definition of spatial order as the new city center - not a new city itself - leads to the introduction of the concept of urban zoning for the first time in Iranian urban organization. Hence, the creation of new urban complexes as an extension of the ancient cities was employed as a guideline everywhere.

In this perspective, urban facilities and amenities were also addressed through urban architecture. Water reservoirs, bridges, caravanserais, gardens, rivers, and streams are not considered as individual and separate entities, but rather as integral parts of the hierarchical and spatial structure of the urban complex. They were organized and integrated accordingly, and they were part of the new master plan for the city.

In Isfahan school of urbanism, every urban complex, neighborhood or village had a central square or focal point. In each hierarchical level of spatial, social, and economic structures of the urban complex or settlement, this square serves as a gateway through which the state presented its socio-political values to the surrounding world: the main elements of governance, administration, religion, economy, and others find their place around this square. The squares serve also as a location where the main thoroughfares intersect and as a transit hub. They are sometimes small and not always geometrically shaped. Around this square, there are usually basic neighborhoods facilities such as public baths, mosques and schools, religious centres, water reservoirs, and markets.

This synthesis does not mean the reproduction of ancient concepts, but rather a renewed and innovative interpretation of those concepts. Therefore, it can be considered as the culmination point of a movement that

began around seven centuries earlier during the period of intellectual, literary, and artistic revival in the 3rd century AH (9th century CE)⁷. The formation of the Safavid government and the subsequent emergence of the School of Isfahan in urban planning can be compared to the centralized and dominant state organization of post-Renaissance Europe and the development of the Baroque style (18th century AD). Through this comparison, the administrative structure of the Safavid government and the artistic style derived from it in the field of urban planning can be seen as still progressing compared to the governmental organization and artistic style of European countries during the Renaissance period (which coincides with the historical era of the Safavid government). While the thinkers and innovators of the Renaissance period were focused on organizing medieval European cities and exploring their ideal cities, the Isfahan style puts its own visionary model into practice and offers a precise and clear synthesis of the existing and desired elements.

2. SCHOOL OF ISFAHAN IN MODERN PRACTICE

The idea of School of Isfahan in urbanism as discussed previously introduced only in 1998 by Professor Mohsen Habibi. However, during his studies at Tehran University's Department of Fine Arts (1963 -1975), Habibi was influenced by Iranian architect-urban designers, Nader Ardalan and Kamran Diba. Ardalan (born in 1939 - educated at Harvard University) and Diba (born in 1937 - educated at Howard University), were both interested in identifying historical patterns and archetypes present in Iranian cities. They incorporated these elements into their practice. The two were also instructors at the Department of Fine Arts and taught courses on the structure of historical cities and the conceptual thinking required to represent Iranian urbanism archetypes in contemporary designs. Their teaching included design studio work and theoretical coursework. Ardalan collaborated with Laleh Bakhtiar in 1973 to write a book called "The Sense of Unity: The Sufi Tradition in Persian Architecture." The book thoroughly explores the archetypes that underlie traditional Iranian architecture and briefly touches on the various types of traditional cities that follow harmonic, natural, and geometric orders. In 1972, Ardalan used the same school of thought to design the Iran Centre for Management Studies in Tehran, while Habibi worked as a project manager during a phase of that project. Ten years later, Habibi was on the design team of new visions for the future of the city of Isfahan, and it was there that the concept of the School of Isfahan as urban design instructions appeared.

Yet I argued in my book "Modern Middle-Class Housing in Tehran"⁸ how the archetype of chaharbagh manifests itself in the modernization of mass housing in Iran from 1945 till 1979. My argument was that chaharbagh, as a solid subconscious element, reproduced itself in mass modern housing. It was a link between modern and traditional, new and used-to-be, exported and modified. Mohsen Habibi, Nader Ardalan, and Kamran Diba are part of Iranian modernism that consciously used this historical consciousness in their theories and designs.

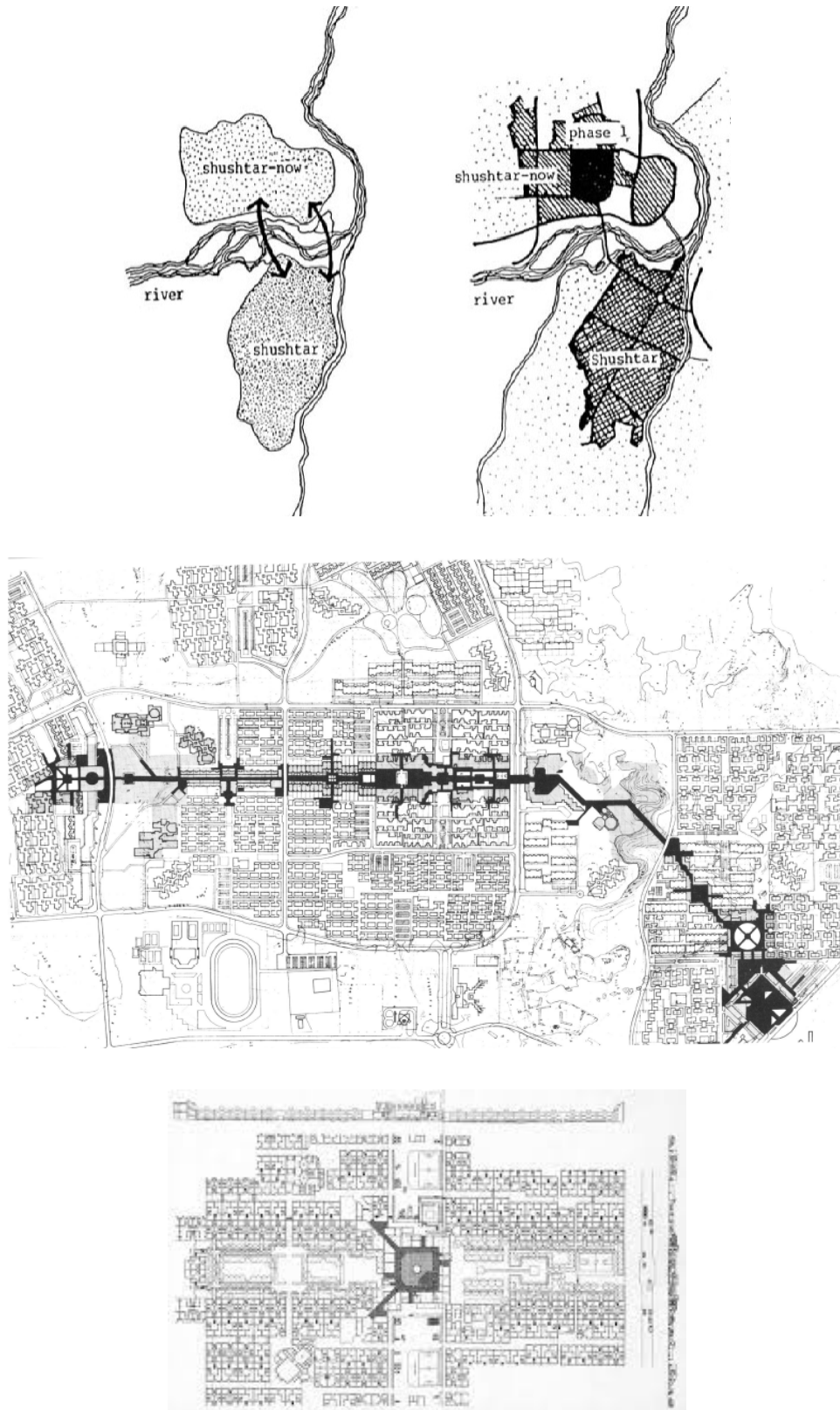


Fig. 3: Shushtar Now, chaharbagh abd neighborhood structure (Source: Diba, Kamran. Buildings and Projects. Berlin: Hatje, 1981)

Shushtar Now

The “Shushtar Now” project is a component of a large-scale modern housing initiative that has been ongoing in Iran since 1945 as part of a broader modernization effort. The need to accommodate a growing population, coupled with a desire to be part of international movements and embrace modernization, prompted Iranian architects to design numerous new neighborhoods and towns within existing cities.

Diba’s approach to the “Shushtar Now” project can be interpreted as combining archetypical elements of the Isfahan School of Urbanism and modern technology. Like Safavid Isfahan, Diba brings the river part of the new development of Shushtar city. He defines a linear public space spine as a “chaharbagh” concept connecting the city’s sides. He provided a series of centers for socio-economically diverse neighborhoods by allocating key public activities within this green spine or modernized “chaharbagh.” He introduced a network of public spaces within the neighborhoods for community-making. Through this project, Diba emphasized creating communities through place⁹. Boundaries and group identities form through lived experience. Like School of Isfahan, here in “Shushtar Now” communities were formed through various gatherings concerning the landscape and familiar archetypes. The use of spatial, figurative, and motival elements creates mental connections between a place and its history, making places reservoirs of memory.

Regular Mass Modern Housing Production in Tehran: Kuy-e Chaharom-e Aban¹⁰

One example of the regular modern model neighborhoods is Kuy-e Chaharom-e Aban, built in 1969. This district was a renovation project based on a comprehensive plan. The project redeveloped a brownfield left behind by derelict brick furnaces in the effort to revive the southern part of Tehran. Kuy-e Chaharom-e Aban can be considered the first tower-in-the-park model for Tehran’s middle class. It consisted of twelve free-standing, five-story apartment buildings placed in a designed landscape; it introduced a completely new mass housing typology in Tehran.

