

# Vernacular Melting Pots: Challenges and Opportunities of Waterfront Public Spaces in Indian Colonial Port Cities: Kochi city

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## Abstract

The port cities of the Indian Peninsula have played a crucial role as urban hubs in trade and commerce for the colonial powers such as Portuguese, Dutch, French and British. As ideas, cultures, and people converged in these urban hubs alongside goods and services, they have been transformed into vernacular melting pots of diverse cultures and ethnic groups, significantly shaping the socio-economic and cultural fabric of the Indian Peninsula.

This study examines the urban morphology of these waterfront spaces. It analyzes their spatial and architectural features in order to understand their impact on the urban fabric of these cities. It thus offers a historical overview of the evolution of Indian colonial port cities, identifying how waterfront public spaces have played a crucial role in defining their character and identity.

It employs historical and contemporary analysis to explore the factors that have shaped the physical form and structure of these spaces, including geography, history, culture, and economics. It examines the intricate morphology of Kochi as case study; One of the first cities to be colonized in the Indian subcontinent.

It also delves into the challenges and opportunities of research into waterfront public spaces in Indian colonial port cities, highlighting the necessity for interdisciplinary approaches that combine insights from geography, architecture and sociology. In this connection, it emphasizes the importance of innovative data collection-analysis techniques to effectively apprehend the complex and dynamic nature of these spaces.

Finally, the case study demonstrates that the colonial influences on Kochi's urban morphology reflects a harmonious blend of both indigenous and colonial characteristics. It therefore concludes that the morphology of waterfront public spaces in India is characterized by a unique blend of indigenous and colonial influences.

**Keywords:** European urbanism, colonial heritage, port city, urban design, urban morphology, heritage conservation.

## Introduction

Over time, most vernacular settlements have come into being complex systems of cities of varied forms, functions and character. The need for mutual dependency between each of such settlements has instigated trade and commerce to exchange merchandise, populace and philosophies building these cities of variety. Both the form and character have been heavily depended on the functional aspects, which have also determined their pattern and skyline.

The primary function of a settlement is to provide for the necessities of a community, such as shelter and sustenance, and as a result, the majority of ancient cities and towns have been founded near the rivers such as the Nile, Tigris, Euphrates, Indus, and Hwang Ho (Mumford, 1961). The natural setting and surplus resources determine the geographic potential of the place, gradually rendering the society's culture. Initially, smaller settlements had quarters for functions like production, administration, defense, communication, and others. Later, when the settlements expanded to towns and cities, the character of the dominant aspect assumed its identity. Some functions were predominantly based on resources like collection, production, industrial hubs, and recreational centers; some were based on religious or culturally significant landmarks. Some were based on their setting, like the coast, hill, and other strategic features.

One such paragon is port cities that have developed near waterfronts. In fact, port cities have been an essential category of cosmopolitan and cultural centers, pioneering new cultural, political, economic, and social practices throughout the globe (Hein, 2013). As noted by Kostof and Castillo (1992), "Being on the sea is like entering a gateway, a node connected to others worldwide". Thus, the port cities have had immense potential as they were the gateways to new lands of prosperity.

In the past, most port cities, especially in South Asia, have been colonized by European empires to monopolize the spice trade. They have been gradually subjugated to establish control over governance. Colonial fortresses thus sprang to overlook the former vernacular settlement and settlements of other migrated trading communities. The pioneers of modern colonial empires have been the Portuguese, who started colonization in the early 15<sup>th</sup> century.

In 1503, the Portuguese constructed their first fort on the Indian subcontinent in Kochi, which was subsequently colonized. Over time, a series of similar patterns emerged progressively across the southern Asian coastlines, extending all the way to Japan (Ishida, 2001). Various studies have looked into different typologies of such colonial cities based on spatial and functional aspects.

This research traces such patterns in Indian colonial port cities and to juxtapose the model on Kochi's existing spatial syntax. Its aim is to explore the potential to enhance the decision-making process by offering a comprehensive comprehension of the city's historical background, its development over time, and its capacity for a more dynamic and environmentally friendly future. Its objectives are:

1. To ascertain the intricate morphology of Kochi as case study
2. To identify the factors that have shaped the physical form and structure of these spaces, including geography, history, culture, and economics

## Theoretical and Historical Framework: Urban Morphology and Colonialism

Urban morphology is outlined as the study of the material-built form of urban landscapes, the identification of various categories of urban landscape based on their morphological characteristics, and the explanation of variations in urban form through historical processes and social agency. Therefore, it combines urban history, topography and geography to provide insights into the historical and social factors. These factors have shaped urban spaces, which are born out of topography, technological limitations, and social practices (Chiaradia, 2019; Algiffari et al., 2024; Darmayanti et al., 2024). Urban morphology is extremely dynamic due to its consideration of all the scales of built landscape and open spaces through interaction with producers and residents. Thus, apart from the urban landscape and geography, the role of agents and the power play has engaged a significant role in urban morphology (Lilley, 2009). This is explicitly reflected in port cities that have come under the colonial rules across the globe.

Colonialism refers to the amalgamation of the political, territorial, epistemic, juridical, cultural, and economic dominance of a group of people by another (Murrey, 2020). The pioneers of European colonial empires have included the Portuguese, the Spaniards, the Dutch, the Danes, the French, and the British. The Portuguese empire, the most extended modern colonial empire, started in the 1415s with the capture of Ceuta in North Africa (Koch, 2003). The new era of exploration, conquest and colonization on contested terrains in the 15<sup>th</sup> century stirred up clashes between world powers. In 1494, the two European powers, the Spaniards and the Portuguese, contracted the Treaty of Tordesillas (Davenport, 1917) and divided the newly discovered lands beyond Europe into two. The division line was a north-south pole-to-pole axis along eastern Brazil and the Atlantic Ocean. The eastern lands were designated to Portugal, including parts of South America, Sub-Saharan Africa, North Africa, the Indian peninsula, Oceania, and East Asian countries. The Spaniards claimed the western lands of the Caribbean throughout Central and South America. The explorations were so critical that the maritime elements and symbols of the discoveries from the expeditions of Vasco da Gama and Pedro Alvares Cabral can be seen built in the flamboyant Manueline style of architecture in Portugal (Kubler, 1972).

### **Indian Colonial Port**

Initially, a port was set up as a harbor to call ships from far-flung lands to exchange goods. Numerous European port cities sprang up globally in and around strategic locations near water in a pure functional spatial expression (Kostof, 1991). The European trading posts were gradually established primarily to extract valuable resources and establish lucrative trade networks (Karsono, 2013). The port activities steadily dwarfed the minor hamlet-like settlements and initial occupations of fishing to instigate trade and commerce. In stages, the Europeans ascertained dominion over the land and its resources by establishing permanent settlements and forts in various regions. The port cities as a hub gradually extended their spokes into their surroundings for allied services and infrastructure restructuring its environs (Hein 2019). Docks, warehouses, roads, canals and fortification were ramified to fortify the port-related trade activities along with residential edifices initiating waterfront privatization (Karsono, 2013). The services gradually extended to hinterlands due to space crunch in the saturated core.

