

# The Interplay of Water, Space, and Human Behavior: Urban Morphology using Urban Palimpsest and Juxtaposition Concepts at the Bosphorus

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## Abstract

The interplay of water, space, and human behavior plays a central role in shaping the morphological development of coastal cities. This study focuses on Istanbul's Bosphorus to examine how historically layered environments respond to rapid urbanization. The research explores how coastal cities can strengthen morphological resilience through the concepts of *urban palimpsest* and *urban juxtaposition*. A systematic literature review of 144 peer-reviewed articles (2000–2025) was conducted to assess how theory and practice address spatial configuration, heritage continuity, and user behavior in waterfront planning. The results reveal a significant disconnect between theoretical models and practical urban applications. It is particularly evident in how addressing adaptive spatial structures, heritage integration, and participatory planning are approached in water-bound cities. This study addresses a major gap in urban morphology literature by offering a comprehensive framework that links morphological resilience with interdisciplinary planning from both theoretical and practical perspectives. It introduces a novel synthesis of water–space dynamics, spatial morphology, and human interaction, grounded in the context of Istanbul's coastal transformation. By conceptualizing the Bosphorus as both a living spatial archive and a planning challenge, the study provides a transferable model that advances scholarly understanding and supports salutogenic, resilient design in coastal urbanism.

**Keywords:** Urban Morphology; Coastal Urbanism; Urban Palimpsest and Juxtaposition; Participatory Planning; Bosphorus of Istanbul; Smart City Development.

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## 1. Introduction

### 1.1 Background and Context

In the evolving discourse on urban form, water cities present a unique set of interdisciplinary and spatial conditions that challenge conventional disciplinary boundaries (Hein, 2004; Kropf, 2018). Their morphological development is shaped not only by land-based urban logistics but also by the complex interactions between water, space, and human behavior. Istanbul, situated along the Bosphorus, exemplifies such complexity, where the interdependence of natural geography and palimpsestic layering forms a deeply rooted urban identity. Yet rapid development and political imbalance disrupt this interdisciplinary interplay, risking the erosion of identity and spatial coherence at the Bosphorus (Bartu Candan & Kolluoğlu, 2015).

While urban morphological development needs to recognize the value of interdisciplinarity, current urbanization pressures expose critical gaps in how theory translates into inclusive and sustainable practice. In response to this gap, the study investigates how the interaction of interdisciplinary urban theories in water cities can enhance context-sensitive development. It also examines how this interaction can strengthen urban resilience, particularly through a comparative analysis of theoretical discourse and planning practice. To address this, the research conducts a multi-dimensional analysis of coastal urban public spaces along the Bosphorus, interpreting them as an urban palimpsest. This is achieved through a systematic literature review which juxtaposes interdisciplinary theories to evaluate their implications for morphological resilience. The study draws upon the Conzenian perspective, which emphasizes the continuity of urban form through the persistence of plot patterns, building fabric, and street systems over time (Conzen, 1960).

Understanding urban morphologies in water cities requires crossing disciplinary boundaries more than in non-water cities during the urbanization process. As Moudon (1997) and Whitehand (2001) state, urban morphology has always relied on interdisciplinarity to ensure practical relevance. Currently, the need for such an approach is increasingly urgent due to the complexity of water, space, and human behavior relationships; the growing challenges of urban sustainability; and the consequences of ineffective urban implementations by transformations. To comprehend the current dimensions of these complexities and disruptions, this research adopts interdisciplinary parameters such as spatial memory, socio-cultural dynamics, and environmental sensitivity as analytical tools. These parameters offer a multi-scalar and multi-disciplinary lens through which the resilience and continuity of urban form along the Bosphorus can be evaluated.

In Istanbul, the Bosphorus acts not only as a geographical feature but also as a formative agent in the city's interdisciplinary and spatial identity, which is now under threat from transformations (Yasar & Kaymak Heinz, 2024). Rapid urbanization threatens the city's authenticity due to a lack of sensitivity to site context. It has led to de-identification, privatization, displacement, and profit-oriented development, resulting in the accumulation of a privileged population along the coast through politically motivated planning discrepancies. These dynamics have significantly weakened the socio-cultural, historical, environmental, physical, economic, and spatial structures of Istanbul, causing disruptions in its morphological continuity and relative urban resilience (Bartu-Candan et al., 2008; Lovering et al., 2011).

## 1.2 Problem Statement and Research Gap

Maintaining morphological continuity is not only a matter of heritage but also a strategic approach for building resilient urban futures. The more the physical form and historical layers of the urban fabric are preserved, the better cities can adapt to environmental, social, and economic disruptions without losing their core characteristics (Ripp, Egusquiza, & Lückerrath, 2024). In contrast, fragmentation caused by rapid and unregulated development undermines adaptive capacity and weakens social cohesion. Pressures from rapid urbanization along the Bosphorus disrupt the essential ties between natural topography, socio-cultural dynamics, and the built environment (Göksel & Doğru, 2019). Inherently, a city will always seek continual renewal and transformation; however, in historically layered settings such as the shores of the Istanbul Bosphorus, this drive for change often encounters a fundamental tension with the continuity of the city's rich morphological substratum. This tension reveals a deeper issue in the urban planning of historically layered coastal cities. There is a lack of a strong and context-sensitive framework capable of preserving morphological continuity and promoting resilience in both theory and practice amid contemporary urbanization pressures.

While this fundamental tension is frequently acknowledged in the literature (Rapoport, 1983; Carmona et al., 2003; Oliveira, 2016; Kubat, 2019), design approaches that directly engage with it in practice

are exceedingly rare (Kropf, 2018). Moreover, academic studies that explicitly address the failure to translate theory into practice on this topic remain limited (Angheloiu & Tennant, 2023). This study responds to this gap by employing the concepts of urban palimpsest and urban juxtaposition as analytical tools to examine how the interaction of interdisciplinary spatial dynamics can either reinforce or undermine morphological resilience in water-edge environments. Focusing on the Bosphorus in Istanbul, this research conducts a comparative analysis of theoretical discourse and planning practice. It aims to reveal the often-overlooked interrelations among three vital elements that shape water cities: spatial memory (Halbwachs, 1992), socio-cultural behavior (Gehl, 2013), and waterfront form (Marshall, 2005). In doing so, it offers a novel contribution to the limited scholarship on morphological resilience in heritage-rich coastal geographies and underlines the urgent need for context-sensitive approaches in contemporary urban planning.

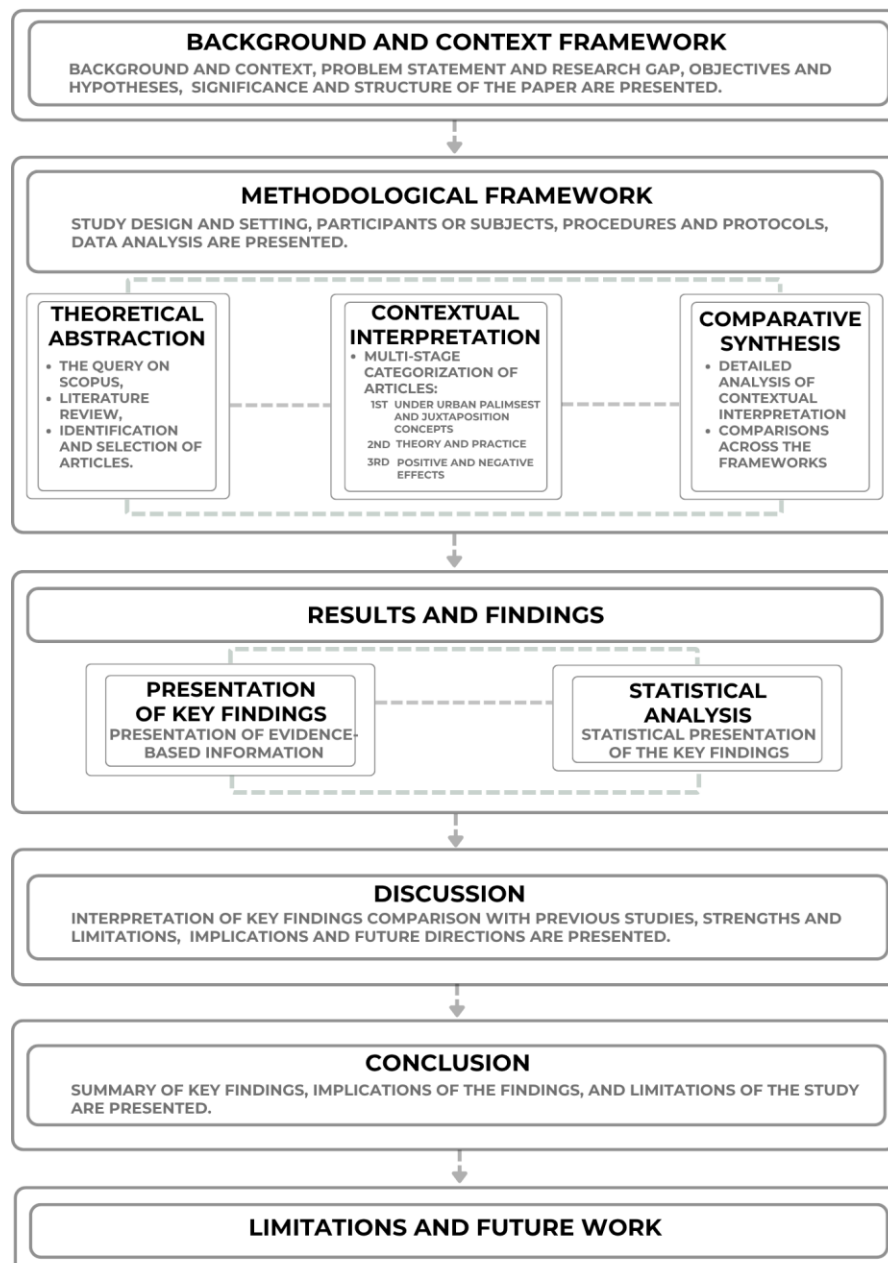
### 1.3 Objectives and Hypotheses

The main objective of the study is to explore how the interaction of interdisciplinary urban parameters in water cities can inform context-sensitive development strategies that support the continuity and resilience of urban form. This study hypothesizes that historically grounded coastal public spaces along the Bosphorus can be interpreted as an urban palimpsest. The research examines these spaces through a multi-dimensional analysis that juxtaposes theoretical and practical interdisciplinary perspectives. By using a comparative systematic literature review, it aims to generate valuable insights into morphological continuity and urban resilience. The study contributes to addressing a critical gap in the literature regarding its multifaceted urban role of the Bosphorus as both an interdisciplinary and spatial agent within Istanbul's urban fabric. It further illustrates how context-sensitive, theory-informed frameworks can decrease the negative effects of rapid urbanization in practice. Ultimately, the findings aim to inform future coastal development policies not only in Istanbul but also in other heritage-rich water cities grappling with similar spatial complexities, thus enriching the field of interdisciplinary urban design and planning.

