

Article

# The (Re)Industrialised Waterfront as a “Fluid Territory”: The Case of Lisbon and the Tagus Estuary

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## Abstract

If delta and estuary areas are observed under the perspective of a double system of dynamic infrastructures, the object of parallel “water/urbanisation” processes, the interface spaces become key nodes. In this perspective, port and waterfront areas can be described as spaces of mediation. The article argues that in the case of Lisbon and the Tagus, as possibly in several other port cities, these edge spaces can be described as “fluid territories.” The pre-eminent characteristic of “fluid territories” is that they are not permanent, neither in space nor time. These areas present accelerated transformations, less defined boundaries, and an increased spatial and management complexity. Moreover, “fluid territories” also mediate (a) the culture-natural environment, with human action appropriating the natural system through infrastructure and urbanisation, and (b) the industrialised economic estuary, with its continuous updating. To demonstrate this hypothesis, two samples of Lisbon’s riverfront are observed, recording its constant variability over the last 200 years of industrialisation, emphasising the “fluidity” of the mediating spaces. The understanding of the “fluid” characteristic of water/land mediation spaces is relevant for the present. Being dynamic and regularly reinventing spaces, spatial planning, public space, and architectural design processes in “fluid territories” should increasingly seek adaptability, flexibility, and openness to change. In the climatic context of continuous uncertainty combined with the need to make room for infrastructure, rethinking mediation areas through the lens of the theoretical concept of the “fluid territory” enables the implementation of urban transformation processes consistent with contemporary challenges.

## Keywords

fluid territory; Lisbon; mediation spaces; port city; Tagus; urban deltas; waterfront

## Issue

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## 1. Introduction

### 1.1. Lisbon and the Tagus: Are the Mediation Spaces a Fluid Territory?

Throughout history, the development of water and land infrastructures and the resulting new spatial demands have led to changes in the territory, with governance structures influencing land use (Pagés Sánchez & Daamen,

2020). Among water-related activities, the importance of the port in economic development has allowed its infrastructures to drive spatial transformations (Grindlay Moreno, 2017; Hoyle, 2000; Munim & Schramm, 2018). This relationship continues to be an important paradigm for waterfront contemporary cities, as it combines a close spatial association with maximum functional interdependence, as Akhavan (2020), Hoyle (1996), and Meyer (1999) point out. In the specific case of delta regions,

Meyer et al. (2016) argue that these have functioned as magnets for economic development and urbanisation for many centuries but, at the same time, these regions are the most vulnerable, where floods, drought, salinisation, and pollution represent major risks for millions of people, economic development, and the environment.

The Lisbon Region and the Tagus Estuary, in particular, have been intrinsically connected throughout history, as the natural system has been shaped to support land appropriation and economic activities. The infrastructure construction has been continuous over time, both on water and land, as if a parallel history could be written, as these infrastructures have been updated to adapt to the new demands of each technological cycle.

The development of the river's accessibilities has taken place through a continuous process of dredging, progressively adapting to the evolution of the boat's characteristics, and building a system of "fluvial roads" hidden beneath the water of the large estuary. The water-based activities responded to the technological characteristics of each cycle, dictating what, by analogy, could be defined as a process of "waterisation"—the water utilisation and infrastructure process.

A parallel development can be observed in the different generations of the land accessibility system, which evolved from the reuse of preindustrial roads to a new mobility system, built on landfill areas, with the new railway and roads side-by-side. Land occupation and use also responded to the technological characteristics of each cycle, confirming the process (established in literature) of (re)urbanisation.

In the perspective of a dual system of dynamic infrastructures and of a parallel process of "water/urbanisation," interfaces become key nodes. As such, the port and waterfront areas can be understood as spaces of mediation.