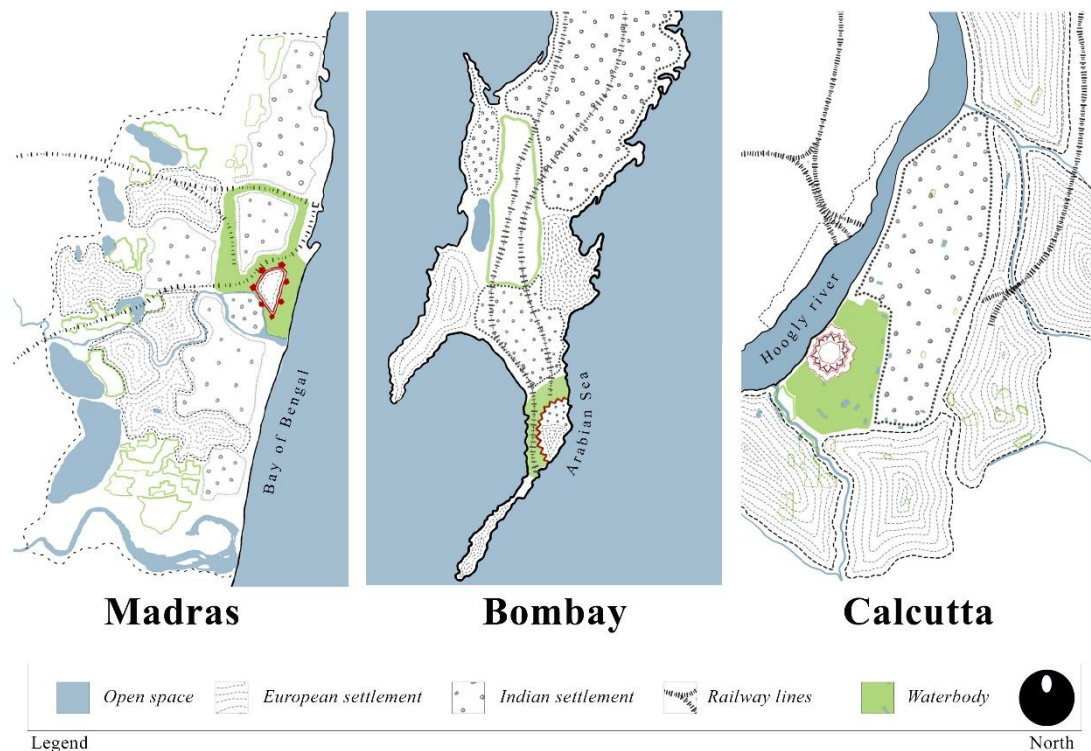
A colony is not merely a type of military occupation; rather, it is also a form of civilian appropriation of territory that is mobilized by a state in order to increase its political and economic dominance (Pier Vittorio Aureli, 2018). This colonial appropriation manifests itself in colonial architecture, which refers to the style of architecture built in various colonies across the world by the colonial empires. It is characterized by the regularity of its form to mobilize the military, control civilians, and efficiently manage resources (Pier Vittorio Aureli, 2018).

Colonial planning was predominantly regimental, unlike the organic and incremental vernacular planning. Common clusters within a Portuguese colonial fortress include a trading post near the coast for trade and commerce of produces and enslaved people, barracks for the military and a nexus of churches (Domingos, 2015). The architectural style of the buildings in the colonies was characterized by a militaristic and purely functional approach, in contrast to the ornamental composite style seen in institutional buildings in Portugal during the 16<sup>th</sup> century, such as the Monastery of Jesus of Setubal.

The establishment of the Dutch East India company, VOC, strapped footholds in most of the Portuguese-occupied colonies in the mid-17<sup>th</sup> century. The main motto of the Dutch was to establish the Dutch East India Company for trade and maximum profit. Fortifications were constructed along the waterfront of the colonies, resembling those found in Holland, to provide defense. These fortifications included an outer canal that served as a protective barrier for the city wall, which was fortified with regularly spaced bastions. The Dutch colonial architecture can be categorised into three main styles: Old Indies Style, Indies Empire style, and New Indies Style. It evolved from simple structures to opulent country houses in luxurious pleasure gardens. Thus, the structures ranged from massive plain warehouses to lavish bungalows, with an emphasis on adapting to the tropical climate of the site rather than

completely imitating the Dutch colonizers' architectural language. However, the regularity of the grid remained at the planning level to expedite construction and prevent conflict among settlers (Pier Vittorio Aureli, 2018).

In contrast to the above, British India grew in response to specific needs rather than a superimposed grid plan (Partha, 1986). Factories and buildings for the defense came up initially, followed by palatial houses of various styles for the officials. The remnants of such European colonial urbanism can be observed in the majority of port cities along the coasts of former colonies in South Asia following similar typology. The native town was cordoned off from the white town with ample buffer space in between. Churches and hospitals of art deco and neoclassical architectural style were built generously for the English within the fort in grids. The English port cities spaciously accommodated formal and informal gardens (Partha, 1986). Fort George in Madras, the first English fort in India, was a modern fort, unlike mediaeval castles such as the impregnable Dutch fort. Later, Bombay and Calcutta were fortified in a similar fashion in order to expand trade. The aforementioned three communities served as the primary administrative centers. The subsequent section presents an analysis of the patterns observed in these cities.



**Fig. 1:** Spatial schematic model of Madras, Bombay and Calcutta  
Source: Illustration by Author, adapted from Kosambi and Brush, 1988

The British constructed three main forts in India during the colonial period: Fort St. George in Madras (now Chennai), Bombay Castle in Bombay (now Mumbai), and Fort St. William in Calcutta (now Kolkata). These forts, primarily built on Dutch and Portuguese ruins, protected colonial interests, facilitated trade, and continued as regional administrative and military hubs. The preliminary structures of Fort St. George in Madras was built in 1640 followed by the Bombay fort in 1661 and Fort St. William in 1696. The forts built in earth and wood were reinforced or rebuilt with masonry and stone to withstand assault. All three forts were strategically located near water to protect the gateway. The recurring components in the above cases are the commercial waterfront, an open esplanade around the fort and sectors for the Europeans, Eurasian merchants, and Indians with ancillary infrastructure of agriculture or military services (Kosambi and Brush, 1988) that separates the European sector and the Indian

sector. The sectors were of mixed-use character with both commercial and residential functions. As seen in Fig. 1, soon after the construction of the fort, sectors of Eurasian merchants and Indians grew near the periphery to support the factory and trade (Partha, 1986). Towards the mid of 18<sup>th</sup> century, the forts were expanded and esplanades were created in the periphery for buffer. The sectors of Eurasian merchants and Indian densified and grew along the water edge whereas the Europeans moved to the suburbs. The city of Bombay grew in a similar fashion but in different direction due to the geographical constrains. The emerged European colonial architecture not only gave control to the colonial powers to control the crowd but also recreated the essence of their hometown back in Europe. As Arthur Smailes opines, the expression of a culture in the townscape is appreciated only in its more superficial aspects. In contrast, it preoccupies the very structure of the city in terms of its rudimentary components and disposition (Dutt and Noble, 2004).