At first glance Kuy-e Chaharom-e Aban is very similar to Soviet Union social housing, with short parallel linear apartment buildings located beside each other in a green space, or the Western concept of a “towers in the park” housing complex. The Iranian designers, however, didn’t consider the park as an open, free, Western Park. Instead, they designed a limited symmetric geometrical garden with all principles of the chaharbagh or Persian garden:

The chaharbagh is roughly oblong in form, enclosed within a wall and occupies the slope of a hill. It is normally divided into terraces. A stream enters at the top of the garden and flows downwards in channels and leads into pools. On the terraces there are pavilions, and the open spaces are divided geometrically and formally planted with trees or shrubs. The paths are regular, and rectangularity reigns everywhere supreme.

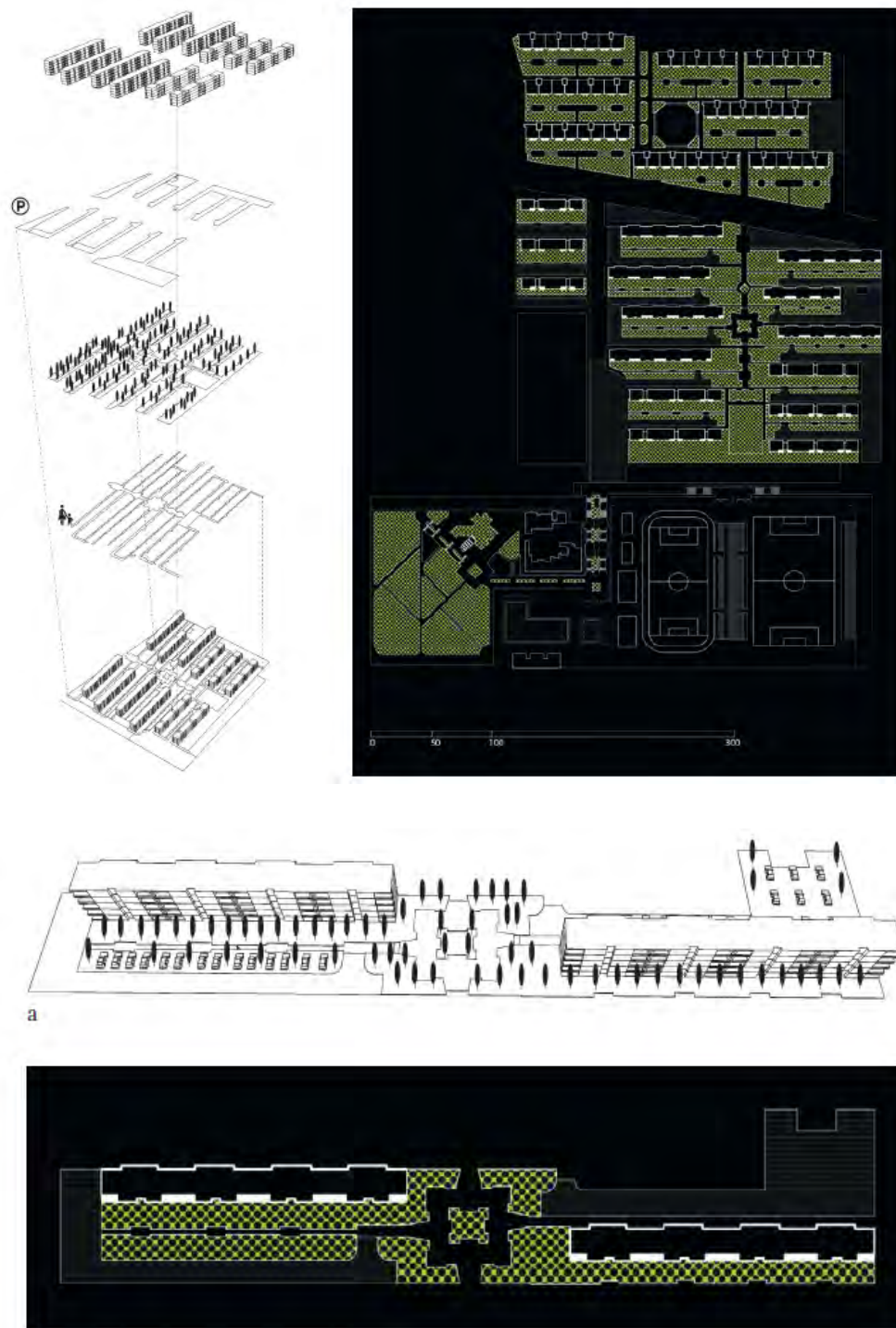


Fig. 4: Kuy-e Chaharom-e Aban, chaharbagh abd neighborhood structure (Source: Habibi, Rana. *Modern Middle-Class Housing in Tehran - Reproduction of an Archetype: Episodes of Urbanism 1945-1979*. Liden: Brill Publishers, 2021.) In Kuy-e Chaharom-e Aban, the terraces and stream of water, called jub, are evident. The rectangular terraces, in classical tetra division, are separated with water- and pathways and, like a modified version of chaharbagh, successfully integrate new objects: apartment buildings instead of pavilions and the parking space as a new element of the classical garden. Each tetra was a combination of green spaces (trees) with a building block or parking space. The parking spaces enter the garden like several fingers and form the landscape of the urban block.

The modernization of the chaharbagh transformed an Iranian archetype and reformed it as an embodiment of modern elements; at the same time, it translated the imported idea of neighborhood unit from combinations of towers in the park to apartment buildings in a Persian garden. The result was an “invented landscape,” which lacked the originality of both the Western model and the archetype. It did, however, introduce an original combination of modern and traditional, intertwining the two figures into something new. The case of Kuy-e Chaharom-e Aban clearly shows the concept of indigenous modernity by setting the modern building in an archetypal landscape, the interpretation being that even modernity is rooted in and on its contextual natural surroundings.

Kuy-e Chaharom-e Aban, as one of the first outcomes of the Tehran Masterplan, provided a unique translation of the “towers in the park” concept, by modernizing the chaharbagh prototype. The introduction of the apartment dwelling constituted a new step towards modernizing society and revolutionized the traditional Iranian house.

3. CONCLUSION

The Isfahan School of Urbanism is renowned for introducing a solid spatial organization for expanding old cities and structuring new ones. The accumulation of natural and rational elements and bringing harmony between these two structures was one of the main characteristics of this school of thought. With modernization, the natural elements such as the chaharbagh system linking buildings to the landscape and culture remained an anchor point of Iranian modern urbanism.

NOTES AND REFERENCES

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² Ibid.

³ Ardalan. Nader, Bakhtiar. Laleh. *The Sense of Unity: The Sufi Tradition in Persian Architecture*. Chicago: University of Chicago Press, 1973.

⁴ Habibi. SM; Ahari, Z. *School of Isfahan: The Language of Urban Design in Ancient Cities*. Tehran: daftar-e pajouhesh-ha-ye farhangi, 2011.

⁵ Habibi. SM; Ahari, Z. *School of Isfahan: The Language of Urban Design in Ancient Cities*. Tehran: daftar-e pajouhesh-ha-ye farhangi, 2011; pp. 45.

⁶ Such as Hasanabad Square in Tabriz, and Alaeddin Square in Qazvin.

⁷ Habibi. SM; Ahari, Z. *School of Isfahan: The Language of Urban Design in Ancient Cities*. Tehran: daftar-e pajouhesh-ha-ye farhangi, 2011; pp. 60.

⁸ Habibi, Rana. *Modern Middle-Class Housing in Tebran - Reproduction of an Archetype: Episodes of Urbanism 1945-1979*. Liden: Brill Publishers, 2021.

⁹ Diba, Kamran. *Buildings and Projects*. Berlin: Hatje, 1981.

¹⁰ For more information look at chapter: Modern Taste – Iranian Domestic Cultural Transformation and the Excellence of the Car-Urban Landscape: Kuy-e Farah, 1961 and Kuy-e Chaharom-e Aban, 1969 at Habibi, Rana. *Modern Middle-Class Housing in Tebran - Reproduction of an Archetype: Episodes of Urbanism 1945-1979*. Liden: Brill Publishers, 2021.

Traditional Dwellings and Settlements

Working Paper Series

MAPPING MORPHOLOGICAL MANIFESTATIONS AND THE IMPACTS OF THE OCCUPATION ON THE CONTINUITY OF TRADITIONS IN GAZA'S URBAN LANDSCAPES

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MAPPING MORPHOLOGICAL MANIFESTATIONS AND THE IMPACTS OF THE OCCUPATION ON THE CONTINUITY OF TRADITIONS IN GAZA'S URBAN LANDSCAPES



The physical forms of neighborhoods in the Palestinian Occupied Territories have been significantly reshaped since the beginning of Al-Aqsa Intifada (Second Uprising) in 2000. With the accelerated constructions of Israeli settlement homes and by-pass roads, the rapid growing Palestinian population, the limited available land for future development, the ongoing destruction of houses and infrastructure for the construction of the Separation Walls along the West Bank, and the political issues associated with the long period of occupation have played major roles in the formation of urban forms of every neighborhood in Gaza. The constant changes and fragility of urban forms in the region contribute to the shift of urban experience, cultural practices, and daily lives of local community.

In addition, over 15 years of intensified blockage has made the city of Gaza the largest urban enclave and open-air prison in the world, where higher population density and a deteriorating shortage of living spaces with basic infrastructure have led to most neighborhoods within Gaza unlivable.