The article argues that, in Lisbon and the Tagus, as well as probably in several other port cities, these edge spaces can be understood as "fluid territories" and present a double dimension. They articulate aquatic and terrestrial surfaces, whose main spatial characteristic is that they are not stable, neither in space nor in time, being reshaped between technological cycles and responding to new needs. These areas tend to be spatially dynamic and less stable, presenting accelerated transformations, less-defined boundaries, and increased territorial and management complexity, combining transversal approaches (Hein, 2021). This port cityscape is administered and planned by multiple institutions and rarely as part of a shared vision. Given the spatial instability and fluidity of its boundaries, buy-in from local stakeholders is needed to facilitate a common approach (Hein, 2021). As Moretti (2019) indicates in her concept of threshold, the border between the city and the port is often perceived as a space of separation and contention. However, it is a dynamic interface capable of responsive potentialities and disposed to technological changes and structural updating. In this perspective, the

article proposes to address mediation spaces as "fluid territories" to accentuate the dynamic characteristic of the interface situation, connecting the water and land systems. It is as if the argued "fluidity" was symbolically announced by the daily tide.

Moreover, these fluid territories are the mediation spaces between (a) the culture-natural environment, understood as the "man-made nature," with the anthropic action appropriating the natural system through infrastructure and urbanisation, and (b) the industrialised economic estuary, with its continuous upgrading, answering to the technological and economic cycles (Meyer & Nijhuis, 2014). The article registers the constant variability of this relationship over time, emphasising how the mediation spaces are "fluid territories" if observed from a broader perspective.

The main argument of the article is supported by the observation of this double dimension: the dynamic mediation between the water and land and the dynamic mediation between the culture–natural system and the economic evolution of each technological cycle. The association of physical and spatial dimensions with the sociocultural dimension is the hypothesis from which the article derives, methodologically using geo-historical spatial mapping and description as an analytical tool (Hein & Van Mil, 2020). Mapping and description allow the initial hypothesis to be corroborated (Schubert, 2017) and affirm how the water and land interface have changed over time as a "fluid territory."

However, the term "fluid territories" is not a new concept and has several applications. In the literature, it has been used as a metaphor in soft planning, following Allmendinger and Haughton's (2007a, 2007b) studies, referring to "a growing number of practices that occur at the margins of statutory planning systems" and "planning solutions that go beyond traditional administrative boundaries and introduce new governance processes between formal and informal structures and institutions," developed "at different scales, ranging from the European level...to regional approaches...and local community-led initiatives" (Cavaco et al., 2023, p. 2). The idea of spatial and administrative flexibility prevails, pointing out "the fluid areas between formal [planning] processes where implementation through bargaining, flexibility, discretion and interpretation dominate" (Allmendinger & Haughton, 2007b, p. 306). In this context, fluidity is also associated with the non-Euclidian notion of relational and multidimensional space, with variable geometry, overlapping the planning scales, shifting "from being 'hard-edged' containers to flexible and less-defined spaces" (Galland & Elinbaum, 2015, p. 69). Along the same line, in their study on the regional development zones in Finland, Jauhiainen and Moilanen (2011, p. 728) define the term fluid territories as being "characterised by flexible boundaries, policy integration, and 'governance of governance.'"

The concept of "fluid territories" is also applied in association with water issues to highlight its dynamic

characteristics, e.g., the recent exhibition on the Danube Region mapping (Slovak National Gallery, 2022). It is often used in the scope of creative activities, such as landscape, urbanism, architecture design studios, or symposiums, associated with the idea of an unresolved space, also unstable or located in the connection between systems (Khosravi & Issaias, 2022; OWMF Architecture, 2023). Khosravi (2020) referred to it, pointing to the “changing inertia and relationships between the port, the city and territory” (Hamed Khosravi Studio, n.d.). It is also used in arts, referring to the interconnection between experiences and transition (argos, 2022), or in interdisciplinary studies (Reading Landscape, 2022).

Nevertheless, it is important to mention that the theoretical concept of “fluid territories” does not refer only to a contemporary phenomenon, considering, for example, the case of the Nile Delta and the cyclical floods that over time allowed for the development of agriculture and the settlement of the population. The contemporary understanding is the recognition that identifying vague parameters in the relationship between the natural system (water/land) and the city can provide new perspectives for interpreting urban transformations.

In this perspective, the article adopts the term “fluid territory” to refer to the mediating characteristic between active systems (water/land, culture-nature/economy, city/estuary), their permanent dynamics, and their regular variability in space and in time, deepening the concept of porosity in the study of port-city territories (Hein, 2021).