### **Character and Spatial Attributes of Indian Colonial Port Cities**

The emergence of European colonial architecture served various purposes beyond its aesthetic appeal. First and foremost, it afforded the colonial authorities a means to exercise dominion over the indigenous populace. The public buildings exhibited an imposing and grandiose character, effectively communicating authority and power. This served as a constant reminder to the native inhabitants of the colonial presence and the strength of the ruling empire. Additionally, the architectural design served as a mechanism for evoking a feeling of familiarity and nostalgia among the European settlers. The replication of Classical European and Anglo-Oriental styles in these distant lands facilitated the colonizers in recreating the essence of their hometowns in Europe. The aforementioned buildings came to represent a concept of a "home away from home" for the European elite who resided in the colonies. These structures provided a feeling of ease and familiarity in an otherwise unfamiliar environment.

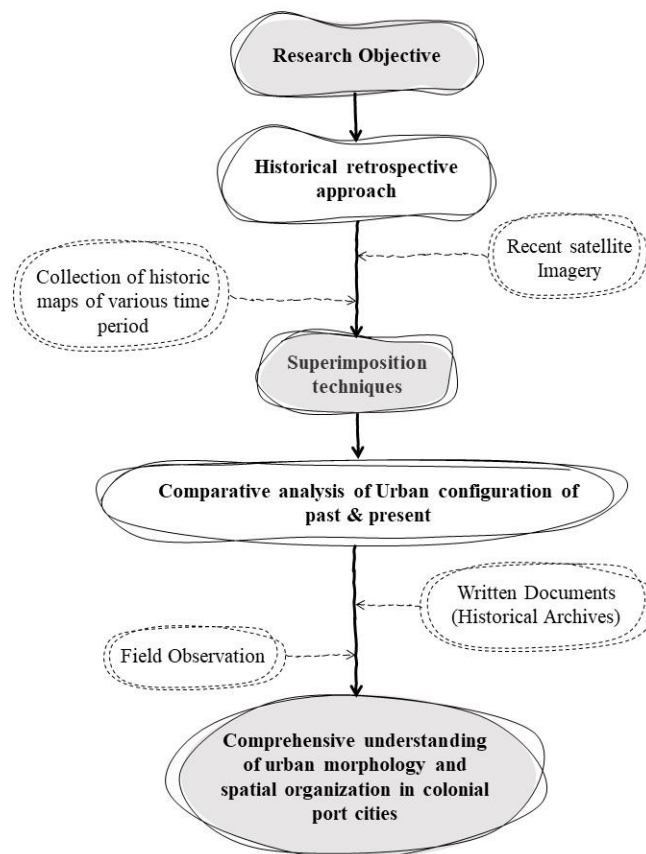
The influence of strong European urbanism in Indian colonial port cities became increasingly pronounced after sufficient efforts of fortification. The construction of grand public buildings in Classical European and eclectic Anglo-Oriental styles became prevalent, particularly in the esplanade area, central business districts, and elite residential areas of these cities (Partha, 1986). During the mid-18<sup>th</sup> century, the two main public structures that dominated the skylines of port cities were the lofty spires of the churches for spiritual needs due to its liberal religious atmosphere and huge footprints of hospitals for physical needs (Davison Love, 1913). The other public buildings included the mansions of governors, like the Great House of the Lord in Bombay and elegant garden houses, like in rural Parel. In addition to architecture, the importance of gardens and horticulture is evident in both small private gardens and large public parks (Hunte et al., 2019), owing to European and Oriental traditions (Partha, 1986). The planning of urban spaces revolved around the positioning and prominence of these European-style buildings. The layout of streets, squares, and public spaces was carefully designed to complement the architecture and reinforce the colonial authority's control over the city's residents. The design and layout of these grand public buildings and urban spaces were not just superficial imitations of European models; they influenced the very fabric of the city in terms of its fundamental components and spatial disposition. The juxtaposition of European-style buildings with indigenous architecture also created a stark visual contrast, highlighting the power dynamics at play in the colonial society. These architectural additions were a tangible manifestation of the colonial powers' dominance and control over these urban spaces.

The decline of industries and advancements in transportation resulted in the relocation of ports and port-related industries, which played a crucial role in the beginning of waterfront decline and regeneration (Hoyle & Pinder, 1992). As industries left these areas, the once thriving waterfronts fell into disrepair and deterioration. However, a positive transformation occurred when these previously private areas were made accessible to the public (Jones, 1998). The potential for waterfront redevelopment to revitalize urban areas was recognized by cities. By revitalizing these neglected areas, cities intended to enhance the well-being. Moreover, the impact of strong European urbanism that extended beyond the colonial period added to the

value. Many of these historic buildings and urban spaces have been preserved as important heritage sites, serving as reminders of the colonial past and attracting tourists and history enthusiasts from around the world (Roberts et al., 2000). The architectural choices made during this period continue to leave a lasting impact on the urban landscape and cultural identity of these cities, making them a compelling subject of study and appreciation in the context of India's colonial history.

### Research Methodology

This research investigates the physical planning of the bygone era in Indian colonial port cities using a retrospective approach informed by the historical method. The historical method was chosen because it endeavors to provide explanations for present-day inquiries through a thorough examination of the past (Pandey & Pandey, 2015; Fiorini et al., 2022). The historical method pursues explanation to queries of current interest by an intensive study of the past (Pandey & Pandey 2015). A retrospective approach in the historic method refers to studying current data and tracing back to historical data to apprehend the evolution sequence in the reverse order.



**Fig. 2:** Research methodology  
Source: Illustration by Author

This method permits a comprehensive understanding of the historical evolution and spatial development of these cities, shedding light on their changing identity and character. The extracted spatial and temporal data not only increase the authenticity and objectivity of the research but also ensures the replicability. Recent advancements in research facilitates image processing software, GIS, deep leaning simulated mathematical morphological models to interpret urban spatial elements from historic maps.

The aim of the study is to achieve a thorough comprehension of how the urban morphology and spatial organization of study area were shaped by historical influences, contributing to their unique character and identity that continues to resonate in the contemporary times. To commence the investigation, recent satellite imagery of the study area was obtained as a contemporary reference base, portraying the present geometry of the city's urban fabric and the layout of the streets as shown in Fig.2. By superimposing historical maps from various periods of the city's development, including early colonial, pre-colonial, and indigenous times, the researcher then retraced the passage of time to compare and appraise the evolution of the city's physical planning and urban configurations.

This research employs a case study approach. In order to gather data, the recent satellite image of the city was traced to apprehend the geometry of the street nexus over which various historical maps were juxtaposed to cognize the historic typology. The historical written records regarding historic city planning and field observation were examined to generate further insights into the historic urban planning concepts.