### 1.4 Significance and Structure of the Paper

This study makes a valuable contribution to interdisciplinary discussions on urban morphology by examining how morphological continuity and urban resilience can be sustained in historically layered coastal environments under rapid urbanization pressure. It conceptualizes the Bosphorus as both an urban palimpsest and a spatial interface shaped by natural geography, socio-cultural dynamics, and evolving planning practices. In doing so, the research offers a novel analytical lens for interpreting spatial transformation in water cities. Adopting a comparative approach that juxtaposes interdisciplinary theories and practical applications, the study exposes key discrepancies between urban theory and planning practice in multi-disciplinarity. Based on these insights, it proposes a context-sensitive methodology aimed at strengthening more resilient and heritage-aware urban development strategies.

Figure 1 visually synthesizes the overall structure of the study and its conceptual progression, clarifying how a systematic literature review and key findings are integrated to support a context-sensitive, transferable model for other historically layered coastal cities. This visualization provided to enhance understanding the analytical depth of the study, as well as to communicate with its interdisciplinary approach and replicability. It not only maps the logical flow of the research but also highlights the integration of theory and practice across urban morphology. By outlining each methodological layer, the figure reinforces the transparency and coherence of the study's analytical framework.



**Figure 1.** Structure of the Study. (Source: Created by the Authors.)

## 2. Materials and Methods

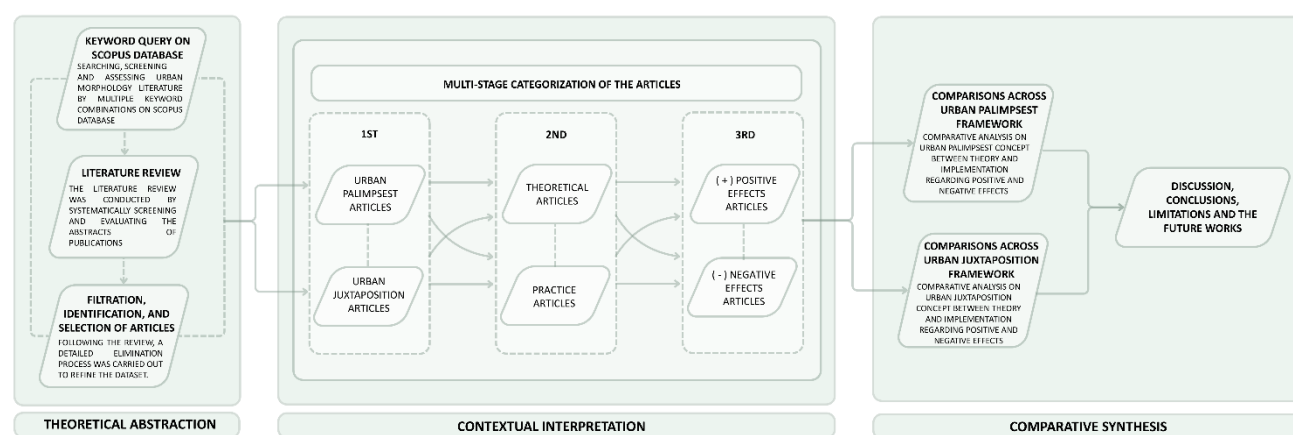
### 2.1 Study Design and Setting

A systematic literature review, as shown in Figure 2, is used to explore morphological development in coastal environments. This study is situated within the coastal urban public spaces of the Bosphorus, interpreting them as both an urban palimpsest and a spatial interface shaped by geographic conditions, interdisciplinary dynamics, human behavior, and planning interventions. To address the complex parameters of urban form and resilience, the research conducts a literature analysis of peer-reviewed publications from the period 2000 to 2025, sourced through the Scopus database.

The methodological flow involves three main parts: theoretical abstraction, contextual interpretation and comparative synthesis. Theoretical abstraction covers the query on Scopus, literature review, identification, and selection of articles. The selection of keywords and filtering criteria for the Scopus query of the study was guided by the conceptual foundations of urban morphology, particularly its emphasis on the relationship between physical form, spatial processes, and interdisciplinary dynamics (Moudon, 1997; Oliveira, 2016; Kropf, 2018). The selected terms are defined in the literature as foundational concepts within the field of urban morphology. The terms address themes related to

resilience by emphasizing the spatial structures and planning processes that enable urban form to endure change, maintain continuity, and respond to external pressures. Additionally, the relationship between these core concepts and urban resilience was specifically examined during the keyword selection process to ensure conceptual alignment. The literature review was conducted by systematically screening and evaluating the abstracts of publications retrieved through relevant keyword searches. Following the review, a detailed elimination process was carried out to refine the dataset.

The literature review findings are organized using a multi-stage categorization to support comparative analysis through contextual interpretation. First, the selected articles are divided into two main conceptual groups: those focusing on urban palimpsest and those on urban juxtaposition. Each group is then further classified as either theory-based or implementation-based. This distinction is not merely descriptive but is methodologically grounded in established typologies within research synthesis studies (Cooper, 1988; Booth et al., 2016). In particular, such classifications help identify how knowledge is constructed and applied across different modes of academic inquiry (Booth, Papaioannou, & Sutton, 2016). The theory-based articles are understood to primarily engage with conceptual frameworks, analytical models, or methodological debates, while implementation-based articles focus on real-world applications, case studies, or policy interventions. Recognizing this distinction allows the study to trace how theoretical discourse and practical experience inform and diverge from one another, thus aligning the review with integrative review practices that bridge conceptual and applied knowledge (Snyder, 2019). In the next stage, articles are analyzed based on whether they present positive or negative impacts of urban transformation on morphological continuity and urban resilience. Articles emphasizing positive effects show intentional and constructive contributions of modern urbanization to the adaptability of urban form, whereas negative effects demonstrate damages or ineffective interventions. Finally, the comparative synthesis stage enables detailed comparisons within and across the two conceptual frameworks, considering both theory and practice, as well as their stance on the positive and negative effects of urban transformation.



**Figure 2.** Systematic Methodology of the Research (Source: Created by the Authors.)

## 2.2 Participants or Subjects

The research corpus consists of peer-reviewed academic articles sourced from the Scopus database, selected according to specific criteria. Eligible articles focus on urban morphology and are directly related to coastal urban public spaces in Istanbul, with particular emphasis on the Bosphorus. Furthermore, only articles written in English and available in full text were considered. From an initial dataset of 1,182 articles, a refined selection of 144 articles was identified through systematic filtering based on geographic location, document type, thematic focus, spatial scale, and language accessibility, as shown in Figures 3 and 4.

TOP LISTED KEYWORDS	DOMAIN KEYWORDS	COMBINATION OF KEYWORDS	TOTAL NUMBER	"ISTANBUL" AND "THE BOSPHORUS" FOCUSED
"URBAN MORPHOLOGY"	"INTERDISCIPLINARY APPROACH"	"URBAN MORPHOLOGY" AND "INTERDISCIPLINARY APPROACH"	5087	50
	"URBAN HERITAGE"	"URBAN MORPHOLOGY" AND "URBAN HERITAGE"	13	1
	"HUMAN BEHAVIOUR"	"URBAN MORPHOLOGY" AND "HUMAN BEHAVIOUR"	34	7
	"WATERFRONT"	"URBAN MORPHOLOGY" AND "WATERFRONT"	12	1
	"AGENT BASED MODELING"	"URBAN MORPHOLOGY" AND "AGENT BASED MODELING"	33	1
"URBAN FORMS"	"INTERDISCIPLINARY APPROACH"	"URBAN FORMS" AND "INTERDISCIPLINARY APPROACH"	9	0
	"URBAN HERITAGE"	"URBAN FORMS" AND "URBAN HERITAGE"	7883	50
	"HUMAN BEHAVIOUR"	"URBAN FORMS" AND "HUMAN BEHAVIOUR"	14	0
	"WATERFRONT"	"URBAN FORMS" AND "WATERFRONT"	33	1
	"AGENT BASED MODELING"	"URBAN FORMS" AND "AGENT BASED MODELING"	32	2
"URBAN PLANNING"	"INTERDISCIPLINARY APPROACH"	"URBAN PLANNING" AND "INTERDISCIPLINARY APPROACH"	43	43
	"URBAN HERITAGE"	"URBAN PLANNING" AND "URBAN HERITAGE"	24	24
	"HUMAN BEHAVIOUR"	"URBAN PLANNING" AND "HUMAN BEHAVIOUR"	94746	365
	"WATERFRONT"	"URBAN PLANNING" AND "WATERFRONT"	351	2
	"AGENT BASED MODELING"	"URBAN PLANNING" AND "AGENT BASED MODELING"	229	35
"URBAN DESIGN"	"INTERDISCIPLINARY APPROACH"	"URBAN DESIGN" AND "INTERDISCIPLINARY APPROACH"	312	3
	"URBAN HERITAGE"	"URBAN DESIGN" AND "URBAN HERITAGE"	562	5
	"HUMAN BEHAVIOUR"	"URBAN DESIGN" AND "HUMAN BEHAVIOUR"	195	0
	"WATERFRONT"	"URBAN DESIGN" AND "WATERFRONT"	16935	104
	"AGENT BASED MODELING"	"URBAN DESIGN" AND "AGENT BASED MODELING"	103	0
"URBANIZATION"	"INTERDISCIPLINARY APPROACH"	"URBANIZATION" AND "INTERDISCIPLINARY APPROACH"	77	9
	"URBAN HERITAGE"	"URBANIZATION" AND "URBAN HERITAGE"	101	0
	"HUMAN BEHAVIOUR"	"URBANIZATION" AND "HUMAN BEHAVIOUR"	218	8
	"WATERFRONT"	"URBANIZATION" AND "WATERFRONT"	38	0
	"AGENT BASED MODELING"	"URBANIZATION" AND "AGENT BASED MODELING"	16935	439