Focusing on three neighborhoods within Gaza, the old Gaza City, the Jabalia Refugee Camp, and The Qatar funded neighborhood of Sheikh Hamad in the town of Khan Younis. This paper examines Gaza's urban morphological changes throughout political conflicts and fast urbanization in the past two decades (2000 – present). Engaging with ontology and epistemology of urban mappings, this paper explores the capacity of mapping to develop a new perspective to analyze the evolutions of urban forms related to two main areas of the cases: 1) local people's daily lives and 2) urban mobility of people, goods, and services. Through cartography and plotting of behavioral patterns and systematic shifts of life under occupation, this paper argues that traditions in Gaza have been imprinted on the urban morphology, highlighting moments of identity existence, that are felt rather than known, and accumulated over time between constant resistance and oppression.

1. INTRODUCTION

The Palestinian Occupied Territories are witnessing profound transformation in the physical form of its built environment and urban life in recent decades due to ongoing political conflicts, war violences and deconstructions, and rapid growing population. Since Al- Aqsa Intifada, in 2000, accelerated construction of Israeli settlement homes, the creation of by-pass roads, alongside a rapidly growing Palestinian population, and the ever-shrinking available land for future development have reshaped the urban landscapes of every neighborhood inside the Gaza Strip. Moreover, Gaza's urban challenges have been exacerbated by over 16 years of intensified blockades, making it the world's largest urban enclave and an open-air prison. Following recent violences and deconstructions, the Gaza Strip is facing a massive urban crisis of dysfunctional infrastructure like water treatment plants, sewerage system and health services for its 2.3 million population.

As a narrow strip, the Gaza Strip is one of the two Palestinian Territories. It is 16 times smaller than the West bank, which makes it the smallest Occupied Palestinian Territory¹. It occupies 141 sq.mi on the northeast of Sina desert². It is considered a metropolitan area trend over 41 km (about 25.48 mi) long from Gaza city in the North to Khan Yunis, in the South³. It has a population of 2,375,000 which makes its density reach 6,507/sq km (16,853/sq.mi.)¹, making it one of the highest dense urban regions in the world. Despite humanitarian aids from the world, 53% of Palestinians in Gaza live below poverty line⁴. Over half of them in poverty primarily rely on social assistance while 29% rely on private sector salaries and 26% on public sector salaries. In terms of employment, Palestinians in Gaza gain their daily incoming mainly from fishing, farming, and taxi driving. However, due to continuous restrictions on the fishing zones, reducing it by 3 nautical miles, and no access to 85% of fishing water, many fishermen have been forced to be out of their jobs.

Infrastructure in the Gaza Strip faces significant challenges, notably in the provision of electricity and drinking water. The region experiences severe electricity shortages, with around 56% of the demand unmet, resulting in daily outages lasting 12-16 hours per day⁵. These power cuts lead to food spoilage, prompting authorities to discard goods to prevent health risks. The water situation is dire, with 95% of the available water unfit for consumption without treatment. Groundwater contamination from sewage, primarily due to improperly dug wells, renders it hazardous for drinking. The lack of proper sewage infrastructure contributes to the contamination of both groundwater and the sea, posing health hazards and limiting recreational activities.

Acting as barriers, borders are usually seen as spatial demarcation lines between heterogeneous sets of physical places or social entities to define the perimeter and the limit of a physical space. In the meantime, borders are the interfaces and linkages of different physical spaces, which allow the transition from one spatial area to another to occur and support the interactions and interplays between different spatial areas.

The physical forms of borders in cities often play a crucial role in defining spatial organization, structures, and functions. Therefore, the qualities of borders and centers significantly influence the qualities of urban lives

¹ Central Intelligence Agency, "Gaza Strip," *The World Factbook*, Nov. 2022, Accessed: Nov. 07, 2023. [Online]. Available: <https://www.cia.gov/the-world-factbook/countries/gaza-strip/>

² Ministry of Tourism & Antiquities, "Gaza City." Accessed: Nov. 07, 2023. [Online]. Available: <https://www.travelpalestine.ps/en/category/32/1/Gaza-City>

³ K. Gugerell and S. Netsch, "Planning in the Face of Power. Experiencing Power Dimensions in a Visioning Process in the West Bank and the Gaza Strip," *Urban Plan*, vol. 2, no. 1, pp. 41–52, Mar. 2017, doi: 10.17645/up.v2i1.862.

⁴ United Nations Office for the Coordination of Humanitarian Affairs, "53 per cent of Palestinians in Gaza live in poverty, despite humanitarian assistance | United Nations Office for the Coordination of Humanitarian Affairs - occupied Palestinian territory." Accessed: Nov. 13, 2023. [Online]. Available: <https://www.ochaopt.org/content/53-cent-palestinians-gaza-live-poverty-despite-humanitarian-assistance>

⁵ Michelle Pace and Haim Yacobi, "Settler Colonialism (Without Settlers) and Slow Violence in the Gaza Strip," *Partecipazione e Conflitto*, vol. 14, no. 3, pp. 1221–1237, 2021.

and their associated activities and behaviors. In various forms, both borders and centers critically contribute to establishing the sense of a place and shaping urban identities and reflect the developed spatial characteristics and performances. Examining the evolution of borders and centers helps urban morphologists better understand how cities develop over time in response to social, economic, political, and cultural changes.

The Gaza Strip, as occupied land, has a clearly defined border along its perimeters that spatially separates it from its immediate surroundings and allows controlled and limited interactions and interplays with the outside world. Inside the Gaza Strip, borders have been defined and developed to separate land uses and various neighborhoods or districts. In the meantime, due to the increased blockades and restrictions on movements of going inside and outside of Gaza, urban neighborhoods and communities within the Gaza Strip have to form inward growth and develop internal borders to facilitate community activities and to provide infrastructures and services. The over 70 years long geopolitical conflicts in Gaza makes the evolution of the borders more complicated compared to other cities which have been shaped by historical traditions, political intentions, and socioeconomic conditions and have been driven by Gaza residents' unique needs and life activities.

To explore Gaza's unique urban changes under the multifaceted political conflicts and fast urbanization over the past two decades from 2000 to 2023, this paper focuses on the form of borders in three urban neighborhoods within the Gaza Strip: The Old Gaza City, the Jabalia Refugee Camp, and the Sheikh Hamad Neighborhood funded by Qatar in the town of Khan Younis. This exploration will revolve around two fundamental areas: first, the daily lives of local residents, and second, the intricate web of urban mobility for people, goods, and services. Those areas are all shaped by a complex matrix of political, religious, and cultural forces, and they manifest themselves into the region's urban landscape through the development of oppressive policies. In addition, by employing cartography and plotting the behavioral patterns and systematic shifts of life under occupation, this paper also examines how the Gaza Strip responds to the struggles of conflicts as an occupied land with its urban form changes.

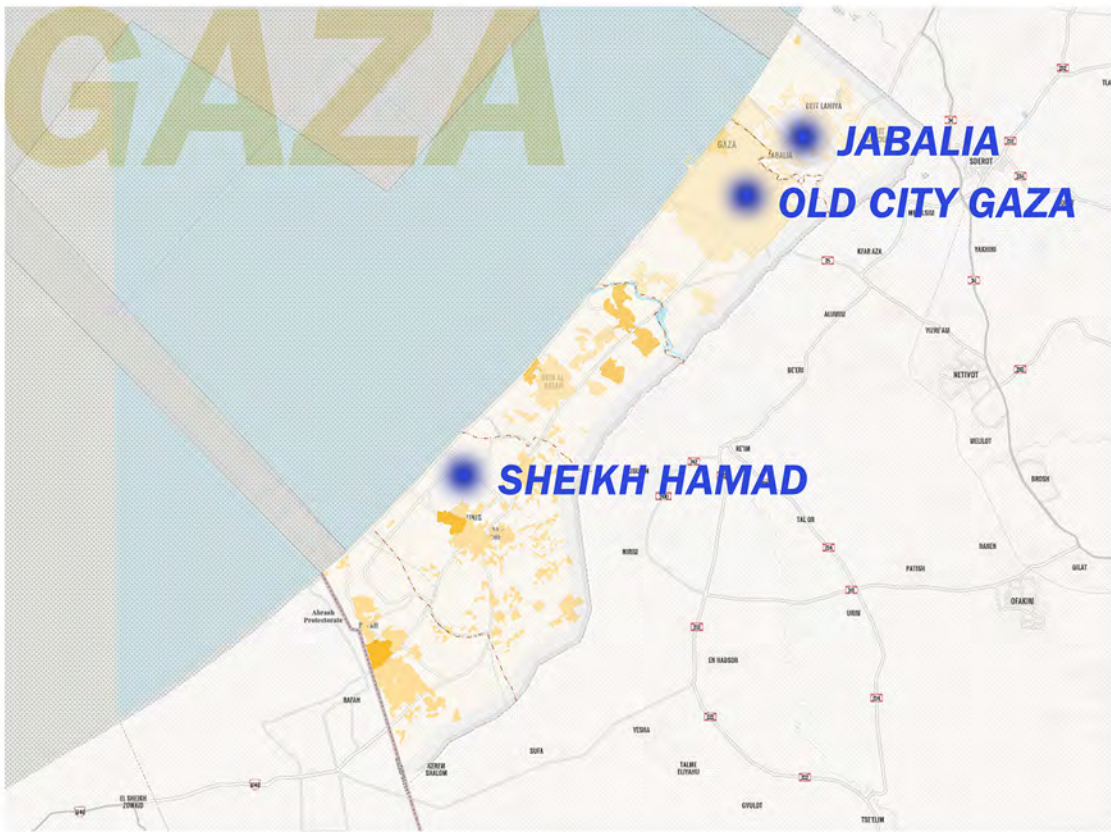


Fig. 1: The locations of the three cases discussed in the paper (drawn by the authors).