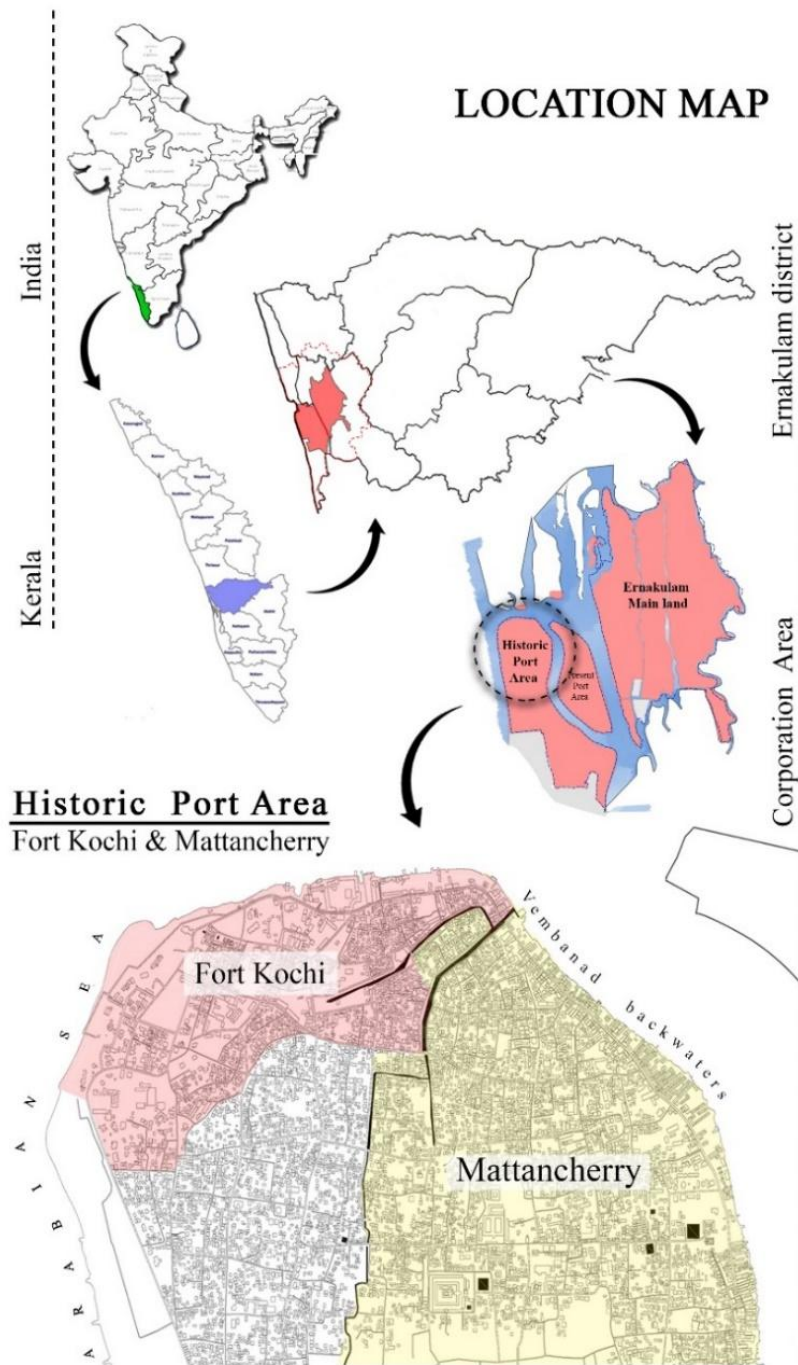
Valuable perspectives and insights about the changes and continuity in the spatial configuration of the city over the centuries were obtained by juxtaposing historical maps with modern satellite imagery (Ahn & Juraev 2023). This has primarily identified urban patterns, historic typologies, and notable landmarks that have endured over time. The comparative analysis offers an animated perspective of the historic urban planning concepts and strategies employed during the growth of the colonial port city precinct. Apart from the cadastral maps, written documents from historical archives and legal records from municipal authorities were also gathered to provide a more comprehensive narrative regarding city's morphosis during various time periods. The most pivotal stage of the methodology was field observation as on-site insights and empirical data obtained by physically exploring the city and its urban spaces provides firsthand understanding of the existing built fabric and voids. The direct and on-site observation perfected the analysis of historical maps and records, delivering a holistic perspective on the character and identity of the city (Farhan et al., 2020).

### **The Case Study: Kochi's Waterfront Public Spaces**

The port city of Kochi is located in Ernakulam district in Kerala, India, as shown in Fig.3. The city is known for its history of the spice trade. Records of navigation via sea date back to the 3rd millennium B. C. by Assyrians and Babylonians to the Kerala coast in the conquest of spices (Menon, 2007). The most important ports on the coast of Kerala, frequented by traders from Greece, Egypt, Rome, Arabia, were the Tyndis, Muziris and Nelcynda; trading spices, semiprecious stones, ivory, and textiles. Kochi gradually emerged as a significant port after massive flooding of the Periyar river in 1341 that silted and wrecked the Muziris port (Thomas, 2018). The merchants around Muziris with time shifted further south to the new port of Kochi. Kochi is a natural harbor penetrated by several inlets from the Arabian sea and riverine estuaries from the Western ghats. The eastern side of the finger like projection known as the Mattancherry was lined by warehouses for the spice trade as it was suitable for the ships to dock in the calm sea. The king resided near the Kaluvetty canal, and the other communities settled along the coast to support trade. The Portuguese, Dutch and the British were the major colonial powers that reigned Kochi from the 16<sup>th</sup> century until the independence (Menon, 2007).

The precinct of Fort Kochi and Mattancherry are declared heritage zone. The canal divides the city into two precincts. The zone to the south is the precinct of the native town known as the Mattancherry area. The zone that had lodged the fort and European sector during the colonial era is the precinct of Fort Kochi. Upon initial examination, there is a noticeable difference in the urban fabric between the two areas, with the northern vicinity of Fort Kochi having a greater proportion of open spaces in comparison to its southern counterpart. During the British era after the conquest in 1795, the Dutch fort walls were fully pulled down to establish British rule. The port activities were expanded and carried at full swing. The port activities were shifted slowly to other locations due to space crunch and new technological advancements. The establishment of the rail network in Ernakulam mainland has resulted in the attraction of trade through road transport. The establishment of Willingdon Island, which is

India's largest artificial island, during the early 20<sup>th</sup> century, attracted various port-related operations. Despite the British dismantling the Dutch fort, several Dutch-owned buildings were repurposed. Fort Kochi is one of the finest examples to exhibit Dutch colonial architecture.