**Figure 3.** Combination of Keywords from the query on Scopus (Source: Created by the Authors.)

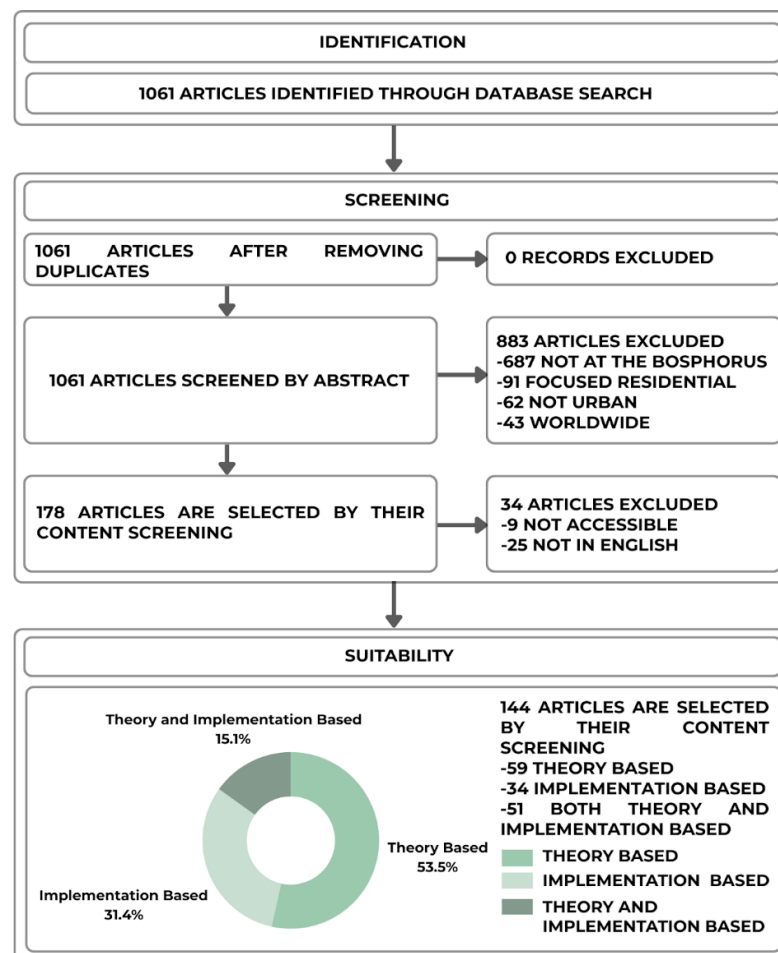
**2.2.1. Eligibility Criteria:** The Scopus database search for the keyword “urban morphology” produced a wide array of results across different urban contexts. To ensure conceptual consistency and thematic relevance, the eligibility criteria were directly aligned with the overarching research aim. This aim investigates how interactions among interdisciplinary spatial parameters support morphological continuity and urban resilience in coastal cities, focusing particularly on the Bosphorus in Istanbul from both theoretical and practical perspectives. Therefore, the primary filter for article inclusion was whether a given study meaningfully contributed to answering the main research question and the following questions:

- What are the positive and negative effects of urban transformation on morphological development along coastal urban public spaces at the Bosphorus?



- Which interdisciplinary parameters are emphasized in the literature as critical for inclusive and context-sensitive coastal development?
- How do water-spatial relationships shape the historical continuity and spatial identity of the contemporary Bosphorus coast?
- What is the role of participatory dynamics in sustaining urban form and morphological processes in historically layered coastal urban spaces?
- How does the interplay between water, space, and human behavior contribute to maintaining morphological resilience and urban form resilience at coastal public spaces?
- How is rapid urban transformation represented and documented in interdisciplinary literature concerning historically layered coastal environments along the Bosphorus in Istanbul?
- How can urban palimpsest and juxtaposition concepts contribute to enhancing coastal morphology in heritage-rich environments?
- What lessons can be drawn from comparative analyses of theory and practice regarding palimpsest and juxtaposition concepts for future coastal development in Istanbul?

Each article was evaluated based on its capacity to respond to one or more of these conceptual questions, ensuring that inclusion was not arbitrary but grounded in the research's theoretical framework.



**Figure 4.** Study Selection and Suitability Diagram. (Source: Created by the Authors.)

**2.2.2. Study Selection:** At the time of writing, a search query on Scopus for “urban morphology” keyword yielded more than 5.000 articles. In order to refine this large dataset and to define a

consistent conceptual domain, a multi-tiered keyword selection strategy was developed. First, a core disciplinary group of keywords was identified based on frequency and relevance: “urban morphology,” “urban form,” “urban planning,” “urban design,” and “urbanization.” These terms reflect the most prominent foundational concerns in the field and structured the first level of screening, as shown in Figure 3. Secondly, a thematic keyword group was constructed in alignment with the research’s interdisciplinary and contextual focus. This included terms such as “interdisciplinary approach,” “urban heritage,” “human behavior,” “waterfront,” and “agent-based modelling.” These keywords were selected not just for their frequency in Scopus but for their ability to represent the theoretical lens of the study, particularly the intersection of spatial form, heritage continuity, and behavioral dynamics in water cities. Lastly, a contextual filter was applied using location-specific keywords “Istanbul” and “the Bosphorus” to ensure geographical precision. These terms narrow the domain and locate the study specifically within the urban morphology of Istanbul’s coastal environment.

A structured, conceptually informed filtering methodology was applied to ensure that the literature corpus aligned with the study’s theoretical and comparative goals. Figure 4 illustrates the study identification and selection diagram. As shown in the figure, from an initial dataset of 1,182 articles, 1,061 remained after duplicate removal. During title and abstract screening, 687 articles were excluded for not focusing on the Bosphorus, 91 for addressing non-coastal or residential spaces, 62 for lacking urban relevance, and 43 for discussing urban issues on a global scale without contextual focus. This left 178 articles, of which 34 were removed due to language or accessibility issues. The final sample included 144 articles, categorized as follows: 34 implementation-based, focusing on case studies and applications; 59 theory-based, addressing morphological development; and 51 mixed-approach, integrating theoretical and practical insights. This multi-stage process ensured a relevant, focused, and methodologically well-grounded foundation for the research.

## 2.4 Procedures and Protocols

This study followed a systematic literature review procedure beginning with the selection of keywords based on urban morphology theory and interdisciplinary spatial dynamics. Searches were conducted in the Scopus database for peer-reviewed articles from 2000 to 2025, using combined keywords related to core concepts, thematic areas, and geographic focus on Istanbul’s Bosphorus. Abstracts were screened against eligibility criteria aligned with the research questions. Full texts of relevant articles were then reviewed and data systematically extracted using a standardized form. Articles were classified by conceptual framework (urban palimpsest vs. urban juxtaposition), type (theory, implementation, mixed), and their focus on positive or negative impacts on morphological resilience. Qualitative content analysis was applied to identify key interdisciplinary themes, with iterative coding ensuring consistency. Finally, comparative synthesis juxtaposed theoretical and practical insights to support effective conclusions on urban morphological resilience in coastal environments.

## 2.5 Data Analysis

The study employs a qualitative content analysis approach to map the positive and negative aspects of urban transformation on morphological resilience as reported in the selected literature. Table 1 illustrates the analysis that was conducted in four sequential stages. These analyses focus on capturing both positive and negative dimensions of urban change within Istanbul’s Bosphorus historical and coastal context. To achieve this, data extraction targeted key ideals, objectives, and visions articulated across theory-based and implementation-based studies. The analytical process was carefully structured



into four sequential stages: conceptual categorization, thematic coding, evaluation of positive and negative effects, and comparative synthesis to ensure a rigorous, multi-dimensional understanding of the literature. This approach allows for a refined exploration of how different scholarly traditions and empirical cases address the complex interplay between geographic identity of water-scapes, spatial urban form, and behavioral dynamics.

Analysis Layer	Description	Key Actions	Purpose/Outcome
<b>Conceptual Categorization</b>	Grouping articles by core frameworks and mode of inquiry	Classify articles as urban palimpsest or urban juxtaposition. Tag as theory-based, implementation-based, or mixed-approach.	Enables matrix comparisons within and across conceptual and methodological categories
<b>Thematic Coding</b>	Identification of interdisciplinary spatial themes	Apply deductive codes (from established frameworks, e.g., Moudon, Oliveira, Kropf) - Identify inductive themes emerging from the literature	Extracts key spatial parameters such as planning policy, human behavior, water-space interaction, heritage continuity, etc.
<b>Positive/Negative Effects</b>	Evaluation of articles based on framing of urban transformation outcomes	Classify articles as presenting positive or negative impacts of urban transformation	Traces academic framing and practical consequences of urban change on Bosphorus waterfront
<b>Comparative Synthesis</b>	Comparative analysis integrating all previous layers	Use comparative tables and visual maps to analyze interplay between theory and practice	Generates rich, context-sensitive insights into urban morphological knowledge and real-world applications

**Table 1.** Data Analysis Stages and Structure (Source: Created by the Authors.)

*2.4.1. Conceptual Categorization:* The 144 selected articles were first grouped into two main conceptual frameworks: urban palimpsest and urban juxtaposition, as shown in Table 2. Each article was then classified as theory-based, implementation-based, or mixed-approach, depending on its focus. This dual classification created a matrix-like structure that allowed systematic comparisons of articles within and across these frameworks, ensuring a clear organization of diverse scholarly perspectives.

	Theory-Based	Implementation-Based	Mixed-Approach	Total
<b>Urban Palimpsest</b>	Articles focusing on theoretical models and frameworks related to urban palimpsest concepts.	Articles presenting case studies or practical applications of urban palimpsest.	Articles combining theory and practice on urban palimpsest.	58 of Palimpsest Articles
<b>Urban Juxtaposition</b>	Articles focusing on theoretical models and frameworks related to urban juxtaposition concepts.	Articles presenting case studies or practical applications of urban juxtaposition.	Articles combining theory and practice on urban juxtaposition.	68 of Juxtaposition Articles

<b>Present or Future Concept</b>	Articles focusing on theoretical models and frameworks with present or futuristic perspective	Articles presenting case studies or practical applications of present or futuristic perspective	Articles combining theory and practice on present or futuristic perspective	18 of Present or Future Concept Articles
<b>Total</b>	59 theory-based articles	34 implementation-based articles	51 mixed-approach articles	<b>144 Articles Total</b>

**Table 2.** The Structure of Conceptual Categorization (Source: Created by the Authors.).

*2.4.2. Thematic Coding:* Thematic coding identified key interdisciplinary themes such as heritage conservation, human behavior, water-space interaction, and scenario simulation. Codes were developed both from existing theories (Moudon, Oliveira, Kropf) and new insights emerging from the articles, as shown in Table 3. This process helped to reveal how these themes influence urban resilience and morphological continuity in Istanbul's coastal context.

<b>Thematic Coding Stage</b>	<b>Description</b>	<b>Examples of Codes / Themes</b>	<b>Purpose / Outcome</b>
<b>Deductive Coding</b>	Applying pre-established codes based on existing theories	heritage conservation, Human behavior, Water-space interaction, Heritage continuity (Moudon, Oliveira, Kropf)	To anchor analysis in established theoretical frameworks
<b>Inductive Coding</b>	Identifying new themes emerging from the literature	New or context-specific insights related to Istanbul's coastal urban challenges such as the need for scenario simulations in design	To capture novel and context-sensitive factors affecting urban resilience
<b>Thematic Analysis</b>	Analyzing how codes relate to urban morphological resilience	Influence of planning, social behavior, water interaction, and heritage on morphological continuity	To understand interdisciplinary impacts on resilience and coastal urban morphology

**Table 3.** The Structure of Thematic Coding (Source: Created by the Authors.)

*2.4.3. Positive and Negative Effects:* Table 4 illustrates the evaluation of the articles for their portrayal of urban transformation as either positive or negative. Positive articles underlined the benefits, such as improved water-land connectivity and heritage preservation through transformation, while negative ones pointed out issues including morphological damage or ineffective policies. This classification helped assess differing views on the impact of urban change.