- The Old City of Gaza:** The Old Gaza City is the historical center of Gaza City, a major city in the north of the Gaza Strip. With its rich archaeological heritage and fast-growing population, the Old Gaza City is facing numerous challenges in urban development. The struggle is exacerbated by the limited available land and ongoing blockade. To its east, the Old Gaza City's growth has been restricted by borders with Israel. Some new developments have been constructed to the west of Old Gaza City, particularly along the shoreline. The industrial areas were placed outside the city on the eastern border to mitigate pollution and noise. Agricultural areas are mainly situated to the eastern and southern, keeping them distanced from residential areas to avoid pests and harmful pesticides.
- Jabalia Refugee Camp:** Located to the North of Gaza City, the Jabalia Refugee Camp has been the largest refugee camp in the Gaza Strip since 1948 with a population of 116, 011 registered refugees in a 1.4 sq km area⁶. Most of today's residents are descendants of original refugees during the past seven decades. Due to rapid population growth and ongoing conflicts and blockades, the Jabalia Refugee

⁶ "Gaza E.R. ~ Map: In and Out of Gaza | Wide Angle | PBS." Accessed: Nov. 09, 2023. [Online]. Available: <https://www.pbs.org/wnet/wideangle/uncategorized/gaza-er-map-in-and-out-of-gaza/1226/>

Camp is one of the highest dense urban neighborhoods within the Gaza Strip with high levels of poverty and unemployment. The camp has significant shortages of essential resources and services and has been the target of frequent military attacks by Israeli forces. The basic needs of its population heavily rely upon services supported by the United Nations, World Health Organization, and other world organizations.

- **Sheikh Hamad Neighborhood:** The Sheikh Hamad Neighborhood is a Qatar funded housing project in 2012 named after Sheikh Hamad bin Khalifa Al Thani, the former Emir of Qatar in Khan Younis, a city in the southern Gaza Strip. To provide housing for families who lost their homes in the 2012 Gaza conflict, the Sheikh Hamad Neighborhood plans to develop 3,628 housing units with parks, mosques, schools, and other infrastructures on empty lands west to Khan Younis to form a new community for Palestinians. The first phase of around 1,060 housing units was completed in 2017 while other phases of development seem to be delayed due to ongoing political conflicts and blockades. Each neighborhood includes open spaces, playgrounds, recreational areas, parking, and streets. Each housing building is structured with a ground floor for retail or services and five upper floors for residences, accommodating 20 to 22 units each⁷.

2. LITERATURE REVIEWS

Weizman views the Palestinian areas as experimental grounds, or "laboratories," where various aspects of territorial and urban conflicts are tested and refined ⁸. The use of the term "laboratory" suggests Israel's systematic approach in territorial and urban conflict to restrict the growth of Palestinian cities and communities through ongoing deconstructions and Palestinian continuous resistance and responses to rebuild and reconstruct their homes and communities.

Boussauw and Vannin explore the concept of 'sustainable urban mobility' within Palestinian society and addresses the limitations imposed by the underlying occupation on its development. Their research emphasizes that the fragile economy and the uncertainties associated with the unstable situation necessitate unconventional approaches to thinking about mobility in Palestine⁹. In contrast to the emphasis on mobility as a means of fostering economic growth in Western countries, public transportation in Palestine is

⁷ G. Elkahlout, "Post-conflict housing reconstruction in the Gaza Strip," *International Journal of Housing Markets and Analysis*, vol. 13, no. 2, pp. 317–330, Jul. 2019, doi: 10.1108/IJHMA-03-2019-0034.

⁸ D. Lloyd, "Settler Colonialism and the State of Exception: The Example of Palestine/Israel," *Settler Colonial Studies*, 2:1, 2012, 59-80, DOI: 10.1080/2201473X.2012.10648826.

⁹ K. Boussauw, & F. Vanin, "Constrained sustainable urban mobility: the possible contribution of research by design in two Palestinian cities." *URBAN DESIGN International*. 23, 2018.

predominantly managed by the private sector, resulting in an informal network of shared taxis. Authorities play a limited role, primarily focusing on licensing and operating terminals. The article underscores the direct link between public transportation and recreational spaces in Palestine. Currently, public spaces in the region are either non-existent or suffer from overcrowding and neglect.

Yara Sharif examines the micro-scale of everyday events in Palestine and find that the Palestinian travel experience has been defined by restricted mobility, requiring travellers to find secretive routes and use unconventional methods, such as two-wheel donkey-carriages. She adds that the travel journeys, including the new pathways people create or checkpoints they avoid, have contributed to the spatial formation of 'non-places'. These 'non-places' are designed by everyday experiences and translate real narratives of despair and resistance into a community rebuilding tool. Immobility thus serves as an apparatus for the occupation, turning a one-hour trip into a four-hour journey. This has resulted in unpredictable waiting times at checkpoints, forcing residents to walk through 'no-drive' zones, becoming a core experience in Palestine. The paper also explains the urgency of survival in Gaza, where the open-air prison has forced residents to go underground. The network of tunnels serves grocery stores and pharmacies, equipped with phone lines, electricity, and ventilation systems¹⁰.

3. METHODOLOGY

This paper, taking three neighborhoods in Gaza Strip, one of the most densely populated urban areas in the world, as a case study, examines the urban morphological changes in the past two decades and their associations with local people's daily life, mobility, and the environment conditions and qualities. The primary sources of spatial patterns studied in this paper include the Google satellite images from 2000 to today, geo-maps, such as zoning maps and property maps, from local government and universities, as well as direct site observations by the authors.

The representation of urban forms in the contexts of Gaza Strip is a complicated architectural, social, economic and political product. Therefore, this study does not restrict itself to boundaries of Palestinian architectural history or the history of Gaza Strip. This study does not employ a chorological or descriptive study to explain such complicated architectural products as it will only produce too broad understandings and fail to develop meaningful arguments. Rather, this study makes social and synchronic analysis based on the

¹⁰ Y. Sharif, "The Battle for Spaces of Possibility within the Palestinian / Israeli Conflict: Healing fractures through the dialogue of everyday behavior." *Proceedings of the Conference of the Battle for Spaces of Possibility within the Palestinian/Israeli Conflict*, 2009. Accessed Oct. 29, 2023. [Online]. Available: http://arts.brighton.ac.uk/_data/assets/pdf_file/0011/44849/40_Yara-Sharif_The-Battle-for-Spaces-of-Possibility-within-the-Palestinian-Israeli-Conflict.pdf

interplay and interaction between the physical urban spaces and local resident's life and mobility as well as the surrounding natural environment and develop critical arguments and theorization. The purpose of this study is not only to describe what kind of urbanization Gaza experienced in the past two decades, but also to develop pattern theory to understand the symbolic meanings of Gaza's urban spaces under constant political and social changes.

There are two analysis methods used in this study: 1) systematic review - focusing on the spatial evidence of "border", this study systematically and explicitly examine the building form of urban borders in the contexts of cultural, social, and historical systems; and 2) qualitative anatomy analysis - this study dissects the complicated forms of "borders" into different spatial elements, each of which is qualitatively analyzed.

4. DISCUSSION OF FINDINGS

Different forms of border determine various types of spatial permeability, permitting views and movements traveling through the divided spatial areas, which shapes the possibility of connectivity for interactions and interplays. There are two primary types of borders within the Gaza Strip: "outer border" that defines the external or peripheral limits of an urban area or place, and "inner border" that refers to the internal or central limits of an urban area or place, normally marking the boundaries of different land uses, administrative or jurisdictional controls, or activities. In this paper, borders are divided into three categories for analysis: closed borders, semi-closed borders, and open borders.

Closed borders refer to physical borders which block both the view and movement permeabilities. This type of border creates an enclosure of a certain place to define its limit, forcing it to be isolated from its surroundings. Taking forms such as solid walls or buildings /structures, closed borders restrict the interaction between the enclosed space and other spaces outside of the border, mainly for the purpose of security control.

Semi-closed borders are spatial dividers in an urban area that permit certain levels of permeability between the two divided places. Unlike closed borders which restrict all permeabilities and movements, semi-closed borders restrict some permeabilities while allowing others for the purpose of managing flows or access. In general, semi-closed borders control movement permeability while allowing view permeability to take place, like glass façade or pony walls, or partially restrict both view and movement permeability, such as cornices, or multi-layer building envelopes.

Open borders are spatial boundaries in an urban area that present low or no restrictions on permeabilities and movements to foster a more accessible and inclusive connection between two different areas. Some common

examples are urban squares or plazas, green spaces, or streets. Unlike semi-closed borders that permit limited access or participation, open borders encourage the two divided areas to fully engage with each other and form a meeting place for the interactions and interplays of the two areas.

4.1. Outer Borders

There are various forms of borders within the Gaza Strip, such as walls, buildings, open spaces, or plants, each of which supports different functions and fulfills different needs. For example, the border between the Old Gaza City and its east boundary is defined by walls and fences built by Israel for the purpose of political and military control, while the borders of the Sheikh Hamad Town are presented in the form of wide streets and empty lands, which define the limit of the residential neighborhood.

Due to its role in the centerpiece of the Israeli-Palestinian conflicts, the Gaza Strip has a complex geopolitical and historical context for its borders with Israel and Egypt. This complex context makes it essential for the Gaza Strip to have a clearly defined border to comprehensively delineate the territorial limits of Gaza and to establish well-structured boundaries that facilitate the establishment of Gaza's sovereignty and governance and international recognition.