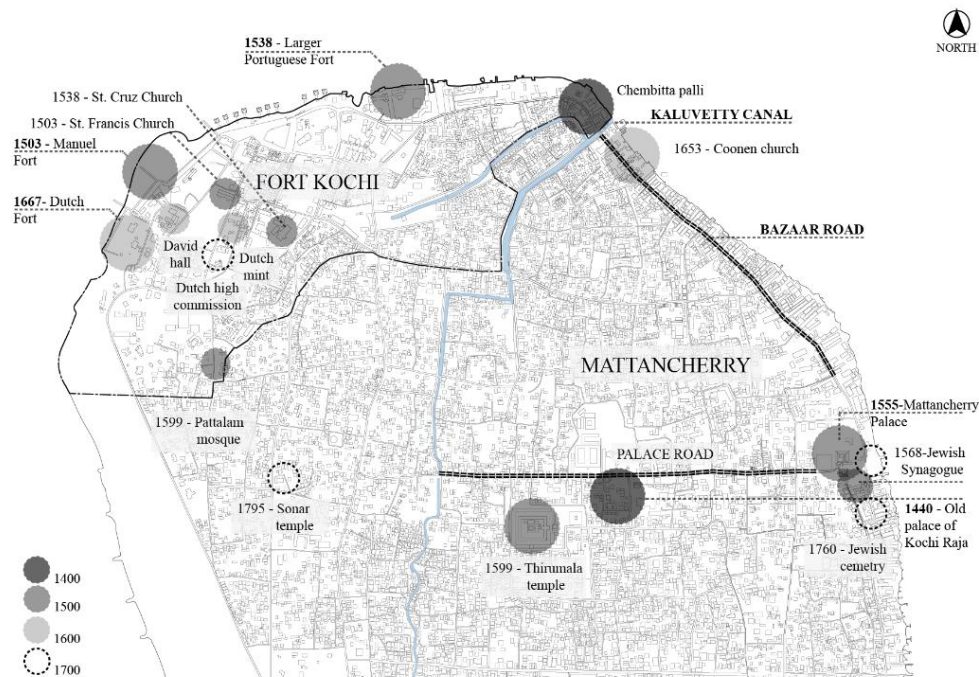


**Fig. 3:** Location of Kochi  
Source: Illustration by Author

Despite the Portuguese having a 150-year reign prior to the Dutch, the remnants of Portuguese architecture are scarce. The primary factor behind the aforementioned situation is attributed to the Dutch, who, following their conquest in 1663, had demolished all Portuguese structures with the exception of two churches. As shown in the Fig.4, the Dutch completely demolished the larger Portuguese fort that was constructed in 1538. The primary focus of the Dutch East India Company was commerce, rather than the development of the city's

infrastructure. The fort size was reduced by one-third by the Dutch, who then constructed buildings on the foundations of the Portuguese remains. In alternative terms, the architectural design of Fort Kochi exhibits Dutch colonial architecture and planning, incorporating certain elements of planning influenced by the Portuguese. The Portuguese fort encompassed a vast area in Fort Kochi, comprising multiple residential buildings, offices, warehouses, and churches.

This region denotes the area where the Dutch expanded their suburban settlements beyond the fort subsequent to displacing the Portuguese. The fortification walls constructed by the Dutch were equipped with a total of eight bastions, each of which was named after the provinces of Holland. The remaining foundations of several bastions serve as sturdy bases upon which the Thakur House, Palatil House, and Bishops House are all situated. The fortification walls of the Dutch fort were accompanied by a spacious moat, which was subsequently filled in during a later period to create the K B Jacob Road. The road serves as a distinct boundary that outlines the exact dimensions of the fort. The palace originally constructed by the Portuguese for the Kochi rajahs was subsequently restored by the Dutch. The palace is currently referred to as the Mattancherry Palace, also commonly known as the Dutch Palace. The palace is located at a considerable distance from the fort, on the opposite end of the island. The palace attracted Indian merchants from various regions, leading to the establishment of a local community comprised of indigenous residents.



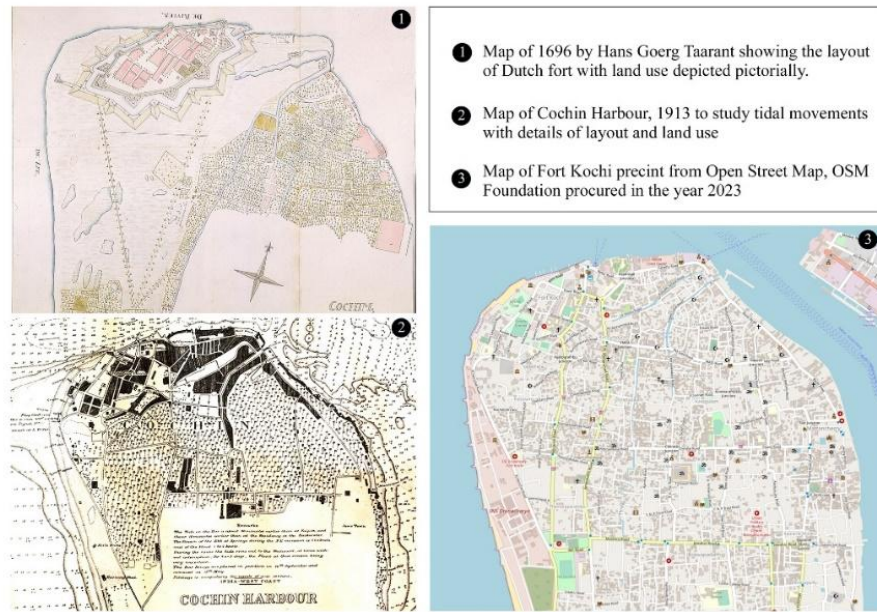
**Fig. 4:** Chronological developments in Kochi

Source: Illustration by Author

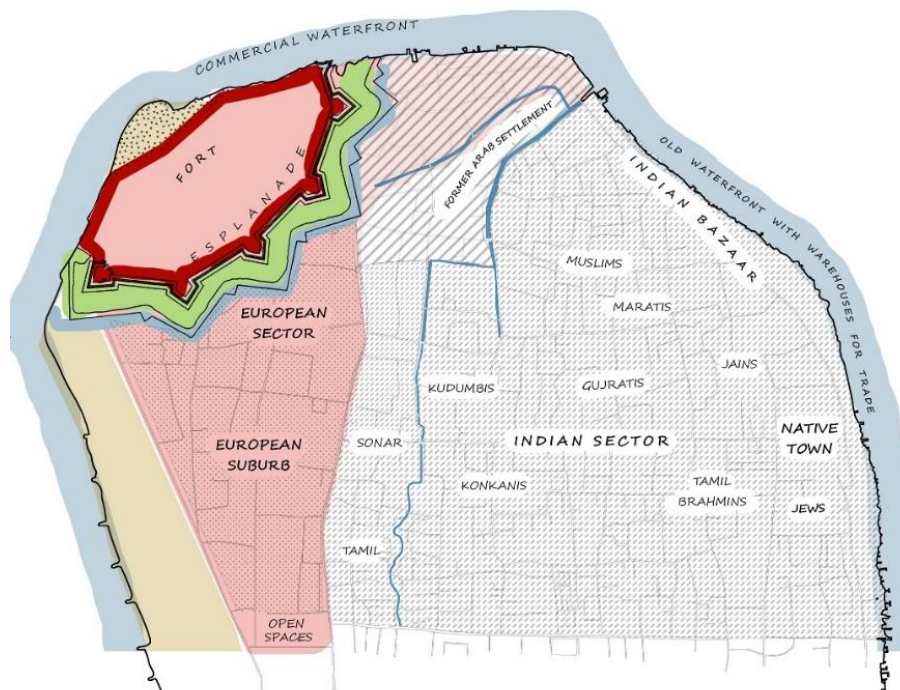
To comprehensively examine Kochi's urban transformation, a carefully curated selection of diverse maps was procured from the David Rumsey Map Collection which is located in the prestigious David Rumsey Map Centre at Stanford Libraries. Each map, meticulously selected for its historical significance, provides a portal into distinct periods of Kochi's development, enabling a multidimensional exploration of the city's character and identity. Table 1 presents the list of various historical maps that were utilized in this research providing glimpses into different stages of Kochi's evolution and changing morphology.