<b>Evaluation Stage</b>	<b>Description</b>	<b>Examples of Positive Effects</b>	<b>Examples of Negative Effects</b>	<b>Purpose / Outcome</b>
<b>Positive Effects</b>	Articles emphasizing beneficial outcomes of urban transformation	Improved water-land connectivity Heritage preservation	—	To emphasize constructive impacts on urban resilience

<b>Negative Effects</b>	Articles emphasizing adverse outcomes or challenges	—	Morphological damage Ineffective planning policies	To reveal risks and limitations in urban transformation
<b>Overall Classification</b>	Binary categorization of articles based on impact framing	—	—	To assess divergent academic and practical views on urban change

**Table 4.** The Structure of Positive and Negative Effects Classification (Source: Created by the Authors.)

*2.4.4. Comparative Synthesis:* Finally, a comparative synthesis combined all findings using tables and visual maps. This analysis showed how theory and practice intersect and diverge within the conceptual frameworks, and how positive and negative perspectives are distributed, as in Table 5. The process provided comprehensive, context-sensitive insights into Istanbul’s coastal urban resilience and informed future development strategies.

Synthesis Stage	Description	Methods Used	Purpose / Outcome
<b>Integration of Findings</b>	Combine results from conceptual categorization, thematic coding, and positive/negative evaluations	Use of comparative tables and visual maps	To reveal intersections and divergences between theory and practice
<b>Analysis of Perspectives</b>	Examine distribution of positive and negative views across frameworks	Comparative analysis within and across categories	To understand how different perspectives shape urban resilience
<b>Contextual Insights</b>	Generate refined understanding of Istanbul’s coastal urban resilience	Synthesis of multi-layered qualitative data	To inform culturally sensitive and spatially relevant development strategies

**Table 5.** The Structure of Comparative Synthesis (Source: Created by the Authors.)

The four-stage qualitative analysis provides an effective framework for integrating and interpreting the rich body of literature on urban morphological resilience in the Bosphorus region. Through conceptual categorization, thematic coding, and evaluative framing of positive and negative impacts, the study delineated distinct yet interconnected dimensions of urban transformation. The final comparative synthesis revealed critical intersections and divergences between theoretical and practical approaches, offering context-sensitive insights that advance both academic discourse and urban development practice. This comprehensive analysis not only clarifies the multifaceted nature of resilience in coastal urban settings but also lays the groundwork for informed, culturally grounded strategies aimed at sustaining Istanbul’s unique morphological heritage amid rapid change.

### 3. Literature Review

The literature review aims to simplify and generalize complex real-world urban phenomena by analyzing selected academic articles through the conceptual lenses of urban palimpsest and urban juxtaposition. This conceptualization provides a theoretical basis for the subsequent stages of the research. The review spans a range of subject areas, including the morphology of water cities, with a focus on palimpsest heritage and spatial juxtapositions, participatory integration theory, which

addresses stakeholder involvement in spatial processes, and identical placemaking theory, which explores the resilience of urban form and its continuity within urban morphology.

*3.1. Morphology of Water Cities; Urban Palimpsest and Juxtaposition, Figure-Ground Theory:* Water is an important element defining the character and the destiny of a city. As Čakarić indicates, morphology (Greek *morphé*: shape) of urban space, as a field of scientific discourse on built space depending on the presence of water, endeavours to explain the nature of the "form" of a city (2010). The form of water cities is gently figured while the water body itself becomes the natural background. Trancik broadens figure-ground theory to include the relationship between built masses (figure) and open voids (water ground), and the patterns formed by these relationships (1986). The formation of water cities, consequently, is determined by the linear or non-linear presence of water ground (Čakarić, 2010), as well as the city's figure of relations, lifestyle, and socio-cultural, economic, physical, and environmental background.

A multitude of the aforementioned interdisciplinary correlations affect coastal urban environments, which consist of various layers viewed from different perspectives. The first is the physical layer, as Bell and Dourish state, in which one can find buildings and complex topological relations between water and the city (2007). The second is the historical layer through which the physical settlement reflects the traces of historical evolution, and the third is the layer that contains many forms (religious, individual, social) of cultural experience (Bell & Dourish, 2007). The overlapping of these layers, while offering spatial configurations, generates an urban form with a holistic background that presents a scene above the water, integral to the process of urban morphology. Thereby, the concept of urban palimpsest describes how cities accumulate historical layers over time, where older spatial and geographical formations persist beneath new urban fabrics (Tan & Nguyen, 2024). By contrast, urban juxtaposition refers to the simultaneous presence of different socio-cultural and functional elements within city spaces, producing dynamic contrasts and interactions (Cozens, Love, & Davern, 2019). As Erkan and Akin state, urban fabric emerges as a result of the interaction of many elements, creating a multi-factorial, highly complex structure/system (2015).

*3.2 Human Factor, Space Configuration and Linkage Theory:* Individuality, therefore, society is another important parameter underlying the aforementioned interrelations of a city. The human factor represents the release of the vital energy from the buildings into the urban atmosphere. This energy circulates through outdoor spaces, gradually fading at its destination while creating linkages through movement, leaving traces for future generations in the urban environment. Spatial configurations, therefore, arise from behavioral dynamics, facilitated by the linkage between circulation systems and the arrangement of spatial elements. As Fumihiko Maki put it, 'linkage becomes simply the glue of the city' (1964). According to Trancik, linkage theory concerns establishing a system of connections between urban spaces (1986). It elevates movement and infrastructure over the abstract spatial definition of figure-ground theory.

Spatial formations shaped by water bodies, on the other hand, present distinct characteristics beyond all other parameters mentioned above. Water has a stimulating effect on human behaviour, awakening a fundamental instinct to move closer to water and engage with it. Even further, accessibility to water has been a symbolic or vital requirement (Langie, Rybak-Niedziółka, & Hubáčiková, 2022) making water is a focal point for people and cities throughout history by creating its own individuals and society.

*"Bosphorus Civilization", Permeable and Impermeable Configurations at the Bosphorus*

The term "Bosphorus Civilization" refers to a community shaped by the Bosphorus of Istanbul. According to Ilik Saltık (2025), the formation of the "Bosphorus Civilization" was primarily influenced by the community's settlement along the shores of the

Bosphorus. The natural existence of the Bosphorus turns into a defining element of the city's society and activities. As Hisar (2009) mentions, the coastline separates land and water into two spaces that can be defined as private and public along the Bosphorus. Although the shoreline clearly divides public and private spaces into two impermeable zones, the water gently seeps into the boathouses beneath the Bosphorus mansions, creating a certain degree of permeability. Oktay also notes that the physical presence and echoing sound of rippling water penetrate the interior of the mansion (2023). In other words, elements of the public space, such as the echoing sound of rippling water, intersect with private spaces, such as the mansions themselves. Thus, even if they do not physically participate in moonlight boating activities, the residents of the mansions inevitably take part in Bosphorus life simply by opening their windows and letting in the sounds and moonlight (Hisar, 1942). Thus, spatial divisions permeate each other. The relationship between the Bosphorus, as public spaces, and the mansions, as private spaces, appeals to all five senses (Ilik Saltık, 2025). Impermeable public and private spaces that were rigidly separated and inaccessible begin to transform, becoming more permeable and interconnected. This shift challenges the fixed shoreline boundaries and disrupts the formerly divided spatial configurations.

As Oktay (2023) notes, the variability in behavioral dynamics suggests a momentary softening and permeability of the otherwise solid boundaries along the Bosphorus waterfront. It can be concluded that there is a non-negligible interaction between the permeability of water boundaries and the variability of behavioral dynamics.

*3.3. Identity, Interdisciplinary Background of Urban Space and Place Theory:* Moreover, the “Bosphorus Civilization” also represents to a place-making experience that needs to be considered in depth under its identical and interdisciplinary background with a holistic perspective. According to Erkan and Akın (2015), the unique identity value and the diversity of natural structures are key variables shaping physical space within the context of settlement culture. That is, the term “space” represents the physical container of the societies, their movement, background, habits, culture, activities and objects, whereas the term “place” represents a particular portion of space that meets the physiological and psychological needs of people while evoking meaningful and memorable messages of a specific culture, climate, and geography (Al-Kodmany, 2013). Place theory addresses user needs alongside the social, historical, cultural, physical, natural, and other interdisciplinary contexts of a location. Thus, space is considered to be ‘a place’ only when it carries contextual meaning, derived from cultural and regional circumstances of a location (Trancik, 1986). Likewise, the “Bosphorus Civilization” is not merely a community settles along the shores of the Bosphorus but an overlay of interdisciplinary contexts that have accumulated over thousands of years, forming its unique identity and authenticity.

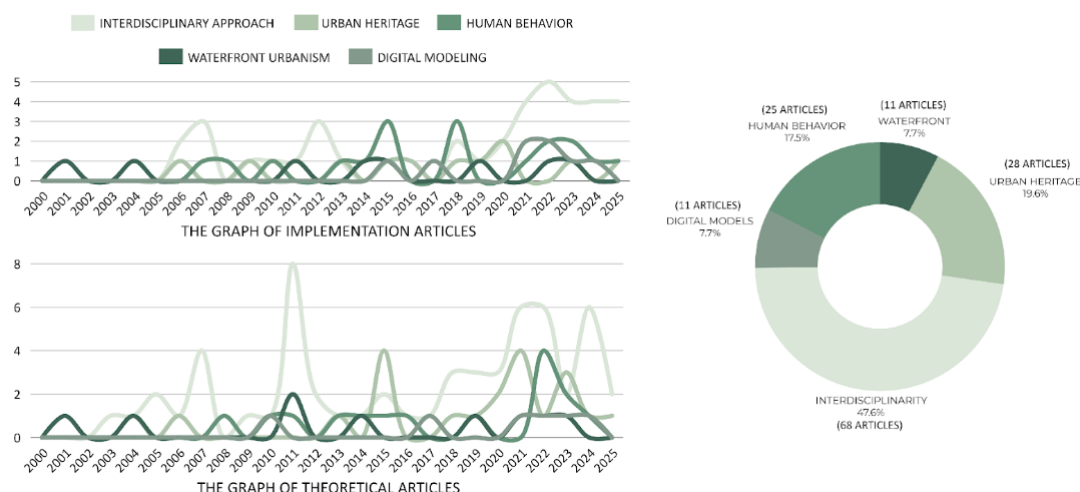
## 4. Results

### 4.1 Presentation of Key Findings

The study's findings emphasize a contextual interpretation grounded in the preceding theoretical investigation. It covers context sensitivity, intersection sets, and conceptual categorization. Primarily, the context sensitivity of 144 selected articles on interdisciplinary parameters is investigated. These articles, varying in their levels of interdisciplinary integration in urban development research, are classified as either theoretical or implementation-based, with their distribution visualized in green tones in Figures 5 and 6. The figure illustrates how these articles cluster according to their interdisciplinary depth, revealing a balanced yet detailed distribution. This visual distinction supports the study's argument regarding the significance of conceptual categorization in framing contextual interpretation. The varying green tones further emphasize the degree of integration, aiding comparative analysis across article types.