- **Outer Border in the Old Gaza City**

In the Old Gaza City, it is bordered by Israel on the east. The nearest outer border is about 3 km away from the city center. Established in 1948, this border, also called the Green Line, has been controlled by Israel military and police forces with a combination of military bases, observation towers, checkpoints, barriers, walls, and fences. As close borders, the outer borders to the east of the Old Gaza City are developed to limit the permeability of movement in and out of the Old Gaza City. As a result, the border is spatially characterized by various military and security infrastructures built by Israel.

In the 1990s, Israel constructed a 60 km long barrier along its border with the Gaza Strip with mainly fences, observation towers, and military bases and infrastructures to impede the movements cross the border. After the first intifada in 2000, most of the barriers were destroyed by Palestinians and were rebuilt by Israel a few months later. In order to create sufficient distances for the safety and security of established border, Israeli military established a one-km buffer zone to prevent anyone to approach the border. Also, due to the fact that the lands outside of the border east to the Old Gaza City were empty lands, there was no border gate opened along the east side of the Old Gaza City, which made the entire Old Gaza City separated from its adjacent lands to the east. Behind the border within 4 km range, there were five Kibbutz settlements built in the 1940s and 1960s by Israel, including Nahal Oz, Kfar Aza, Sa'ad, Alumim, and Mefalsim.

The barriers have significantly restricted Old Gaza City's growth. Since Israeli military generally made warning shots to any people or vehicles closing to the one-km buffer zone, local Palestinian government forbade any public project developed close to the east border. Private developments also became limited along the one-km buffer zones to prevent potential risks. As a result, most of Old Gaza City's expansion towards the east in the early 2000s stopped at Al-Karameh Street, which was about 1 –1.5km away from the border. Only several industrial buildings were developed and constructed in areas close to the border.

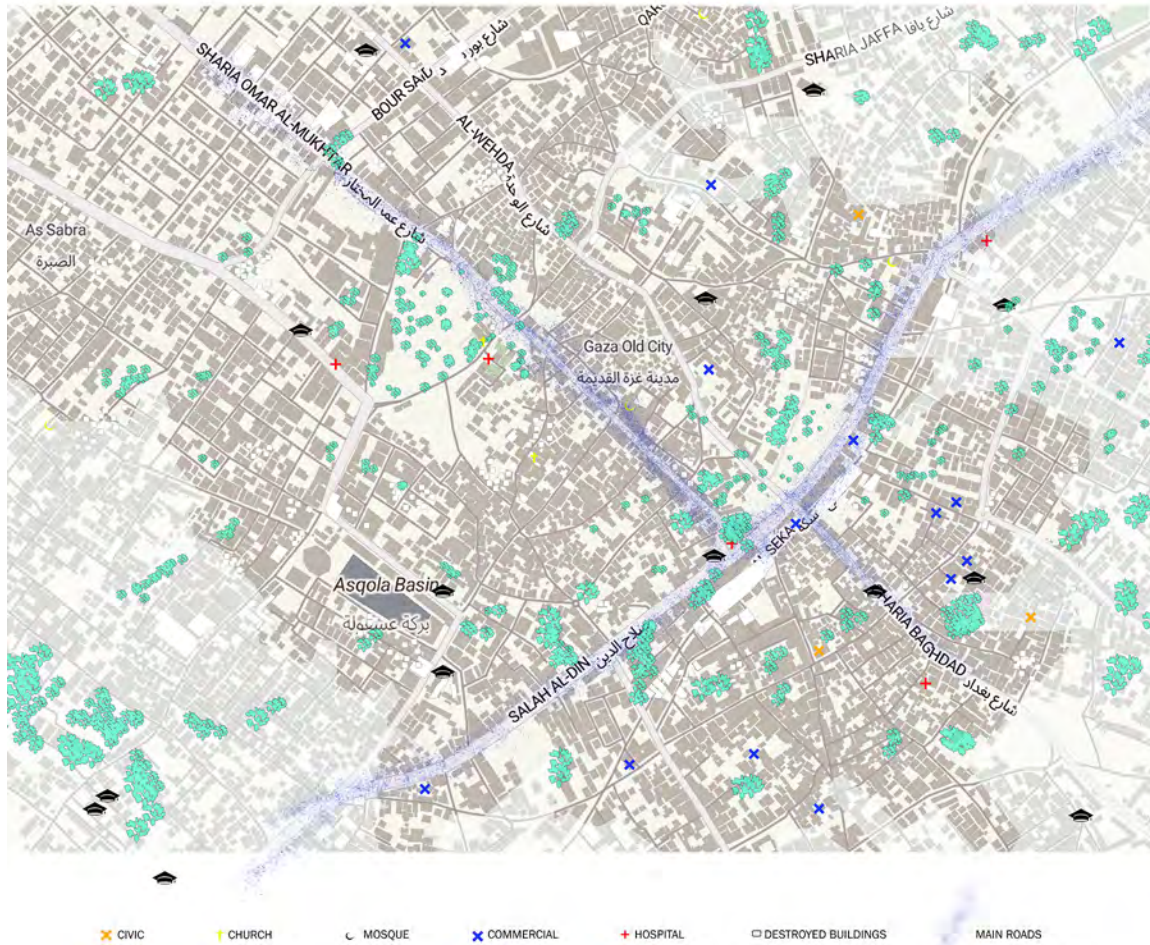


Fig. 2: The Old City of Gaza in 2023 (drawn by the authors).

After Israel's disengagement in 2005, Israel withdrew most of its military forces along the border. This allowed Palestinians to be able to exploit the land close to the border beyond the Al-Karameh Street for new development. More industrial factories, warehouses and workers' houses have been constructed in the areas adjacent to the border. In the meantime, Israel has intensified the security infrastructures along the border by implementing a \$220 million project to upgrade the barriers. Many high-tech security monitors, remote-control gun towers, new observation towers, and multiple-layer fences have been constructed between 2002

and 2006. Based on the new security measurements, Palestinians are allowed to be close to the border fences within 100-300 meters on foot to only work on farming fields. The distance within 100 meters of the fences is still a no-go zone that no one can be on the land for any purpose.

However, the mobility situation along the east outer border of Old Gaza City has changed critically in the past two decades. Before 2005 when Israel started its disengagement from the Gaza Strip, two border crossing gates, the Nahal Ouz Gate and the Karni Gate, were open along the east outer border for the transportation of goods and fuel (such as gas, benzene, and industrial diesel) into Gaza and also to allow Israeli settlers to access settlements in Gaza. Although there were Israeli security checkpoints that prevented people movements close to the border, some industrial sites, including gas /oil stations and small factories, were developed along the bordering area to enjoy the easy access to industrial fuels and goods.

After Israel's disengagement in 2005 and Hamas' takeover of the Gaza Strip in 2007, Israel implemented an intensified blockade on the movement of people, goods and services in and out of the Gaza Strip. The Nahal Ouz Gate was permanently closed in 2010 and the Karni Gate was closed in 2011. As a result, all cross-border transportation ceased while the east borders were reinforced by fences, military bases, and security infrastructures that prevent any unauthorized crossings. There has been nothing meaningful for Palestinians to access and the Old Gaza City's expansion towards its east has been confined.

To the west, shorelines along the beach are the outer border of Old Gaza City, which also prevents Gaza's further expansion. Urban neighborhoods around the shorelines had been already dense before 2000. But Google satellite images in different years indicate major developments taken place in recent years around the Gaza Sea Port. This reflects a land use change inside Gaza.

Gaza Sea Port was controlled by Egypt and Israel before the 1990s and limited developments were allowed due to political tensions and conflicts and Israeli's restriction of maritime activities and goods movements. Although the port was handed over to Palestinian administration in the 1990s, the function of the port was still limited due to Israel's severe control over the access to the sea. After Hamas started to administrate Gaza in 2007, some developments, including a breakwater and marina as well as lightings, have been constructed. This allows Palestinians to have some water activities within the breakwater in spite of restrictions to access to sea. With the continuation of Israel's blockade, the function of the Gaza Sea Port has been transformed from an industrial port to a tourist place which give local residents the rare recreational opportunity of enjoying water. In recent years, more hotels and tourist facilities have been developed around the port and more high-rise and mid-rise buildings have been constructed in nearby neighborhoods.

The popularity around the Gaza Sea Port and its surrounding areas also reflects the recent urban developments in the west of Old Gaza City in the past two decades. In the early 2000s, Old Gaza City attempted to expand towards its east border due to large numbers of empty lands there. However, that growth became failed because of the ongoing conflicts with Israel. Although the available lands in the west were limited, there were many scattered empty lands, each of which was about 500 sq meters to 1,000 sq meters. □ Many Palestinian residents moved to the west from the Old Gaza City where historical buildings and high dense urban environment prevented significant urban growths. After Israel's disengagement in 2005, more developments took place in the west as more residents considered it was a safer place than the Old Gaza City, a main target of Israel-Palestine conflicts in 2006 and 2008. Those developments were featured by infill mixed use buildings (retail/commercial at the ground floor and residences above) with narrow gaps between buildings.

From 2011 to 2013, the urban growth at the west of the Old Gaza City reached a short period of booming due to the opening of Gaza-Egypt border which brought more resources, materials and supplies for building constructions. Urban growth became intensified during this time and many buildings damaged by Israeli forces were repaired or rebuilt. However, with the close down of Gaza-Egypt border in 2014 and more restrictions of border control by Israel since 2015, the fast urban growth was forced to be disrupted. With the development, new commercial and residential centers and street grid networks started to form to the west of the Old Gaza City, which provided alternative public life centers from the old city center with more new infrastructures and amenities.