The evolution of Kochi's urban morphology was revealed by a thorough examination of each of these historical maps and a comparison of their details with contemporary satellite imagery. The study obtained valuable insights into the evolution of the city's streets, landmarks,

and neighbourhoods by superimposing these historical maps onto current satellite data. Collaboration between the David Rumsey Map Collection and this research endeavor has enabled a comprehensive and nuanced comprehension of Kochi's character and identity. The combination of historical cartography and modern technology has produced a rich tapestry of information that delineates specific areas within the city based on their unique characteristics, architectural features, and historical significance. The resultant character zones as shown in Fig.5, provide a valuable base for understanding the city's urban evolution and how different areas have evolved and retained their distinct attributes over time as shown in Fig.6.



Historic maps with contemporary satellite imagery for superimposition



Character zones of Kochi

**Fig. 5:** Map analysis and character zones of Kochi

Source: Illustration by Author

The inferences of historical map analysis and written records can be broadly classified into physical, social and cultural aspects.

**Table 1:** List of various historic maps

Source: Author

| S. No. | Year | Cartographer            | Description   |
|--------|------|-------------------------|---|
| 1      | 1503 | Albuquerque             | A Portuguese map of Fort Kochi (district of Santa Cruz), showing layout of Fort Manuel of Cochin.   |
| 2      | 1663 | M E Proot               | The plan shows the city's walls expanded to take up the entire tip of the peninsula, featuring many urban blocks occupied by trading rooms, warehouses, ecclesiastical institutions and grand residences. |
| 3      | 1665 | Johannes Vingboons      | A colourful map showing built and open spaces of the Fort.  |
| 4      | 1670 | Phillip Baldaeus        | A map to extensively remodel Cochin, condensing the urban area and surrounding it with more robust fortifications in line with the latest standards of engineering.                                       |
| 5      | 1696 | Hans Goerg Taarant      | Map showing the layout of Dutch fort with land use depicted pictorially.  |
| 6      | 1700 | J. B. Homann Heirs      | A detailed map of Kochi during the 18 <sup>th</sup> century, highlighting prominent landmarks and trading hubs of the time.   |
| 7      | 1733 | Homännische Erben       | A coloured engraved map of southern India and Ceylon with relief shown pictorially  |
| 8      | 1750 | William Faden           | An engraved map with relief   |
| 9      | 1767 | D Zynen                 | Line drawing of plan of city and fortress of Kochi  |
| 10     | 1792 | A A Buijskes            | A hand-coloured fortress of Kochi and surroundings  |
| 11     | 1816 | John Thomson            | A hand-coloured engraved map with relief shown by hachures.   |
| 12     | 1825 | Aaron Arrowsmith        | A hand-sketched map, illustrating the recreation of colonial Cochin with changing waterways and coastal features of Kochi dating 1821   |
| 13     | 1850 | John Tallis             | An antique engraved map, offering insights into the urban layout and architecture of Kochi  |
| 14     | 1883 | Letts, Son & Co.        | A coloured map of macro scale   |
| 15     | 1913 | Survey of India         | An official survey map of Cochin state with clinometric heights with natural features and political boundaries.   |
| 16     | 1920 | Survey of India         | An official survey map, providing precise details of infrastructure development and transportation networks in Kochi.   |
| 17     | 1922 | John George Bartholomew | Col. map. Relief shown by hypsometric tints and spot heights; depths by bathymetric tints.  |
| 18     | 1950 | Kochi Municipality      | A comprehensive city plan highlighting modern developments and urban planning initiatives in Kochi after independence.  |

### Physical Aspects the Urban Morphology of Kochi

The geographical setting, coastal features and topographical elements: The various zones of the harbour were resided by various groups based on their purpose for trade collectively defining the city's relationship with water bodies. Therefore, the spatial layout of Kochi revolves around its waterfront. The Fort Kochi area, with its iconic Chinese fishing nets, historic buildings, and quaint promenades speckled with large rain trees, showcases how the city's development was shaped by its proximity to the sea. Initially, the fort and its lavish premises controlled maritime trade, asserting its overseas monopoly, whereas Mattancherry area was lined with warehouses catering to the commerce of ethnic groups. The interiors are replete with residential areas dotted with institutional and other public structures.



**Fig. 6:** Character zones and morphology  
Source: Illustration by Author

### Urban Layout and Land Use Patterns

The Fort Kochi precinct was fortified during different periods of colonial rule to protect the city from invasions. The traces of remnants including bastions and walls, form distinct spatial elements in the city's landscape. It is clearly evident from the maps that the fort walls were pulled down to facilitate the construction of main roads. The wide streetscapes, lined with charming colonial-era buildings, art galleries, and boutique shops, attracts both tourists and

history enthusiasts alike. The ancillary narrow lanes and winding streets in the older quarters, retain their historic character, evoking a sense of nostalgia for the bygone era.

**Architecture and heritage:** The architecture of Kochi is a collage of various colonial powers that once dominated the city. In Fort Kochi, remnants of Portuguese architecture are evident along its streets, yet the predominant influence is Dutch, as the British, upon their victory, chose not to dismantle the Dutch buildings. The enduring European structures such as Bastion Bungalow, St. Francis Church, and Dutch Palace, along with other ethnic edifices like the Paradesi Synagogue, although distinct in their appearance, harmoniously coexist with traditional Kerala-style buildings. Being a prominent port city, Kochi's character is deeply intertwined with its maritime heritage. The remnants of bustling harbour, the historic waterfront, the ancient port facilities and iconic landmarks like the Chinese fishing nets bear witness to the city's maritime significance during the colonial period.

### **Social Aspects of the Urban Morphology of Kochi**

**Demographics and Community structure:** Apart from the medieval floating population of merchants from Rome, Persia, Egypt and China, the presence of a large, diverse group of various ethnicities has rendered the demography of Kochi a cosmopolitan nature. Each group was confined to the vicinity of their place of worship, situated along various alleys, with edifices that reflected their respective cultures. Though the visual distinction of ethnic groups based on attire has diminished over time, the essence of these diversity is still seen manifested in the typology of buildings and cultural dispositions.

**Social interactions and public life:** Kochi's spatial planning incorporates communal spaces, such as public squares and parks, which have been gathering spots for the city's residents for generations. These spaces of various scales serve as vital nodes for social interactions and cultural events. Public spaces, including markets, squares, and waterfront areas, serve as venues not only for everyday interactions but also as spaces for hosting festivals and fairs. Numerous festivals, inheriting their ethos from the colonial era, are secular in nature, such as carnivals that bring the entire populace onto the large public spaces irrespective of their cultural or religious backgrounds.

**Urban challenges and opportunities:** The city's spatial attributes have also been influenced by its gradual expansion over time as the city was growing towards south due to space crunch. Swiftly, following the decline of port activities in Fort Kochi and with the advent of railways in the adjacent main island of Ernakulam, the main island witnessed rapid development of new residential neighbourhoods, industrial areas, and infrastructural developments, overshadowing the former prominence of Fort Kochi. Economic downturns and population shift of Fort Kochi precinct conceived neglected public spaces, unused built fabric and deteriorating heritage impacting the aesthetics and cultural value of the place. Conversely, this transformation also introduced potential large redundant spaces along the waterfront, shifting from port functions to public functions. The once-neglected and abandoned warehouses slowly reincarnated into heritage category hotels and other public spaces such as cafes, galleries, and boutiques featuring souvenirs and artisanal goods.