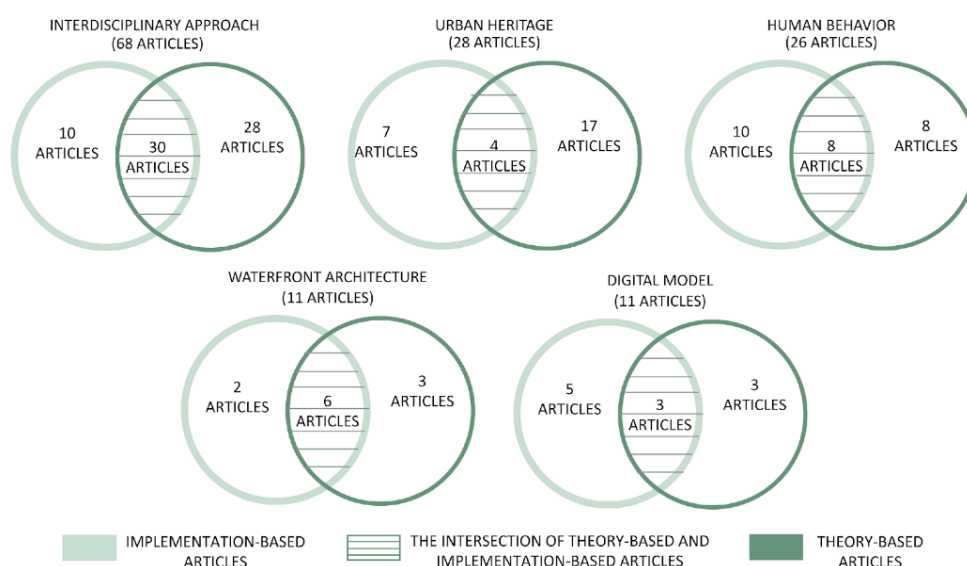
The articles are categorized by year under five dominant abstraction keywords: “interdisciplinary approach,” “urban heritage,” “human behavior,” “waterfront urbanism,” and “digital modelling.” Figure 5 reveals a progressive increase in the proportion of articles associated with an interdisciplinary

approach, especially after 2015, paralleled by a notable rise in the other thematic keywords. This correlation indicates an expanding recognition of the necessity to address urban development through interconnected social, spatial, cultural, economic, environmental, and historical dimensions. The figure also shows a steady growth in implementation-focused studies over time, suggesting a shift from abstract theorization toward applied interdisciplinary strategies in urban morphology. This convergence of theory and practice underlines a broader academic transition toward resilience-based approaches in the preservation and transformation of urban form. This trend underlines the evolving role of interdisciplinary methods as both analytical tools and practical frameworks in shaping resilient urban futures. It also reflects a growing academic consensus on the importance of bridging theory and implementation to address the complexities of contemporary urban transformation.



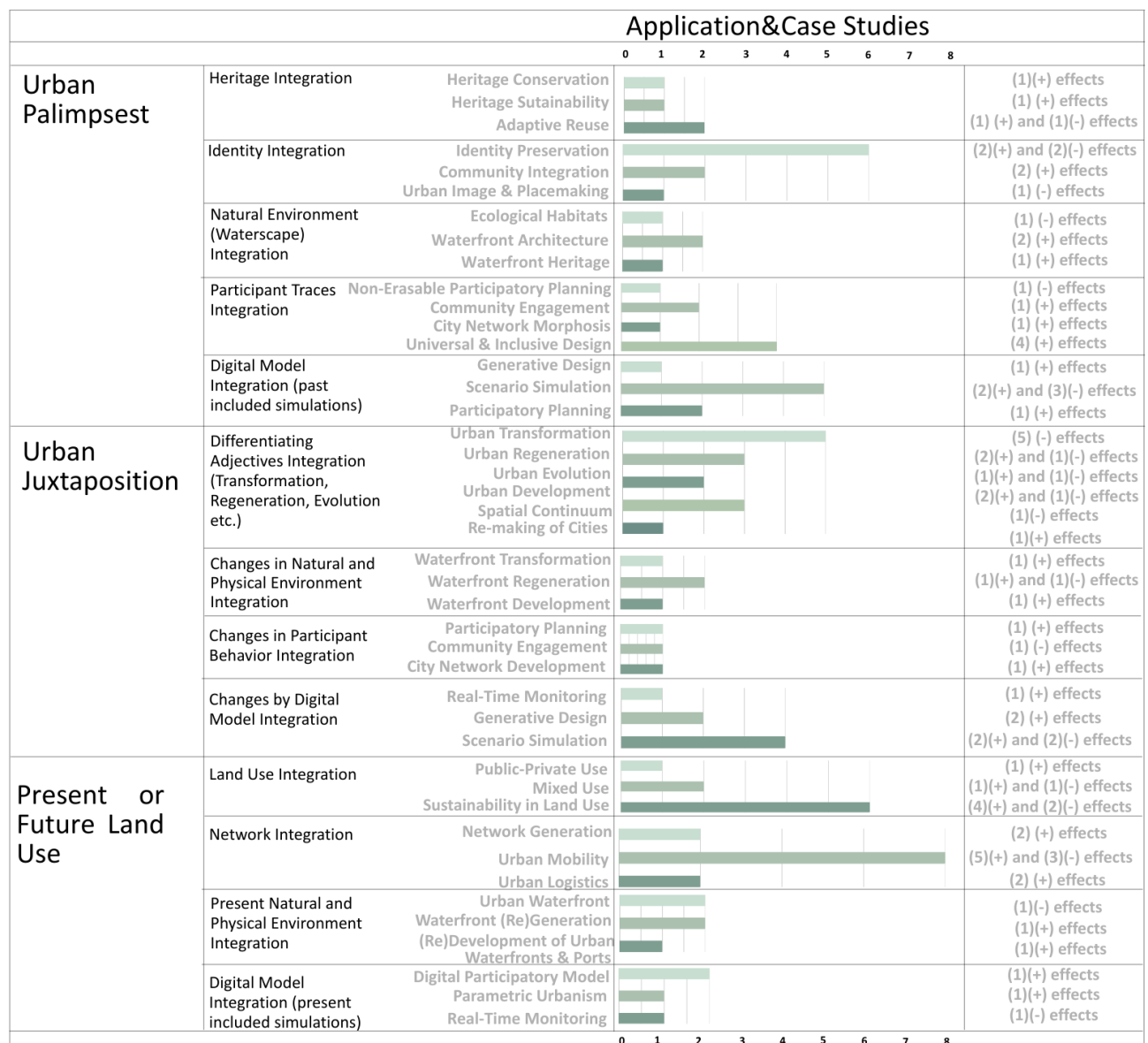
**Figure 5.** The Context Sensitivity by of 144 Selected Articles on Interdisciplinary Parameters Through Years between 2000 and 2025 (Source: Created by the Authors.)

The intersection sets shown in Figure 6 illustrate the distribution of theory-based, implementation-based, and intersection articles among the 144 selected studies: 59 are theory-based, 34 are implementation-based, and 51 represent an overlap of both. The “interdisciplinary approach” keyword dominates the dataset, while the majority of the remaining keywords, such as “urban heritage,” “human behavior,” “waterfront urbanism,” and “digital modelling”, are concentrated within the intersection set. This indicates that conceptually rich and methodologically integrative studies often emerge at the nexus of theory and practice. The prominence of this intersection supports a contextual analysis that draws from both theoretical and applied perspectives, leading to the evaluation of 110 theoretical and 85 implementation-based articles under three core conceptual categories.



**Figure 6.** The Intersection Sets Showing the Numerical Distribution of Articles (Source: Created by the Authors.)

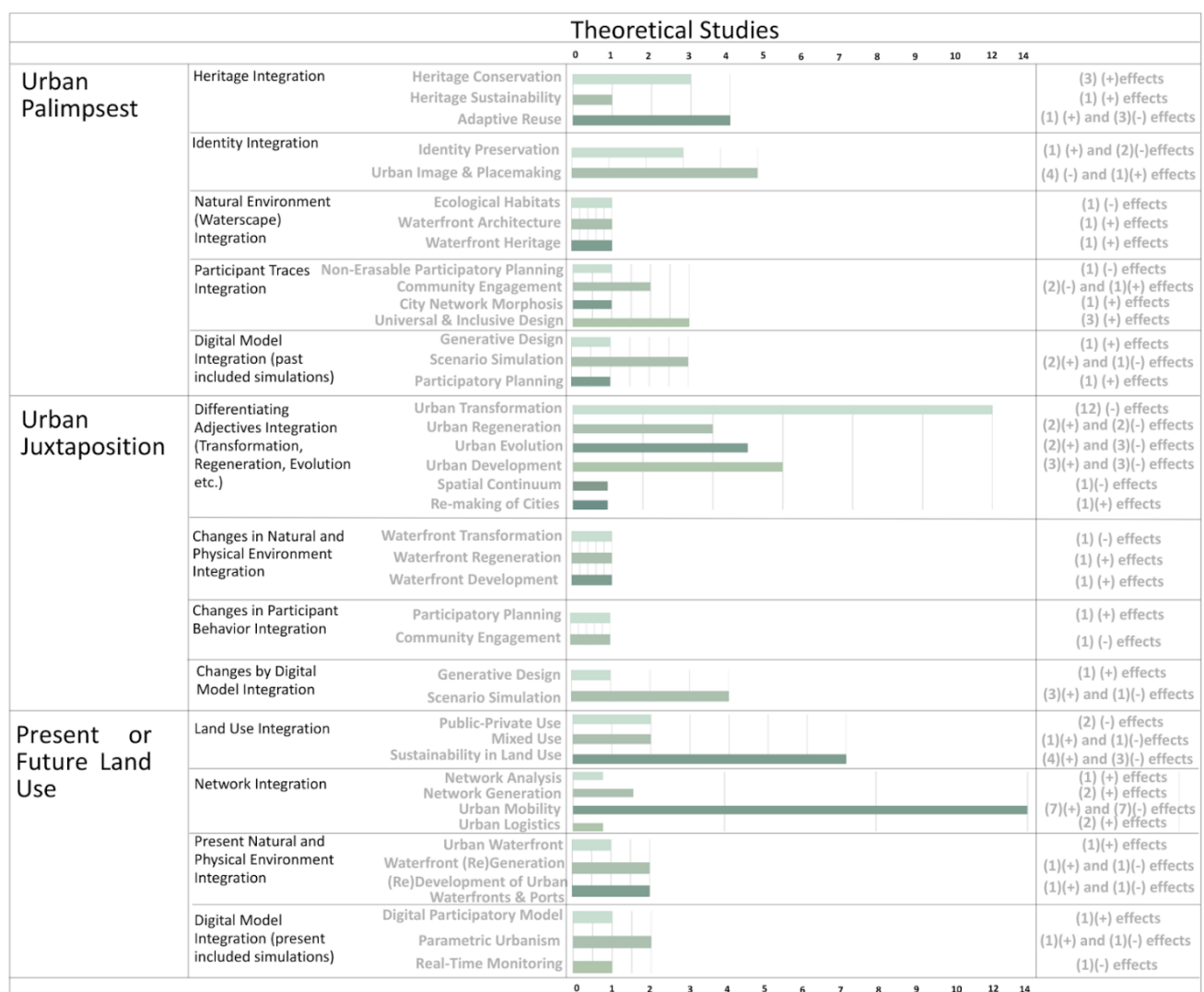
The conceptual categorization of both theory-based and implementation-based articles is structured through sub-classifications derived from theoretical abstraction. This framework is built around three overarching concepts, each further detailed through keyword-driven subclassifications, as illustrated in Figures 7 and 8. The first category, urban palimpsest, focuses on the analysis of heritage imagery and the enduring identity elements of the city. Articles within this group are examined under heritage integration, identity integration, natural environment (waterscape) integration, participant traces integration, and digital model integration. The second category, urban juxtaposition, addresses the identification of differentiating urban sub-parts and includes subclassifications such as differentiating adjectives integration (e.g., transformation, regeneration, evolution), physical structure change integration, participant behavior change integration, and digital model integration. The third category, present or futuristic land use, encompasses theoretical and practical perspectives on spatial organization, with subclassifications including land use integration, network integration, existing physical environment integration, and digital model integration. This categorization provides a structured approach for understanding the alignment of studies with both theoretical constructs and implementation strategies. This section is not a foundational concept originally adopted by the study. Rather, it emerged from the analysis of the selected articles, in which the themes related to the present and future were particularly prominent, emphasizing the current and potential effects of urban palimpsest and juxtaposition concepts on everyday life today and in the future.