To support this approach, interface spaces were selected in Lisbon and the Tagus Estuary. The aim is to discuss the situation of spatial mediation between water and land, as well as between the culture–natural system and the economic cycle demands, highlighting the dynamics and transitory characteristics of these territories. It argues that especially since industrialisation, the evolution of these spaces over time justifies the regular reinvention of the existing structures and the creation of new ones in response to socioeconomic changes. Moreover, in recent decades, with the acceleration of technological and societal transformations, this fluid relationship between the river and the city has intensified: The cycles of reinvention are getting shorter, dictating a succession of new paradigms. New problems loom on the horizon, such as climate change adaptation, reminding us that even the recent upgrades to those spaces may not be definitive and exhaustive.

## 1.2. Methodology

To explore how waterfront areas, as water/land mediation spaces, can be understood as “fluid territories,” the article focuses on Lisbon and the Tagus Estuary and develops a case study approach. Two key exemplary samples are selected, the Boavista and Alcântara riversides, analysing their evolution within the framework of the hypothesis. This empirical observation seeks to highlight

the constant variability of the occupation of these mediating spaces over the last 200 years of the industrialisation process, emphasising their “fluidity” characteristics.

It should be mentioned that the large Tagus Estuary is the centre of the Lisbon Region and that industrialisation has found preferable riverfronts at different moments in time, moving from Lisbon Municipality’s western waterfront to the eastern one, to the southern banks and Alhandra upriver. In Lisbon, the:

Development and transformation of different areas of the riverbank was not simultaneous, nor were the growth dynamics on the banks of the Tagus, initially more north-centred, close to the city and, in the 20th century, progressively advancing towards a metropolitan dimension—also integrate the southern shore. (Costa, 2007, p. 55)

Since Lisbon is not considered one of the major industrial riverfronts in Europe, the selected case studies focus on the western riverfront of Lisbon Municipality. This area experienced the first industrial and port occupation in the 19th century and has undergone urban regeneration dynamics since the 1940s. Consequently, this location provides a more extensive historical development and better illustrates the argument presented in the article.

The analytical work is supported by primary sources, namely historical cartography and literature that ensures the correct interpretation of the charts. As proof of the argument provided, the text presents maps hand-drawn by one of the authors, depicting the relevant aspects of the urban transformation that took place over time in the port space. The approach is supported by established empirical research on the evolution of the waterfront case study (Costa, 2007, 2013), and the understanding of the redevelopment of these interface spaces accordingly to three moments: the waterfront of the first industrialisation, the waterfront of the second industrialisation, and the contemporary one (Andrade & Costa, 2020; Costa, 2013).

The use of the author’s interpretative hand-drawn maps of the two cases makes it possible to highlight the evolution in space and time of the mediation spaces, addressing each moment with the article’s hypothesis: Can these areas be understood as “fluid territories” that regularly (re)shape the industrialised culture-nature estuary?

The morphologic evidence of the urban transformations is reinforced with the presentation of realised or unrealised plans and projects for these areas. The objective is to emphasise that the “fluidity” of these territories is not only revealed in their physical expression but also in the domain of the ideas and approaches to their spatial transformation, justifying their qualification as spaces with an accelerated dynamic, in continuous reinvention.

It should be noted that this dual approach (evidence of urban morphology and ideas of spatial transformation) does not undervalue the existence of relevant

technological, political, and socio-economic processes that conduct and justify it. Nevertheless, the methodology focuses on evidencing the argument, the “fluidity” characteristic of these territories, leaving the door open for further publications on the discussion of the “whys,” which could certainly vary in each territory and city.

Thereby, the article’s hypothesis on the dual perspective of the “fluid territories” is discussed “in practice.” The article is completed with a broader discussion of the hypothesis, justifying why Lisbon and the Tagus can be considered as a “fluid territory” and why this definition is relevant to the discipline.

The theoretical concept of “fluid territories” is a provable argument for the Lisbon case study. But as happens with several concepts in urbanism, typological representativeness becomes a hypothesis for other cases. Consequently, the article suggests that it might be possible to extrapolate the results, particularly to other industrialised waterfronts with more intense dynamics of (re)urbanisation. As a hypothesis, might they also be understood as “fluid territories”?