### **Cultural Aspects the Urban Morphology of Kochi**

**Cultural tangible heritage:** As discussed above, despite the waning of its maritime trade legacy, the vestiges of each ethnic group continue to resonate in the present times in various forms. The heritage buildings and edifices render Fort Kochi a veritable living museum, epitomizing India's diverse ethnic groups through their distinct typologies blended with colonial hues. The European style and proportion are often seen infused into indigenous knowledge systems shaped by the interaction of various factors such as colonial policies, cultural exchange and educational institutions. The remnants of historic infrastructure like old street lamps or street names and edifices of colonial legacy like the statues or archaeological remains connects both locals and tourists to the historic past.

**Cultural practices and traditions:** The practices and traditions inherent to each group are deeply embedded within both the social and physical tapestry of the city. The spaces and

routes of cultural or religious importance in Fort Kochi, during fairs, transform into live stages where history and culture come into animation and are celebrated by locals and often experienced by tourists, creating a lively intersection of past and present. The multifaceted cultural legacy of Fort Kochi is vividly mirrored in its cuisine, which is a *mélange* of influences from various traders and settlers. Art, literature, and creative expression: Elements assimilated from traders and settlers are discernibly woven into the performing and visual arts of Kochi in colorful costumes and bold expressions, that now it is a platform for the celebration of contemporary arts, particularly during the Kochi-Muziris Biennale. Local authors, drawing inspiration from this multicultural legacy, have vividly depicted the city's glory across various epochs in their literary works, eloquently expounding upon Kochi's storied past and vibrant present.

## Discussions

The objective of this study was to demonstrate the impact of colonial interventions on Indian colonial port cities, with a detailed examination of the enduring effects on the spatial morphology and societal dynamics of Kochi. This study reveals the significant influence of colonial architecture and urban planning, employed as strategic tools for asserting dominance and control, has significantly shaped the city's identity. The architectural styles and urban landscape of Kochi, bearing the historical imprints of Portuguese, Dutch, and British rule, are manifestly evident not only in their physical form but also in their social and aesthetic aspects, serving as tangible representations of power and cultural hegemony. The significant shift in the use of waterfront spaces, originally designed for trade and defense, to quintessential sites of public engagement and cultural expression, fosters a sense of community and cultural continuity. As contemporary urban development exerts pressure on the historic fabric and spaces, the challenge of balancing conservation with modern urban needs becomes increasingly critical. The case of Kochi not only exemplifies this phenomenon but also offers solutions within Indian colonial port cities, where the urban morphology is inextricably linked with historical narratives and processes.

While the literature frequently emphasizes idealistic preservationist approaches to historic spaces, the Kochi case study unveils a more nuanced understanding, adopting a pragmatic stance towards heritage preservation. This approach in Kochi involves not merely fossilizing physical structures but also adapting them to meet contemporary urban requirements.

The examination of urban morphology in waterfront public spaces within historical Indian colonial port cities entails various challenges and opportunities.

## Challenges

1. **Historical context:** The historical heritage of Indian colonial port cities is characterized by a significant influence from various colonial powers. The examination of historical records, maps, and documents is essential for comprehending urban morphology. However, this undertaking can present challenges due to issues related to their accessibility, preservation, and interpretation.
2. **Changing land use:** The waterfront areas of these cities have experienced significant changes in land use and development over time. The challenge lies in comprehending the original urban morphology and its evolution over time, considering factors such as urbanisation, industrialization, and commercialization in the region.
3. **Deterioration and conservation:** The preservation of numerous historic waterfront buildings and open areas in Indian colonial port cities is at risk due to various factors, including neglect and inappropriate contemporary alterations. The challenge lies in striking a balance that accommodates the preservation of the building's historical significance while meeting the demands of contemporary

needs, including enhancing accessibility, functionality, and environmental sustainability.

4. **Data availability:** Obtaining accurate and comprehensive data for studying urban morphology, especially for historical time periods, can pose challenges. Due to the possibility of information loss, fragmentation, or inaccessibility, it is difficult to construct a comprehensive comprehension of the evolution of waterfront places.

### Opportunities

1. **Urban heritage conservation:** The field of urban morphology provides an avenue for identifying and safeguarding the architectural, cultural, and historical value of waterfront public spaces. This approach also presents a favorable prospect for quick remedial action before damage and loss. This enables the development of strategies aimed at conserving heritage, rehabilitating heritage areas, and facilitating the adaptive reuse of such areas, thereby ensuring their sustained viability in the long run.
2. **Community engagement:** Open public spaces adjacent to waterways possess the inherent capacity to evolve into prosperous hubs of communal activity. The comprehension of urban morphology enables the integration of neighborhood communities into planning and design processes. This engagement facilitates the development of a sense of responsibility and encourages active involvement, leading to urban environments that are more inviting and supportive of social unity.
3. **Tourism and economic development:** Tourism can serve as a catalyst for economic growth within a community by drawing visitors to meticulously maintained waterfront public spaces. The field of urban morphology facilitates the exploration of opportunities in tourism, cultural events, and waterfront redevelopment initiatives. These endeavors hold the potential to revitalize the local economy and generate employment opportunities.
4. **Sustainable development:** The examination of urban morphology offers valuable insights into the ecological and environmental characteristics found in waterfront regions. These technologies enable the integration of environmentally friendly practices, such as green infrastructure, pedestrian-friendly designs, and water management strategies. The incorporation of ecological and environmental factors results in the development of cities that demonstrate decreased vulnerability to natural disasters and provide a better living environment for humans. By addressing these challenges and embracing the opportunities, the examination of urban morphology in waterfront public spaces in Indian colonial port cities can pave the way for vibrant, resilient, and culturally.

### Conclusion

The research sheds light on the physical planning of the bygone eras in Indian colonial port cities through a retrospective approach informed by the historical method. By employing this methodology, historical maps from different timelines, including early colonial, pre-colonial, and indigenous periods, were meticulously analyzed and superimposed onto the current satellite maps. This comparative analysis of past and present configurations enabled the researcher to discern the city's historic typologies, urban patterns, and notable landmarks that have persisted or transformed over time. The research seamlessly integrated written records from historical archives and on-site field observations to complement the analysis of historical maps, providing valuable descriptions and insights into the intentions behind the city's physical design and layout during various epochs. The case study of Kochi in Kerala demonstrates a port city of legacy dating back to ancient times in the spice trade, attracting traders across the globe. The colonial influences on Kochi's indigenous urban morphology reflects a harmonious blend of both.

The study provides a comprehensive understanding of the enduring effects of historical influences on the development of these cities, delving into the physical planning of colonial port cities.