**Figure 7.** The Contextual Interpretation of Articles under Application and Case Studies. (Source: Created by the Authors.)



Articles were analyzed through their keywords, abstracts, and content to match them with the most relevant subcategories under the three main categories as shown in Figures 7 and 8. For example, the article titled “Cultural Heritage in the Urban Planning Studies of Historical Peninsula in Istanbul between 1930 and 1950” includes the following keywords as “Istanbul”, “historical peninsula”, “urban planning”, “cultural heritage”, “protection”, and “conservation”. Accordingly, the article is categorized under ‘application and case studies’ within the ‘urban palimpsest’ concept and placed in the ‘heritage conservation’ subclass, as it critiques the period’s planning approaches for overlooking the Historical Peninsula’s wider cultural context and highlights the adverse effects of urban transformation. As reflected in the figures, “urban palimpsest” appears as the most suitable concept across both theory and practice. Theoretical articles mainly focus on analytical layers like palimpsest layering and morphological continuity, while application-based studies demonstrate practical themes such as spatial interventions and community engagement. This distribution emphasizes how conceptual depth and applies relevance shape the interdisciplinary discourse on urban form.



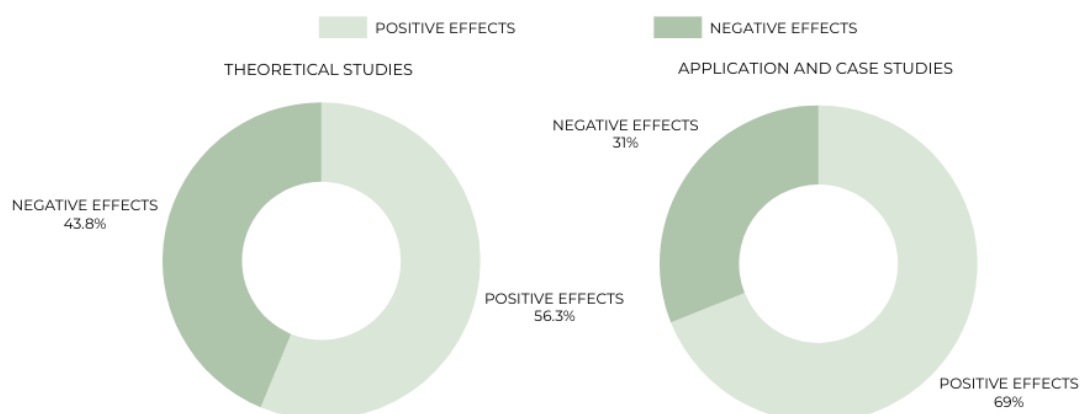
**Figure 8.** The Contextual Interpretation of Articles under Theoretical Studies. (Source: Created by the Authors.)

## 4.2 Statistical Analysis

Comparative synthesis covers the evaluation of selected articles for their content regarding positive or negative impacts of urban transformation on morphological continuity, focusing on the concepts of urban palimpsest and urban juxtaposition. The syntheses also draw attention to future coastal urban development along the Bosphorus. By comparing theoretical and applied studies related to Istanbul, the synthesis identifies both transferable strategies and context-specific limitations. This dual reading reveals how certain frameworks effectively adapt to Istanbul’s layered spatial dynamics, while others

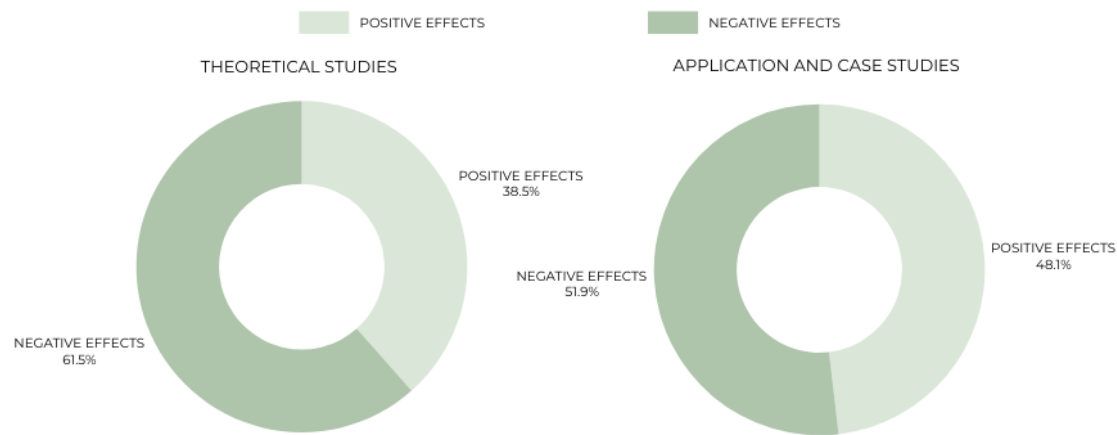
fall short when confronted with cultural or morphological complexities. The resulting synthesis supports the development of contextually grounded and spatially resilient urban models, aligning with the study's broader aim of reimagining the Bosphorus as a connective, historically embedded, and water-sensitive urban corridor.

The urban palimpsest concept is particularly instrumental in interpreting how successive spatial layers shape a continuous urban identity along Istanbul's Bosphorus. The shoreline acts as a living archive where Byzantine harbors, Ottoman yalis, republican infrastructure, and contemporary interventions overlap and interact. Articles were categorized based on whether they addressed the continuity or disruption of heritage during urban development. As shown in Figure 9, 56.3% of theoretical articles show positive effects of palimpsest thinking on heritage continuity, while 43.8% illustrate negative outcomes, often linked to unregulated urban growth and the erasure of historical traces. In contrast, 69% of implementation-focused studies report successful applications of the palimpsest approach, suggesting practical potential for integrating historical layers into planning decisions, while 31% reflect shortcomings or unresolved tensions. This distribution reveals a meaningful divergence: theoretical studies tend to critically engage with historical discontinuities, while applied research more often documents efforts to reconcile past and present in urban form. Thus, Figure 9 reflects not just frequency, but a shift in disciplinary orientation, from critique to action, emphasizing the growing potential and positive effects of palimpsest-informed strategies in shaping resilient coastal urbanism.



**Figure 9.** The Percentage of Positive and Negative Effects of Urban Transformation by the Theoretical and Application Studies under Urban Palimpsest Concept on Urban Resilience (Source: Created by the Authors.)

“Stamboul,” Le Corbusier writes in *The City of Tomorrow and its Planning*, “... a charming partnership between man and nature” (1929). In his 1924 book *Urbanisme*, he proposes a process of morphological reform based on a structured composition of principles of order that define a renewed and modern society. However, today Istanbul has neither truly protected the charming partnership between man and nature nor achieved the urban development around the ideas of modern morphological reforms. The coastline of Istanbul, like many others, is often perceived as beyond criticism, a line that embodies both the crises of urbanization and the critiques of spatial production (Erkılıç, 2019). Coastal urban spaces, as the object, needs to be rescued from being merely the subject of criticism in order to preserve the morphological resilience of heritage cities. The root causes of coastal urbanization crises are therefore multi-layered and complex. According to Al-Hankawi et al. (2024), the literature discusses the multi-layered impact of juxtaposition as a coastal urban development strategy. This influence spans across the urban fabric, infrastructure, user profile, landscape, and water bodies, as well as physical, economic, social, and environmental dimensions. These studies, often comparative across periods, aim to improve these dimensions holistically.



**Figure 10.** The Percentage of Positive and Negative Effects of Urban Transformation by the Theoretical and Application Studies under Urban Juxtaposition Concept on Urban Resilience (Source: Created by the Authors.)

The urban juxtaposition concept addresses the coexistence of contrasting architectural forms and spatial elements that reflect evolving historical and contemporary urban needs. Theoretically, juxtaposition should create a productive dialogue between past and present; however, in practice, many transformation and regeneration projects have instead produced spatial ruptures. The criteria used to classify juxtaposition articles as positive or negative often focus on whether it eliminates massive forms of urbanization, rather than fostering a creative tension between old and new. In doing so, juxtaposition may become a tool of architectural and cultural amnesia. As shown in Figure 10, 61.5% of theoretical studies view juxtaposition negatively, citing the dominance of destructive urbanization patterns that fragment historical continuity. Only 38.5% of theoretical works interpret juxtaposition positively, typically in more controlled or culturally sensitive contexts. In implementation studies, the results are more balanced; 48.1% show positive outcomes and 51.9% negative, suggesting that the concept's practical application remains highly contested. These figures indicate a discrepancy between the theoretical ideal of juxtaposition as an integrative strategy and its uneven execution on the ground. Rather than strengthening layered complexity, many real-world applications, especially under neoliberal development pressures, reveal a pattern of historical erasure masked as modernization. This critical insight from Figure 10 suggests that the concept of juxtaposition, while theoretically promising, often fails to deliver resilient or culturally embedded outcomes in practice. The data underlines the importance of refining juxtaposition strategies to move beyond visual contrast toward deeper morphological integration that respects place identity and urban memory.

Although destruction is often masked as modernization, contextual interpretation still reveals results aligned with the destructive form of juxtaposition. Figures 11 and 12 demonstrate that rapid and large-scale urbanization of coastal areas significantly contributes to negative outcomes, affecting both development processes and the morphological resilience of these urban spaces in relation to each examined concept.