In the meantime, urban growth of the Old Gaza City mainly takes place towards its south and north where more empty lands become available. The farmlands that defined the city's limit have been replaced with residences and streets. Due to the restrictions of available lands to its east and west, Old Gaza City has to expand itself to the north and south. The 2.5km long empty lands and farmlands between Old Gaza City and adjacent Jabalia City to the north have been filled with new urban built ups. Both Old Gaza City and Jabalia City have been interconnected with urbanized developments. There is no obvious border that spatially divides the Old Gaza City and the Jabalia City. To the south, based on the study of Google satellite images, the Old Gaza City has pushed its edge nearly 2km from 2003 to 2023.

The unique urban growth results in a longer distance of commuting between the old city center and the newly developed area. However, Palestinians' mobility was seriously restricted by Israeli blockades on basic supplies such as fuel, cars, and car parts. Traveling to further places becomes more expensive and unaffordable. Many people take walking, donkey carts, or rickshaws as means of travel that support short-distance trips. As a result, it is necessary to locate resources and destinations within distances which can be affordable for most people. Therefore, community amenities and infrastructures have been developed within walking distances of

people in all adjacent areas rather than been used to form a border to separate places. In Old Gaza City, the average distance between major arterial streets where primary amenities and services are normally located is about 400-500 meters. For most residents, roughly 4-5 minutes of walking will allow them to reach their destinations for many life supplies.

The mobility change leads to the linear development of urban centers along major arterial streets rather than around a dense concentration center. In the case of Old Gaza City, its northern and western outer borders are major streets that are characterized by a high concentration of commercial and public buildings and active economic activities. All urban infrastructures and amenities can be easily accessible from all surrounding areas. In fact, those major streets or the outer borders tend to focus more on the togetherness rather than the separation of two places. Therefore, the northern and western outer borders of Old Gaza City have gradually disappeared.

- Outer Border of the Jabalia Refugee Camp

After seven decades of its establishment in 1948, the Jabalia Refugee Camp has evolved into an urban neighborhood filled with permanent buildings, structures, and built environment. Compared to the Old Gaza City, Jabalia Refugee Camp is relatively farther away from the borders with Israel. Therefore, there is no highly secured outer border imposed by Israeli military forces. Unlike the traditional sense of refugee camps, the Jabalia Camp has no spatial barriers that physically enclose the camp from the outside urban districts. That means there is no controlled movement between the camp and surrounding streets and the entire camp has been well integrated into the surrounding urban contexts of the Jabalia City.

However, the Jabalia Refugee Camp still needs a clearly defined boundary for its administration and infrastructure support. Residents of the Jabalia Refugee Camp heavily rely upon essential life support provided by the United Nations Relief and Works Agency (UNRWA) and other international organizations which primarily provide services to residents of refugee camps including education, healthcare, and humanitarian assistance, excluding residents in other urban areas. Any resident considered a resident of the Jabalia Refugee Camp is entitled to receive aid from UNRWA. Consequently, although the population of the Jabalia Camp has grown from around 3,000 to nearly 120,000 in 2022, most residents still chose to stay inside the camp. In addition, the long and ongoing Israeli blockade has further damaged Gaza's economy and made it harder for the refugees to move outside of the camp. Those lead to a much higher dense urban neighborhood inside the Jabalia Refugee Camp than those in its immediate surroundings.

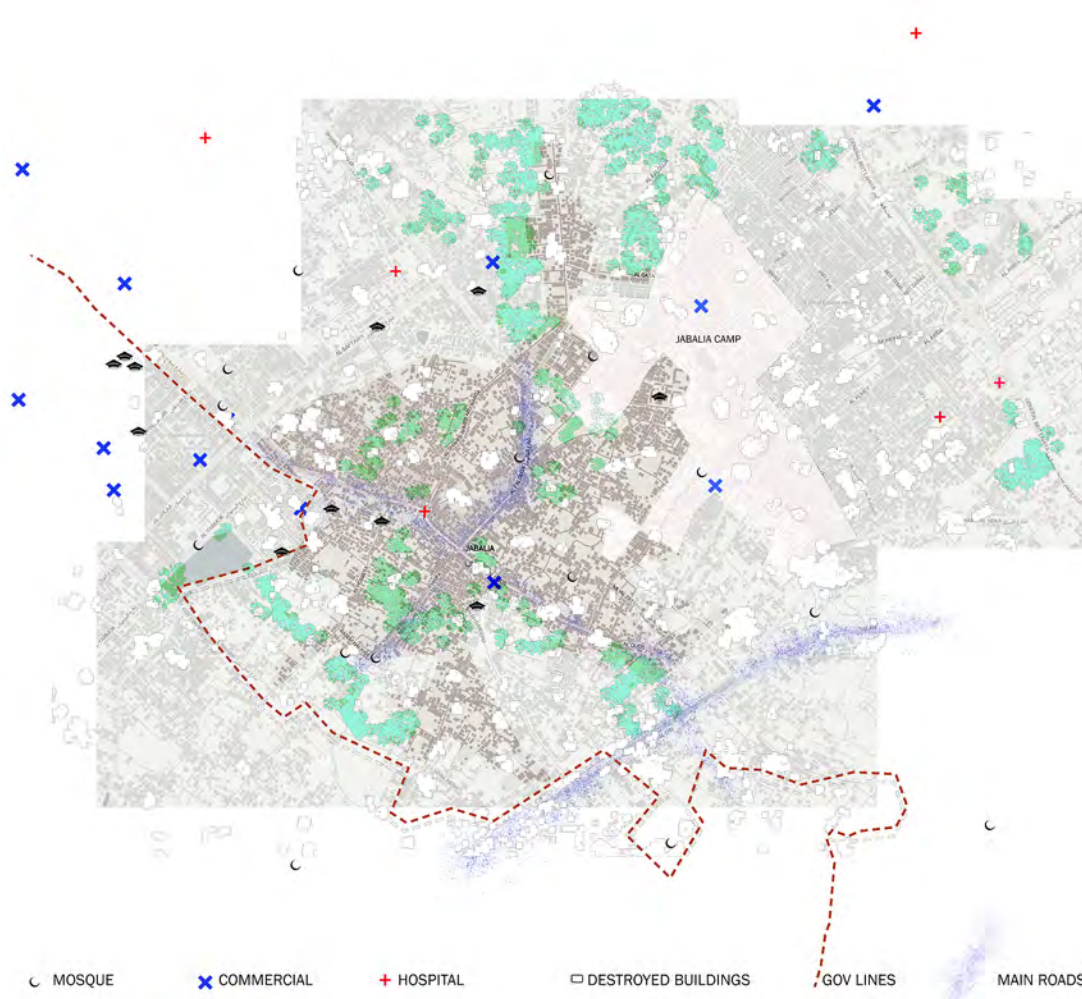


Fig. 3: The Jabalia City and the Jabalia Refugee Camp in 2023, divided by major streets. (drawn by the authors)

The Jabalia Refugee Camp has open borders for its outer borders. Based on the study of Google Satellite images, only 450-meter-long borders of the Jabalia Refugee Camp's 7km long perimeters are defined by empty lands or farmlands. The majority of the Jabalia Refugee Camp is bordered by various arterial streets and regular streets. Making borders open and approachable, those streets create provide view and movement permeabilities that encourage interactions and engagements between the camp and surrounding urban areas, and consequently allow the camp to be integrated into its existing urban contexts.

In addition to the open borders of streets, Jabalia Refugee Camp's outer borders also take the form of semi-closed borders. Along those bordering streets, there are crowded buildings with multiple floors developed to reinforce the sense of outer borders around the Jabalia Refugee Camp. All those buildings are open towards the streets with shops, stores, and other public spaces on their ground floor, providing life infrastructures, amenities, and services to the residents from the camp and surrounding communities. This promotes street vitality and further facilitates the opportunity of engagements between the camp and its surroundings.

Furthermore, the functions and accesses to services supported by those buildings and streets provide some economic benefits and opportunities to camp residents who have suffered from damaged economy and high unemployment caused by decades long displacements and political conflicts.

The open and semi-open outer borders of Jabalia Refugee Camp also reflect the change of urban mobility in the area. Like the case of the Old Gaza City, Palestinian residents have experienced intensified blockades in the past 20 years, which results in non-vehicle transportation means, such as donkey carts, walking, and rickshaws being the main means of mobility. In addition, the constant shortage of electricity prevents active nightlife in the camp. People's lives have been forced to shrink to shorter distances due to the affordability of transportation and accessibility to electricity.

- Outer Border of the Sheikh Hamad Neighborhood

The Sheikh Hamad Neighborhood is a housing development project in the Southern Gaza Strip funded by Qatar in response to Gaza Strip's rapid population growth and lack of housing and life resources caused by Israeli's blockades. The planned Sheikh Hamad Neighborhood is in one of few low dense areas within the Gaza Strip and its lands were used for farming before the project was initiated.

As a recently completed residential development, the Sheikh Hamad Neighborhood has become a new destination for its residents. Their new mobility pattern heavily relies upon new transportation facilities, such as roads and streets, built inside and around the neighborhood. Arterial streets have been developed to link the neighborhood to surrounding areas and also form the outer borders. Some smaller streets have been developed within the neighborhood to facilitate walking and other alternative means of transportation.