The findings of this study are invaluable for heritage conservation, community engagement, tourism, economic development, and sustainable urban planning. By preserving and rejuvenating historical waterfront public spaces, these cities can maintain their role as dynamic centers of community activity, simultaneously fostering economic growth and environmental sustainability. The study emerges as a constructive resource for practitioners and scholars in related fields, offering insightful information on the integration of cultural heritage preservation within contemporary urban planning. Ultimately, the research underscores the importance of urban morphology in uncovering the hidden narratives of Indian colonial port cities and provides a valuable foundation for future studies and initiatives aimed at preserving their cultural heritage and embracing their dynamic urban growth. By acknowledging the complexities of their past, these cities can pave the way for a more prosperous and culturally enriched future, honoring their historical significance and embracing the potential for enduring resilience in the face of contemporary challenges.

## References

- Ahn, Y.-J. and Juraev, Z. (2023) Green spaces in Uzbekistan: Historical heritage and challenges for urban environment, *Nature-Based Solutions*, 4 c. Available: <https://doi.org/10.1016/j.nbsj.2023.100077>.
- Algiffari, M.F., i Martosenjoyo, T., Beddu, S., and Ishak, R.A. (2024) Historical Evolution of the Development Patterns of Gorontalo, Indonesia, *International Society for the Study of Vernacular Settlements*, 11(2), 78–90, available: <https://doi.org/10.61275/isvsej-2024-11-02-06>.
- Chiaradia, A.J.F. (2019) Urban Morphology/Urban Form, *The Wiley Blackwell Encyclopedia of Urban and Regional Studies*, (April 2019), 1–6. Available: <https://doi.org/10.1002/9781118568446.eurs0382>.
- Darmayanti, T.E., Bahauddin, A., and Aryani, D.I. (2024) Understanding Sense of Place: Insights from People’s Experiences at Pasar Baru, Bandung, Indonesia, *ISVS e-journal*, 11(2), 48–65, available: <https://doi.org/10.61275/isvsej-2024-11-02-04>.
- Davenport, F.G. (1917) *European Treaties Bearing on the History of the United States and Its Dependencies*, 1st ed., Washington, D.C.: Carnegie Institution of Washington.
- Davison Love, H. (1913) *Vestiges of Old Madras 1640-1800* [online], London: John Murray. Available: <https://www.rroij.com/open-access/weighted-intuitionistic-fuzzy-delphi-method-38-42.pdf> [accessed 1 Aug 2023].
- Domingos, N. (2015) Colonial architectures, urban planning and the representation of portuguese imperial history, *Portuguese Journal of Social Science*, 14(3), 235–256. Available: [https://doi.org/10.1386/pjss.14.3.235\\_1](https://doi.org/10.1386/pjss.14.3.235_1).
- Dutt, A.K. and Noble, A.G. (2004) Urban Development of South Asia, in Dutt, A.K., Noble, A.G., Venugopal, G. and Subbaiah, S., eds., *Challenges to Asian Urbanization in the 21st Century*, Dordrecht: Kluwer academic publishers, 255–276. Available: [https://doi.org/10.1007/1-4020-2531-9\\_1](https://doi.org/10.1007/1-4020-2531-9_1).
- Farhan, S., Akef, V., and Nasar, Z. (2020) ‘The transformation of the inherited historical urban and architectural characteristics of Al-Najaf’s Old City and possible preservation insights’, *Frontiers of Architectural Research*, 9(4), 820–836. Available: <https://doi.org/10.1016/j.foar.2020.07.005>.
- Fiorini, G., Friso, I., and Balletti, C. (2022) ‘A Geomatic Approach to the Preservation and 3D Communication of Urban Cultural Heritage for the History of the City: The Journey of Napoleon in Venice’, *Remote Sensing*, 14(14), 3242–3256. Available: <https://doi.org/10.3390/rs14143242>.
- Hein, C. (2013) ‘Port Cities’, in Clark, P. (edited), *The Oxford Handbook of Cities in World History*, Oxford: Oxford University Press.
- Hoyle, B.S. and Pinder, D. (1992) ‘Cities and the sea: change and development in

- contemporary Europe.’, in *European Port Cities in Transition*, London: Belhaven Press.
- Hunte, N., Roopsind, A., Ansari, A.A., and Trevor Caughlin, T. (2019) ‘Colonial history impacts urban tree species distribution in a tropical city’, *Urban Forestry & Urban Greening*, 41, 313–322. Available: <https://doi.org/10.1016/j.ufug.2019.04.010>.
- Ishida, T. (2001) “‘Japan’s Waterfront Experiments - Edo/Tokyo, Hakata/Fukuoka: The Formulation and Evolution of Japan’s Metropolis on the Alluvial Horizon’”, in A. Graafland, (edited) *Cities in Transition*, Rotterdam: 010 Publishers.
- Jones, A. (1998) ‘Issues in Waterfront Regeneration: More Sobering Thoughts-A UK Perspective’, *Planning Practice & Research*, 13(4), 433–442. Available: <https://doi.org/10.1080/02697459815987>.
- Karsono, B. (2013) ‘Historical Analysis of Urbanity on the Waterfront’, *Jurnal Arsitekno*, II(1), 53–61.
- Koch, P.O. (2003) *To the Ends of the Earth: The Age of the European Explorers*, Florida: McFarland.
- Kosambi, M. and Brush, J.E. (1988) ‘Three Colonial Port Cities in India’, *Geographical Review*, Taylor & Francis, Ltd., 78(1), 32–47. Available: <https://www.jstor.org/stable/214304>.
- Kostof, S. (1991) *The City Shaped: Urban Patterns and Meanings Through History*, London: Thames and Hudson.
- Kostof, S. and Castillo, G. (1992) *The City Assembled: The Elements of Urban Form through History*, Little, Brown UK.
- Kubler, G. (1972) *Portuguese Plain Architecture: Between Spices and Diamonds, 1521-1706*, Middletown: Conn: Wesleyan University Press.
- Lilley, K.D. (2009) ‘Urban Morphology’, *International Encyclopedia of Human Geography*, 66–69. Available: <https://doi.org/10.1016/B978-008044910-4.01093-2>.
- Menon, A.S. (2007) *A Survey of Kerala History*, Thiruvananthapuram: DC Books.
- Mumford, L. (1961) *The City in History: Its Origins, Its Transformations, and Its Prospects*, Boston: Houghton Mifflin Harcourt.
- Murrey, A. (2020) ‘Colonialism’, *International Encyclopedia of Human Geography*, 2, 315–326. Available: <https://doi.org/10.1016/b978-0-08-102295-5.10804-2>.
- Pandey, P. and Pandey, M.M. (2015) *Research Methodology: Tools and Techniques*, Romania: Bridge Center.
- Partha, M. (1986) ‘The Early British Port Cities of India: Their Planning and Architecture Circa 1640-1757’, *Journal of the Society of Architectural Historians*, 45(2), 95–114. Available: <https://doi.org/10.2307/990090>.
- Pier Vittorio Aureli (2018) ‘Appropriation, Subdivision, Abstraction: A Political History Of the Urban Grid’, *Log*, 44(Fall 2018), 139–167.
- Roberts, P., Sykes, H., and Granger, R. (2000) *Handbook for Urban Regeneration*, London: SAGE.
- Thomas, B. (2018) *Kochiites*, Kochi: Pranatha Books.