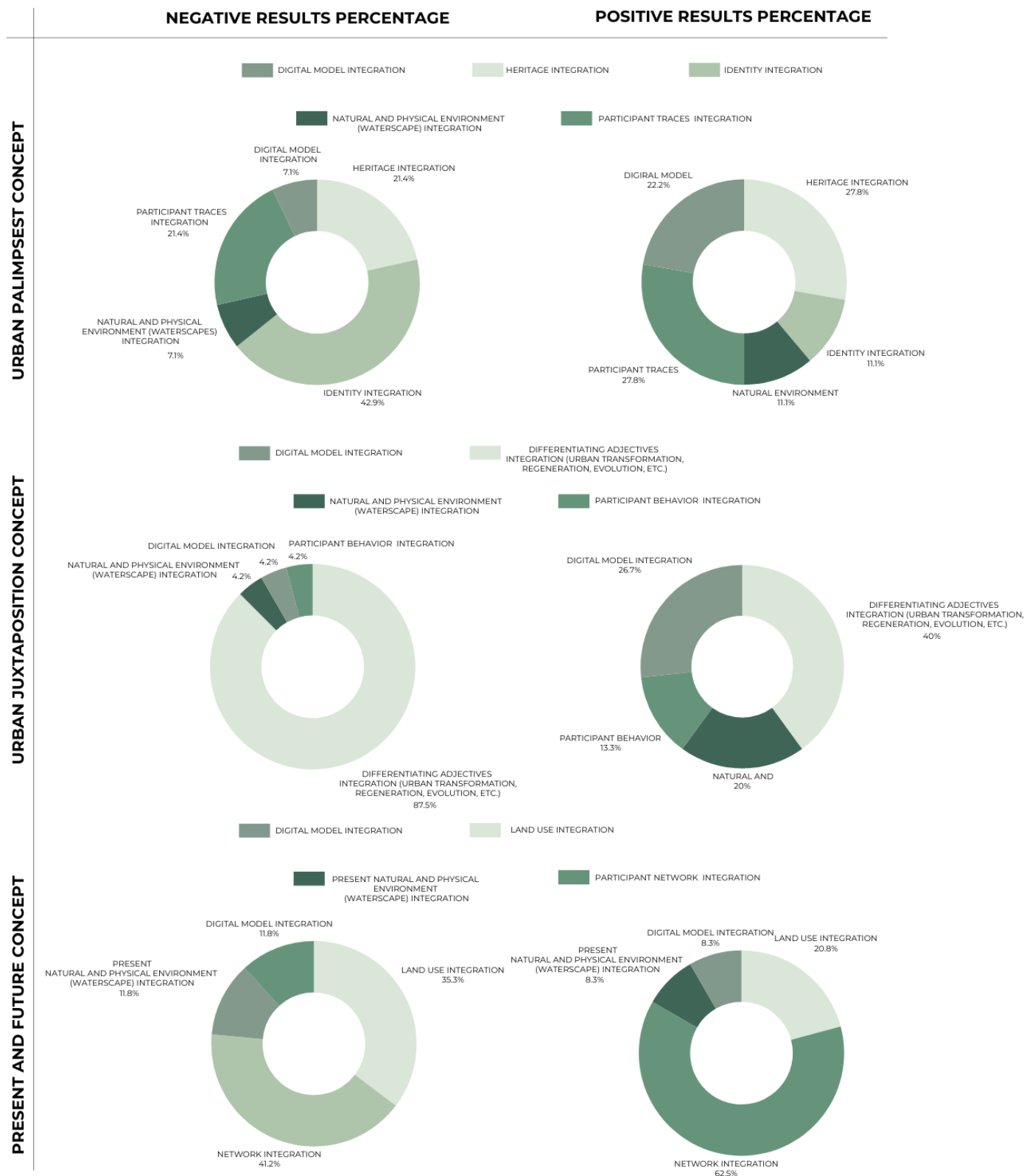
The comparative analysis of the urban palimpsest concept investigates how key themes are addressed across theoretical and applied articles. These themes include identity continuity, heritage layering, participant traces, natural and water-based environments, and digital modelling (see Figures 7, 8, 9, and 10). A striking pattern emerges around identity integration: 42.9% of theoretical articles coded as negative exhibit a breakdown in identity continuity, suggesting a widespread failure to embed historical and cultural layers within development discourse. This trend is similarly observed in application-based studies, where 33.3% of negative cases focus on identity-related disruption. These findings reflect a growing concern that coastal development along the Bosphorus often overlook site-specific identity in favor of generic modernization. Other negative themes in theoretical works include heritage discontinuity (21.5%), loss of participant traces (21.5%), underuse of digital models (7.1%) and limited integration of the natural environment (7%). On the positive side, theoretical studies show

the continuity of participant traces and heritage, both accounting for 27.8%, indicating a promising path forward for integrating local narratives and spatial memory into planning. These are followed by digital modelling (22.2%), natural environment (11.1%), and identity integration (11.1%). Similarly, case studies confirm the leading positive role of participant traces (30%) in practical applications, followed by digital and identity integration (both at 20%), showing where theory and practice align. Figures 11 and 12 underline a broader pattern: when urban palimpsest strategies actively involve communities and recognize layered memory, both theory and application point to more resilient outcomes. Conversely, when identity is neglected, cultural coherence erodes.

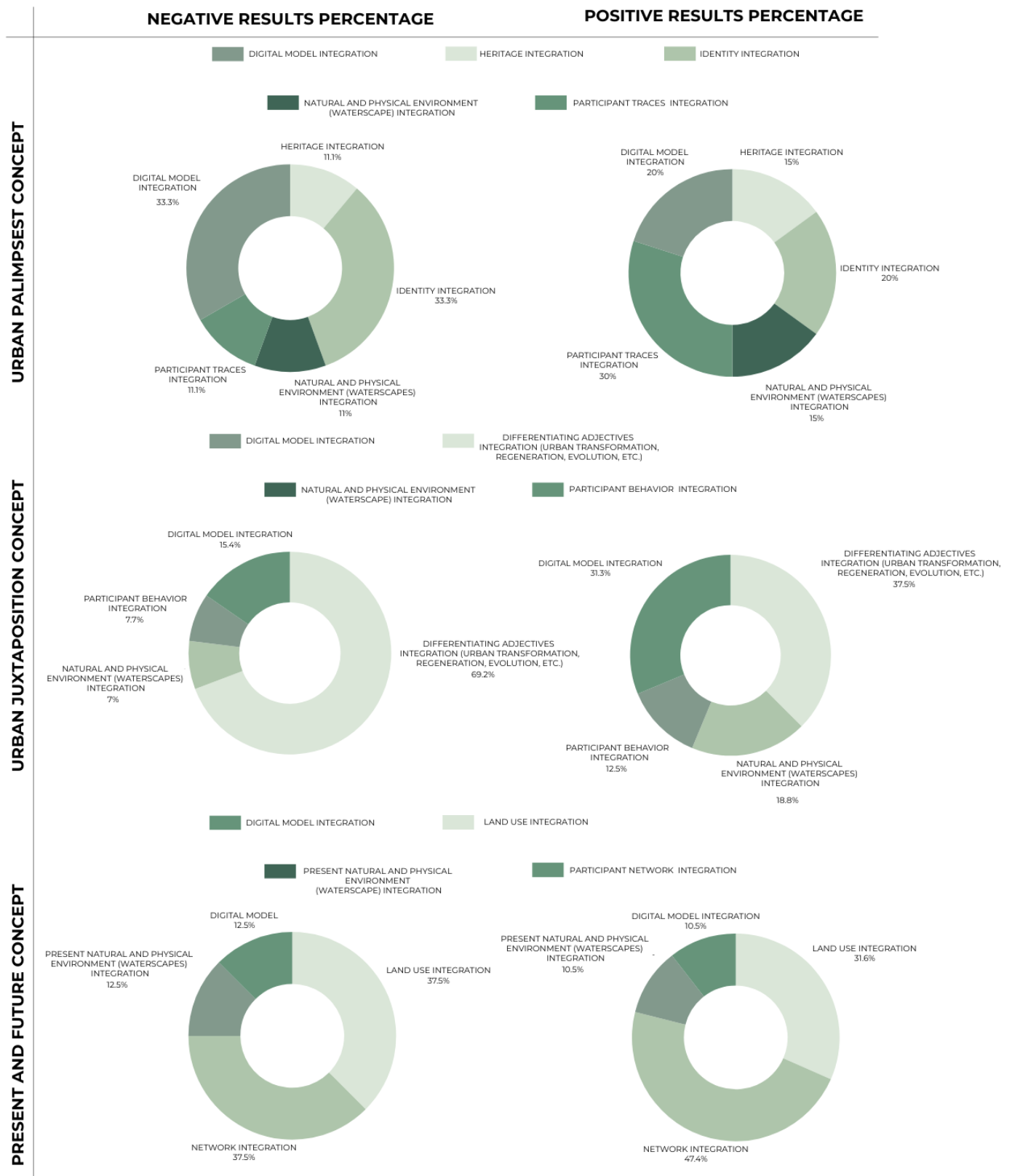
The comparative analysis of the urban juxtaposition concept reveals that, while the idea aims to strengthen creative tension between old and new, its implementation often results in spatial dissonance. This is particularly evident in an overwhelming 87.5% of theoretical and applied articles citing “differentiating adjectives”, such as regeneration, transformation, evolution, as indicators of negative impact, reflecting aggressive redevelopment tactics that compromise historical integrity. Such framing indicates that, in practice, juxtaposition is frequently reduced to a stylistic clash rather than a meaningful integration of historical and contemporary forms. Other minor negative patterns include the neglect of digital models, participant behavior, and natural-physical environment integration (each at 4.2%). On the positive side, the presence of digital modelling (26.7%), natural-physical context (20%), and participant behavior integration (13.3%) are associated with more sensitive interventions. Notably, 40% of positive articles also use transformation-related language, suggesting that not all such terms are inherently negative, context, scale, and intention matter. Figures 11 and 12 clarify this ambivalence, revealing that juxtaposition can either contribute to urban vibrancy or accelerate cultural loss depending on how it is framed and applied.

The comparative analysis of the present and future concepts emphasizes the critical role of network and land-use integration in shaping future-ready coastal environments. In theoretical studies, the dominant sources of negative assessment are insufficient network integration (41.2%) and weak land-use connectivity (35.3%), pointing to concerns about spatial fragmentation and the lack of coherent development logic. Digital modelling and waterscape integration follow at lower rates (11.8% each). In contrast, theoretical articles coded as positive show successful network integration (62.5%) and land-use cohesion (20.8%) as the structural backbone for a forward-looking urban form, which are supported by digital and environmental tools (8.3% each). A similar pattern is found in application studies: 47.4% demonstrate effective network integration and 31.6% show land-use strategies as key to resilient development, supported again by digital (10.5%) and natural-environmental (10.5%) inclusion. Articles emphasizing negative practice outcomes point to gaps in these same categories, especially poor network and land-use coordination (37.5% each). Figures 11 and 12 reveal that the present and future-oriented frameworks are most effective when infrastructure systems are planned in tandem with heritage and environmental contexts, suggesting a need for integrated, cross-scalar planning that links past, present, and future morphologies along the Bosphorus.