Since its location is far away from the borders with Israel to the east and the shorelines to the west, Sheikh Hamad Neighborhood have not developed any closed outer border to restrict any movement between the neighborhood and its surroundings. However, as a housing project exclusively funded by Qatar, the Sheikh Hamad Neighborhood needs a clearly defined border to distinguish it from its surroundings. Its limits are entirely defined by newly constructed streets and roads. The west border is a seven-lane street (three lanes for each direction and one lane for left turn), wider than most major highways inside the Gaza Strip, which normally have two lanes for each direction. Its east border includes a portion of newly completed street and another portion of unpaved street. Its north and south borders are existing streets with one lane for each direction. Although open borders are around the neighborhood, there is no substantial engagement or interaction between the neighborhood and its surroundings as only one third of this neighborhood has been completed and most surroundings are still farmlands or empty lands.

4.2. Inner Borders

There are various forms of borders inside Gaza Strip, mainly for the purpose of separating various urban areas and designating different land uses. In general, the inner borders take the form of streets, buildings, walls/fences, plants or green spaces, empty lands, and spatial facilities. According to different functions and needs, inner borders take different forms to establish different spatial permeabilities.

Inside the Gaza Strip, open borders are the predominant form of inner border used in all the three cases studied by this paper. In each case, streets and roads are primarily used to divide various land uses and functions, define and delineate boundaries for different spaces, and manipulate the movements of people, goods, and services. Also, empty lands and farmlands have been widely used inside of the three cases to mark different urban districts or neighborhoods. In addition, semi-closed borders such as buildings with retails or public services at the ground floor work together with streets or roads to reinforce the boundaries between different districts.

Palestinians' access to water was denied and restricted in the West Bank and Gaza Strip. Palestinians were not able to access the Israeli settlements before the 2005 disengagement¹³. This led to the creation of other forms of inner borders, limiting the access and construction of wells near these settlements. On the other hand, these settlements had access to more than 40 fresh wells used for agricultural and domestic purposes. These wells pump the best water quality in the Gaza Strip¹². These settlements' locations were chosen for these specific reasons.



Fig. 4: The Sheikh Hamad Neighborhood in 2023, defined by streets from its surroundings. (drawn by the authors)

- Inner Borders of the Old Gaza City

Streets and open spaces are used inside the Old Gaza City to separate its districts. The entire Old Gaza City is divided into two halves: the Daraj Quarter to the north and the Zaytun Quarter to the south, both of which are bordered by Omar Mukhtar Street, a 23-meter-wide avenue, and an urban park, the Shijia Park. In the east part of the Old Gaza City, a narrow commercial and retail area with only 45-meter wide is shaped between the Salah Al Deen Street, a major street linking the entire Gaza Strip from north to south, and the Al-Sikkeh Street.

Along major streets, stores, and shops normally open towards the street with signages and items displayed outside to promote their businesses. Various store signages improve the diversity of street fronts and store facades. However, this takes away spaces for pedestrians and makes the sidewalk narrow and tiny, which restricts the addition of any seating or other public street furniture. Pedestrian traffics have become much harder after 2007 when Israel imposed electricity cuts in Gaza and intensified restrictions on basic materials imported into Gaza. The electricity shortages cause constant power outages that force residents to shut down their businesses and stay home at night. Lack of modern cars, car parts, and fuel also forces residents to use

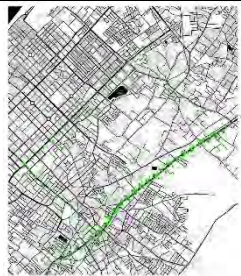
donkey carts, rickshaws, and pedicabs for their daily commutes. Although those traffics help residents to overcome the challenges caused by limited resources, they undermine pedestrian activities by occupying street spaces for walking and increase risk of conflicts and accidents.

Among the three cases studied in this paper, the Old Gaza City has the largest urban development and the most public and governmental facilities that need closed inner borders to highlight the difference of land uses and maintain the controlled access to those facilities. Solid walls with limited gates or buildings have been often used to prevent both view and movements into the facility they define. For example, the Arafat Secondary School, employs walls to define the school boundary and to create an inward courtyard that controls the flow of people in and out, while the Shijia Police Station uses solid walls and buildings with limited openings towards the street to separate the police station complex from its surrounding contexts.

The intensified blockade by Israel since 2007 and the repeated outbreaks of hostilities in Gaza continue to severely disrupt basic supplies and services in the neighborhood. Due to the lack of fuel to operate trash collection, the Old Gaza City has to reduce its service of trash collection and local residents have been told to leave their daily life trash along the middle lanes of major streets so that donkey carts can collect them. This results in the accumulation of waste and trash along the middle of major streets, which becomes a visual form of inner borders to mark different communities based on their trash collection services. The accumulated waste and trash form some barriers between different communities that bring challenges to local people to cross the streets and make engagements with others in the afternoon or at night, as most donkey carts collect trash in the morning.

Table 1 below summarizes various forms of inner borders used in the Old Gaza City.

The Old Gaza City:

Inner Border Form	Type	Example	Form
Streets	Major Streets/ Highways	Salah Al-Deen Road	
	Regular Streets	Omar Al Mukhtar	
	Small Streets	Fehmy Beak Al Hoseini	
	Alleyways	Al Fakhura	
Buildings	High-rise or Mid-rise Residence	Al Thafer 9 Tower	
	Low-rise Residence	-	
	Public Buildings	City Hall	
	Mixed Use Buildings	Wattan Tower, Mushtaha Tower	

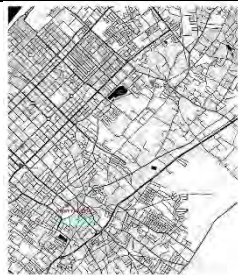
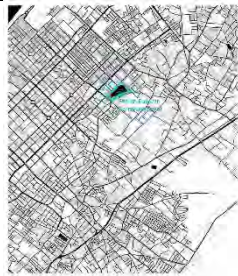
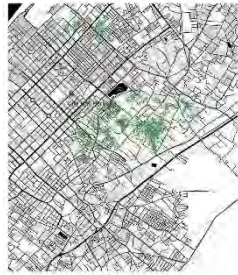
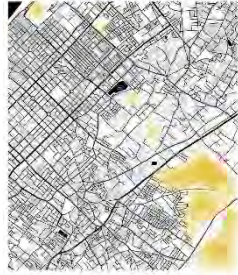
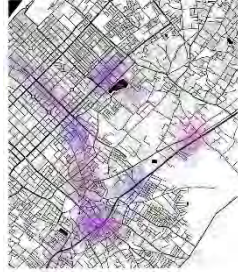
	Industrial Buildings	Plastic Factory near Karni	
Walls/fences	Opaque Walls/fences	School walls	
	Half Opaque Walls/fences	The Wall, Shiekh Radwan Stormwater Pool's walls	
	Transparent Walls/fences	-	
Plants/green spaces	Public green spaces	City Hall Park, Al Azhar Park, Unknown Soldier Park	
	Private green spaces	Yarmouk Playground, Al-Rashid Shawa Cultural Building	
Empty lands	Farmlands	Eastside	
	Unused Lands	300m from the Wall	
Spatial facilities	Public facilities	Arafat Police City, Electricity Company, Trash collection land	
	Private facilities	Al Azhar University, Islamic University of Gaza, Mashtal Hotel's Resorts	
	Other	UNRWA Facilities	

Table 1 The different forms of inner borders used in Old Gaza City. (drawn by the authors)

- Inner Borders of the Jabalia Refugee Camp

Without clearly defined sub-urban districts, the Jabalia Refugee Camp consists of multiple clusters of residences, community facilities, and infrastructures. Few open spaces are seen as inner borders since the camp is more crowded and higher dense than most urban districts within the Gaza Strip. The arrangements of streets in a network pattern contribute to the delineation of different urban areas inside the Jabalia Refugee Camp. Streets, roads, and alleyways serve as both demarcate boundaries of different areas and land uses and the entry points cross the boundaries. For example, the Abu Hussein Primary School for Boys has its borders defined by open streets around its four sides.

A unique feature of Jabalia Refugee Camp's streets is that the shops and stores at ground floor of buildings along the street tend to open their doors towards both the outer streets (the inner border) and the inner streets (inside the residential complex). By doing so, residents of a certain complex enjoy the proximity of urban amenities and services while residents of other communities can enter from the outer streets. This makes the residents from both inside and outside have good interactions and allows the business to serve a larger range of the population, reflecting the overpopulation situation inside the camp.

Semi-closed and closed borders are also visible inside the Jabalia Refugee Camp. There are multiple schools and humanitarian agencies such as the United Nations Relief and Works Agency (UNRWA) and United Nations High Commissioner for Refugees (UNHCR) which use solid walls and buildings with limited openings to separate themselves from surrounding urban areas for the purpose of maintaining safety and security. Due to ongoing conflicts and war violences, schools and humanitarian agencies often face security challenges that bring risks to their staff, assets, and operations. Therefore, they need walls and buildings as spatial means of security measures to create barriers to control access to the facilities. For example, the Abu Hussein Primary School for Boys is surrounded by 2.5 meters tall walls around its four sides.