## 2. Case Study Observation and Discussion: Two Samples of Mediation Spaces Between Lisbon and the Tagus

The morphologic interpretation of the evolution of the Boavista and Alcântara riverfronts allows us to observe five different moments, common to both cases, although they occurred at slightly different moments in time: (a) the first industrial occupation of former preindustrial territories; (b) the first initiatives of landfills and occupation of water areas for industrial uses, associated to the first industrialisation dynamics; (c) the large port and railroad landfill at the end of the 19th century; (d) the waterfront occupation in the 1960s, observing the intense port and industrial occupation of space, although several of the buildings were already unoccupied, as the second industrialisation resulted in the migration of these activities to the east and south riverfronts of the Tagus Estuary; (e) the contemporary situation, highlighting the ongoing urban regeneration processes.

The discussion of the physical evidence of accelerated land transformation is reinforced by the approaches and concepts that underpinned them, evidencing how the “fluidity” of both cases also extended to the domain of the ideas, in a continuous process of evolution, also on the perspectives of how the riverfront areas should evolve. Both arguments converge to justify the article’s argument, that these can be understood as “fluid territories.”

### 2.1. The Boavista Riverfront as a Fluid Territory: Five Moments of an Industrial District Permanently in Question

The Boavista riverfront is a testament to how, during the approximately 200 years of industrialisation, the medi-

ating space between the water and land presents characteristics of “fluidity.” Not only has the water/land mediation space undergone five generations of spatial configuration, but it has also been constantly challenged, with the succession of unrealised spatial plans and projects, (re)urbanisation works, and renovation of functional and building tissues. This process has been accompanied by an evolution in the conceptual approaches to the territory, regulating the balance between the culture-nature system and the economy, in a continuous “fluid” dynamic.

This territory’s evolutionary process can be initially referred to as the preindustrial Boavista Street and Beach, as seen in the concave riverfront in Figure 1a. The beach was described by Silva (1993, p. 8) in the early decades of the 19th century as an “implausible deserted space” which was progressively occupied by industry and the subject of failed public attempts to reorganise the informal urban configuration of plots with a very short street, water facades, and a deep, perpendicular extension. The cholera epidemics of 1854 and 1855, followed by the yellow fever epidemic of 1857, which focused on the infectious emanations of mud from the site, were the final arguments to justify the works of the Boavista riverfront (Silva, 1993).