Overall, the comparative analyses of urban palimpsest, juxtaposition, and future-oriented frameworks reveal a shared tension between the preservation of cultural identity and the pressures of modernization. Across all three concepts, negative outcomes consistently stem from fragmented approaches, whether through neglecting identity continuity, reducing juxtaposition to stylistic contrasts, or failing to integrate networks and land use. Conversely, positive results emerge when strategies emphasize continuity, community participation, digital and environmental integration, and context-sensitive development. Together, these findings underscore the importance of holistic, layered, and inclusive planning approaches to ensure culturally resilient and future-ready coastal urbanism along the Bosphorus.



**Figure 11.** The Comparative Synthesis of Contextual Interpretation of Theoretical Studies Articles under Urban Palimpsest Concept, Urban Juxtaposition Concept and Present and Future Concept (Source: Created by the Authors.)



**Figure 12.** The Comparative Synthesis of Contextual Interpretation of Application and Case Studies Articles under Urban Palimpsest Concept, Urban Juxtaposition Concept and Present and Future Concept (Source: Created by the authors.)

## 5. Discussion

### 5.1 Interpretation of Key Findings

This study presents a multi-layered evaluation of how the urban palimpsest and urban juxtaposition frameworks shape the morphological resilience of coastal urban spaces along Istanbul's Bosphorus. The findings reveal that while both concepts aim to strengthen continuity and non-destructive spatial

evolution, their implementation varies significantly in effect. Particularly under conditions of high development pressure, the transformative ideals of these frameworks are frequently diluted or selectively interpreted.

A central insight emerges from the contrast between theoretical and implementation-focused studies: while theoretical literature tends to emphasize the risks of unchecked urban development, application-based studies report a greater share of positive outcomes. This discrepancy may be partially attributed to institutional dynamics that influence how results are framed in practical contexts. More critically, projects employing terms like “regeneration” or “transformation” often serve as a rhetorical veil masking interventions that disrupt rather than preserve urban continuity (Şahin & Arslan Selçuk, 2025). Furthermore, marginal engagement with key components, such as identity integration, network and land-use connectivity, natural environment considerations, and digital modelling, signals an underdeveloped toolkit for delivering truly resilient morphological strategies.

These findings illuminate a crucial gap: the resilience of coastal urban development along the Bosphorus demands more than conceptual endorsement of palimpsest or juxtaposition. It requires methodological rigor, water element integration, identity-based spatial development, and participatory planning processes. In conclusion, while urban palimpsest and juxtaposition remain vital theoretical lenses for analyzing urban morphology, their practical application along the Bosphorus reveals underlying tensions between idealized continuity and disruptive transformation. These results support the hypothesis that integrated, water-space attuned models, particularly those embedding identity, participant memory, and public accessibility, are essential for the resilience of coastal urban development. Without this commitment, Istanbul risks losing its heritage complexity and urban character to fragmented, commodified landscapes.

## 5.2 Comparison with Previous Studies

These findings are broadly consistent with existing critical literature on coastal transformation in Istanbul, which shows the city’s vulnerability to spatial fragmentation due to speculative development and constructed incoherence (Bartu Candan & Kolluoğlu, 2015). The results support the theoretical proposition by Sarihan and Lovra (2024) that urban resilience hinges not only on physical preservation but also on the continuity of cultural identity and participatory presence. The positive contributions of digital modelling, for example, affirm a growing consensus that new tools can serve both design forecasting and community engagement.

In contrast, the performance of the juxtaposition concept diverges from its theoretical promise. Although intended to provoke creative dialogue between temporal layers, its application often results in visual rupture and loss of identity. This mirrors critiques in the literature which argue that juxtaposition has become a vehicle for aesthetic commodification, detaching projects from historical rootedness (Vergara-Perucich & Arias-Loyola, 2024). In this sense, this study adds empirical depth to these theoretical concerns, illustrating how implementation without contextual grounding may produce outcomes that contradict original planning intentions.

## 5.3 Strengths and Limitations

The study’s strength lies in its comprehensive methodology, combining quantitative categorization with qualitative content analysis across an extensive body of literature. This dual approach enables a refined understanding of how theoretical constructs manifest in practice. The thematic use of palimpsest and juxtaposition as comparative lenses also adds conceptual clarity to an otherwise complex set of urban dynamics.

However, the exclusive reliance on published academic literature introduces certain limitations, particularly in terms of potential publication bias in implementation-focused studies. The classification process, though rigorous, may also be influenced by interpretation of key terms or framing choices by the original authors. Additionally, while the figures visually support the analysis, some charts would benefit from clearer alignment with the accompanying commentary to avoid under-explained visuals.



## 5.4 Implications and Future Directions

The findings underline the urgent need for context-sensitive planning frameworks that go beyond abstract references to concepts like palimpsest and juxtaposition. Urban resilience, particularly in historically dense coastal regions like the Bosphorus, must integrate spatial continuity with cultural memory, public accessibility, and sensitivity to waterbody-focused urban environments. Methodologies that assess the authenticity of palimpsestic layering, along with tools capable of distinguishing exploitative juxtaposition from constructive contrast, are especially needed.

Future research should develop performance-based models for evaluating identity continuity, assessing environmental integration, and measuring participatory presence in waterfront development. Expanding the use of digital modelling, identified as a cross-cutting strength in both theoretical and applied studies, can further aid in simulating long-term morphological outcomes. Ultimately, coastal urban development in Istanbul must resist reductive, market-driven interventions and instead reinforce layered, inclusive, and resilient urban futures.

## 6. Conclusion

### 6.1 Summary of Key Findings

This study examined how the frameworks of urban palimpsest and urban juxtaposition shape the morphological resilience of coastal public spaces, with a particular focus on the Bosphorus shoreline. Drawing on the analysis of 144 academic articles published between 2000 and 2025, it investigated the intersection of water, space, and human behavior in influencing the continuity, disruption, and re-imagination of Istanbul's urban waterfront. The study confirmed the central hypothesis: that resilience in coastal urban morphology depends on an integrative approach that respects historical layering, spatial adaptability, and participatory presence.

The findings reveal a more refined landscape. The urban palimpsest framework consistently supports continuity in identity and heritage, with both theoretical and application-based studies affirming its capacity to embed past layers into contemporary development. This supports the hypothesis that spatial continuity contributes to an identity-grounded and resilient urban form. However, several theoretical studies also raise concerns about the selective or symbolic use of heritage, where integration is superficial or ornamental, rather than structurally and socially embedded.

In contrast, the urban juxtaposition concept, although theoretically intended to strengthen constructive tension between old and new elements, often results in fragmented urban outcomes when applied without contextual sensitivity. In practice, juxtaposition has been co-opted into commercially driven redevelopment schemes, leading to the erasure of spatial memory and the exclusion of civic life. This tendency is particularly visible in regeneration projects along the Bosphorus, where, both theoretical critiques and applied cases reveal aggressive ruptures in the urban fabric and identity. These findings challenge the optimistic theoretical assumptions of juxtaposition and suggest that its effective implementation requires stronger contextual awareness and regulatory frameworks. Moreover, the results emphasize the need to distinguish between performative uses of transformation discourse, those that merely adopt the language of renewal, and authentic interventions that meaningfully engage with place and history.

The study further emphasizes the performative role of participatory memory in strengthening resilient urban morphologies. In the context of the Bosphorus, memory is not a static archive but a dynamic process enacted through everyday rituals, public gatherings, and spatial habits that continuously shape and reinterpret the shoreline's identity. This ongoing engagement shows that resilience is not only a function of physical design but also of the lived experiences that sustain cultural continuity. Integrating participatory memory into urban planning processes enables cities to move beyond passive preservation, positioning memory as an active tool for inclusive, adaptive and future-oriented coastal development.

Importantly, this study reveals that resilience in coastal morphology cannot be achieved through spatial form alone; it must instead emerge from the dynamic choreography of environmental, spatial, and social interrelations. Accordingly, the research underlines the interplay between water, space, and human behavior as a central theme in shaping the future morphology of the Bosphorus. Positioned at the intersection of continents and centuries, the Bosphorus is not merely as a geographic boundary, but a living archive which spatial continuity, ecological flows, and cultural rituals co-produce a resilient urban memory. Here, urban morphology operates not as a fixed form but as fluid memory: Ottoman mansions lean beside concrete high-rises, public life animates waterfronts layered with imperial and modern history, and spatial traces are rewritten daily through collective use.

## 6.2 Implications of the Findings

This study contributes to both theoretical and practical understandings of “water cities,” where physical form is inseparable from ecological rhythm and social practice. By showing how identity continuity, participatory traces, and digital modelling each play a role in sustaining urban resilience, the research advances the discourse on coastal morphology, offering an interdisciplinary perspective that bridges urban theory, environmental design, and spatial governance.

Moreover, the research emphasizes that sustainable coastal development is not merely a technical challenge, but a cultural and spatial negotiation. When urban design along the Bosphorus respects the continuity of memory, engages with ecological flows, and invites inclusive participation, it exceeds infrastructural function to become a living, adaptive, and resilient urban edge. The core contribution of this study lies in its call to reconceptualise coastal morphology, not only as a spatial condition, but as a reflection of social consciousness and environmental ethics, deeply rooted in both historical continuity and future potential.

## 6.3 Limitations of the Study

While this study offers a comprehensive synthesis of existing literature, several limitations must be acknowledged. First, the selection of article was restricted to English-language publications indexed in the Scopus database, which may have excluded valuable regional case studies and grey literature, particularly those addressing localized urban dynamics. Second, although the coding and categorization processes followed a systematic framework, they inevitably involved subjective interpretive of terminology and emphasis as presented by the original authors. Lastly, the study’s exclusive reliance on secondary data limits its capacity to account for real-time urban processes, policy evolutions, and experiential insights from on-the-ground contexts.

## 6.4 Recommendations for Future Research

These limitations also present opportunities for future research. Subsequent research should engage in in-situ analyses of user behaviour, spatial appropriation, and public perception within palimpsestic and juxtaposed waterfront environments, particularly in transitional neighbourhoods. Incorporating phenomenological, semiological, and agent-based modelling approaches may offer a richer understanding of how individuals experience and contribute to the evolving morphology of urban waterfronts. Finally, future work should prioritize co-creative and participatory planning methodologies, supported by digital simulation tools, to empower local communities in shaping inclusive and resilient coastal futures.

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## Conflicts of Interest

The author(s) declare(s) no conflicts of interest.

### Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

### Institutional Review Board Statement

Not applicable.

### CRediT author statement

Detail the specific contributions of each author in their respective sections. After adding the individual contributions please include the statement to the end of your text in this section: "All authors have reviewed and approved the final version of the manuscript."

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