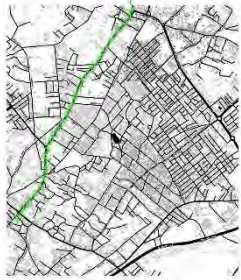
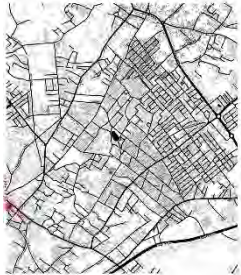
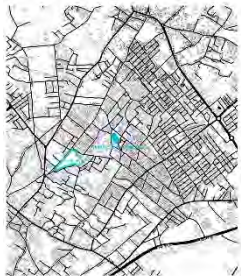
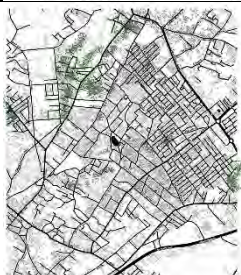

Another inner border within the camp becomes visible in the evening. Due to the ongoing blockades and electricity infrastructure damages, people in the Gaza Strip have experienced significant electricity outages and the power supply is unstable. When a part of the neighborhood loses power supply while another part has power, the difference between brightness and darkness forms a visible inner border. In addition, when some buildings use alternative energy sources or battery-powered devices, an inner border is clearly defined between those without power and those with lights on.

The power shortage also influences camp residents' mobility patterns as trips in the evening and at night become more challenging when the power is out. Local residents have to adjust their scheduled routines to reflect the anticipated power schedules by having activities needing electricity, such as reading or cooking,

planned at the time when power is available. Consequently, people reduce their trips to farther outside in the evening or at night while staying with their families or friends in closer proximity. When people stay physically closer, the outer border will be reinforced while the inner border will be weakened. This is reflected in local life: after sunset, lives in alleyways and inside homes become more active while few people stay outside of the camp or travel far away.

Table 2 below summarizes various forms of inner borders used in the Jabalia Refugee Camp.

Jabalia Refugee Camp

Inner Border Form	Type	Example	Form
Streets	Major Streets/ Highways	Al Falouja	
	Regular Streets	Al-Almey	
	Small Streets	-	
	Alleyways	Trans Neighborhood Alleyways	
Buildings	High-rise or Mid-rise Residence	Al Saftawi Towers, UNRWA Towers	
	Low-rise Residence	Most of the camp	
	Public Buildings	Police Station	
	Mixed Use Buildings	Jabalia's Souq (Downtown) District	
	Industrial Buildings	Water-treatment Facility	
Walls/fences	Opaque Walls/fences	School walls	
	Half Opaque Walls/fences	Cemetery walls	
	Transparent Walls/fences	Rashid Stormwater Pool fences	
Plants/green spaces	Public green spaces	El-Rantisi Park	
	Private green spaces	Hasoona Park	
Empty lands	Farmlands	Eastside	

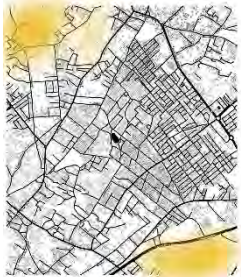
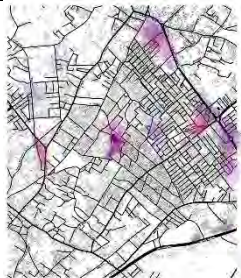
	Unused Lands	300m from the wall	
Spatial facilities	Public facilities	Sewage Facilities	
	Private facilities	Abed Al-Rahman Resorts	
	Other	Cemetery, UNRWA's School District, Abu Rashid Stormwater Pool	

Table 2 The different forms of inner borders used in the Jabalia Refugee Camp. (drawn by the authors)

- Inner Borders of the Sheikh Hamad Neighborhood

As a relatively new project, the Sheikh Hamad Neighborhood has three phases of development. The first phase of 1,060 housing units was completed in 2017 along with the outer streets around the neighborhood and some inner streets. However, the remaining two phases have not been completed until today due to ongoing political conflicts and war deconstructions. Even for the first phase, there are still some unfinished outdoor courtyards and landscapes. This has left large bulks of empty lands and streets that divide the completed part of the Sheikh Hamad Neighborhood and its unfinished parts.

Inside the completed part, open borders, such as streets, make the main contribution to forming boundaries among different areas within the neighborhood. The first phase is divided into two halves: the east has seven clusters of housing and a neighborhood center, and the west half has six clusters of completed housings and 17 completed housing buildings that have not form any cluster. Both halves are separated by a four-lane street (two for each direction and one divider in the middle). The neighborhood center in the east half consists of a neighborhood park, a mosque, two schools (one for boy and the other for girl) and a neighborhood center, all of which are separated from nearby housing complexes by four-lane street (two lanes for each direction without the central divider).

Streets are also the main boundaries for the housing clusters. In the east half, every two housing clusters are divided by four-lane streets while every three clusters in the west half are divided by streets that have not specified lanes. The borders between each housing cluster show different forms between the east and west

halves. Parking lots and open space for pedestrian traffics become the boundaries in the east while pedestrian alleyways with some greeneries are the boundaries in the west. In each housing cluster, open green spaces combined with parking lots make each housing building away from one other.


Semi-closed borders are primarily used for housing buildings facing major streets where the ground floor units are stores and shops, allowing users to enter from the streets. In addition, semi-closed borders are used to define the boundaries of the neighborhood park in the neighborhood center of the east half. Short walls and metal fence gates restrict people from entering or exiting the park but permitting views to cross the boundary.

Closed borders are only discovered at the two schools at the neighborhood center in the east half. Solid walls with limited openings clearly delineate the boundaries of the school limits and restrict both the people's movements and views from entering.

As a new and incomplete residential neighborhood, Sheikh Hamad Neighborhood is relatively too far away from other urban centers to walk and has no public transportation service. Traveling by car is the primary transportation means which requires road, streets, and parking facilities. The main forms of the outer and inner borders of the Sheikh Hamad Neighborhood reflect this fact. Both outer and inner borders mainly take streets and roads to delineate the limit of the neighborhood and to make its sub-divisions. Also, parking lots are used to separate different residential clusters while connecting residents from different clusters when they share the place for parking.

Table 3 below summarizes various forms of inner borders used in the Shiekh Hamad Neighborhood.

Shiekh Hamad Neighborhood

Inner Border Form	Type	Example	Form
Streets	Major Streets/ Highways	Gush Katif Road	
	Regular Streets	Qatar Road	
	Small Streets	Roads of the Neighborhood	
	Alleyways	Between buildings	
Buildings	High-rise or Mid-rise Residence	Most of the Neighborhood	
	Low-rise Residence	None	
	Public Buildings	Mosque	
	Mixed Use Buildings	Buildings on Qatar Road	

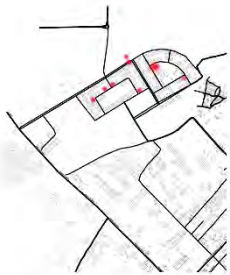
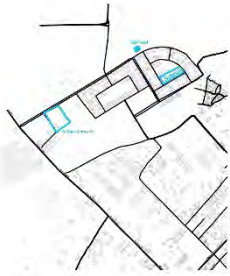
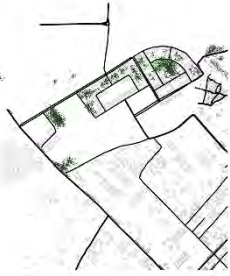
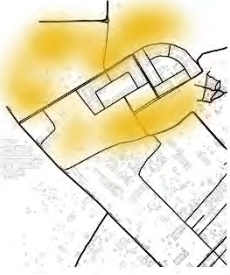
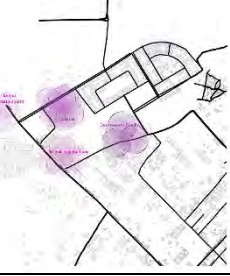
	Industrial Buildings	None	
Walls/fences	Opaque Walls/fences	School walls	
	Half Opaque Walls/fences		
	Transparent Walls/fences	Al Quds Open University fences	
Plants/green spaces	Public green spaces	Park, Squares between buildings.	
	Private green spaces	None	
Empty lands	Farmlands	West-side	
	Unused Lands	Unbuilt lands of the neighborhood	
Spatial facilities	Public facilities	Al Quds Open University, Stormwater Facility	
	Private facilities	Asdaa Entertainment City	
	Other	Islamic Neighborhood-funded by Japan	

Table 3 The different forms of inner borders used in the Shiekh Hamad Neighborhood. (drawn by the authors)

5. CONCLUSION

Gaza's urban development has been shaped by its complicated historical, political, and socioeconomic contexts. The constant cycles of deconstructions and rebuilding, the frequent violences, and the ongoing

blockades and restrictions have brought the Gaza Strip unique characteristics of its urban forms. In all three cases, the outer borders are significant to delineate the territory limits for the declaim of spatial opportunities and control. In the Old Gaza City, the outer borders separate it from the Israeli territory and new developments of other Palestinian lands. For the residents of the Jabalia Refugee Camp, the outer borders define the boundaries for exclusive rights and services provided by the United Nations and other humanitarian assistances. In Shiekh Hamad Neighborhood, the outer borders create a unique image of an exclusive neighborhood funded by Qatar. In each case, closed, semi-closed, and open borders have been used for different purposes and needs.

Compared to the clearly defined outer borders, inner borders within each case tend to actively engage with spatial elements on both sides of the borders and form more integrations than separation. Rapid growth of population requires more structures to be built and neighborhoods to expand that encourages more fluid transitions between different urban areas. Also, the lack of basic life resources caused by ongoing blockades leads to more shared infrastructures and amenities among different urban areas that contribute to an increasing interconnectedness and interdependence.

Therefore, in the Gaza Strip, the outer borders remain clear forms to meet the needs of separation while the inner borders become gradually dissolved for more integrated urban fabrics. The next part of this research will continue to document the effect of the current war on the inner and outer boundaries and how that impacts the future of the destructed villages.

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