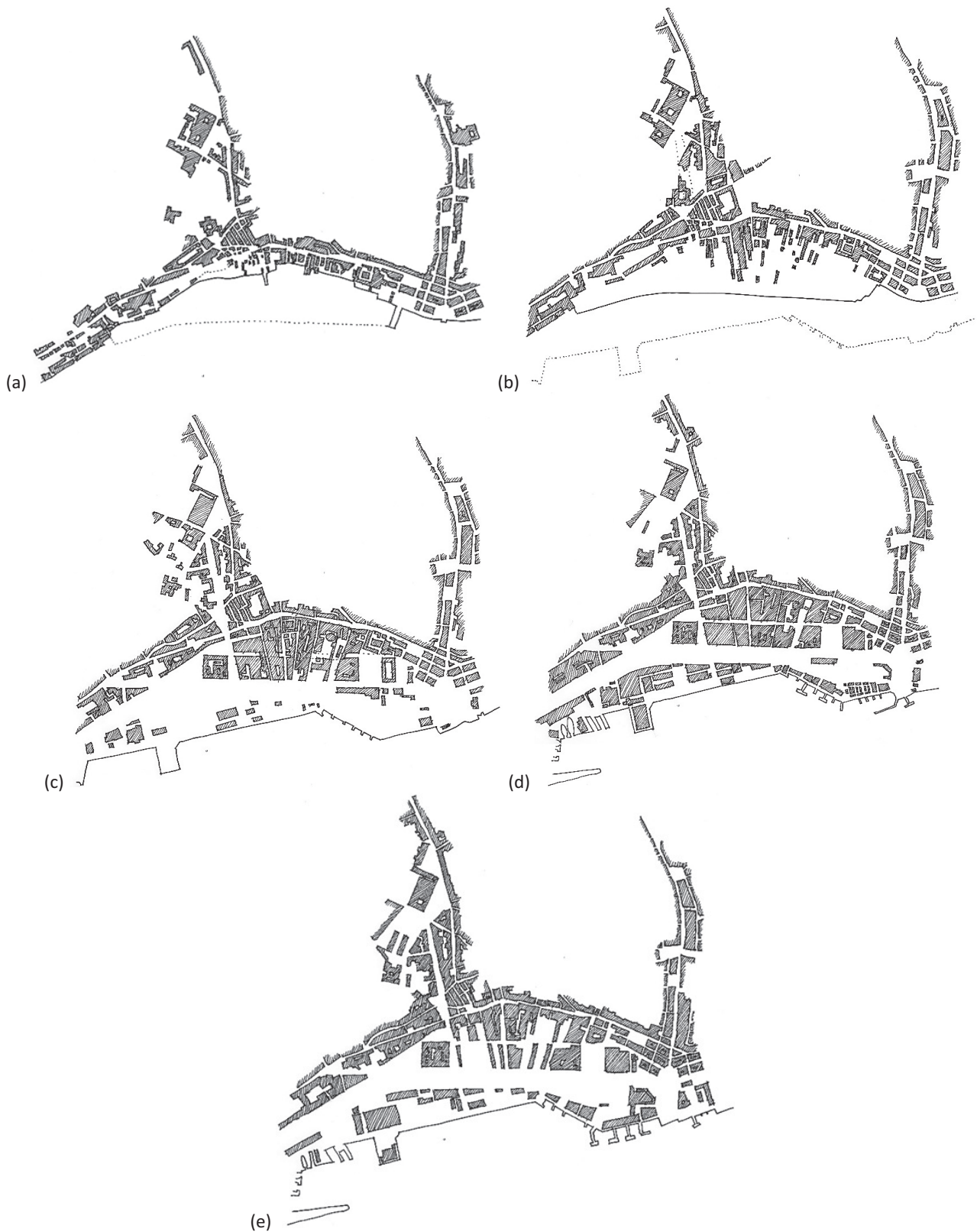
After an initial unsuccessful project to build a closed harbour in the 1840s, a new landfill and the deep-water dock were built between 1858 and 1865, combining industrial expansion, harbour improvement, sanitisation intervention, and urban reform (Figure 1b). The following decades were marked by an improvement and the establishment of new industries and by the urban reform plan of the 1860s, which reprofiled the transverse streets and proposed the opening of a middle longitudinal one (Figure 2a). This reform was fully implemented several decades later, at the beginning of the 20th century (Costa, 2007, pp. 78–86), and can be observed undergoing in 1911 (Figure 1c).

As observed, if we can argue that during the 19th century, there was not a single decade of stability in the Boavista riverfront, both in its physical transformation and in the evolution of the ideas to address it, the 20th century was not different. Proposals for a large longitudinal landfill for the Port of Lisbon had been developed since the 1870s, but it was not until 1886 that a project was stabilised by João Joaquim de Matos and Adolfo Loureiro. The project was realised between 1887 and 1905, allowing the implementation of the port’s modern infrastructure, with the opening of the new longitudinal border road and rail corridor. As a result, a new waterfront layout was created, separating the former Boavista Landfill from the water, as can be seen in Figure 1c.

The first decades of the new century were marked by the intensive and heterogeneous occupation of the new port riverfront extension with facilities of the first industrialisation, such as the fishing docks, shipping companies, the electrical installations of the train company and the port’s sanitary facilities (Sousa, 1926). Again, the

dynamics of change did not take long and the emergence of the second industrialisation, with the consequent change in the energy source and technologic paradigms,

justified the rapid obsolescence and abandonment of the dense industrial and port facilities occupation from the 1950s onwards, as can be observed in Figure 1d.



**Figure 1.** The Boavista riverfront evolution in maps: 1807, 1865, 1911, 1963, and 2023. Drawings by João Pedro Costa, 2023.



In the second half of the 20th century, unimplemented plans for the redevelopment of Boavista’s decaying urban fabric succeeded one another. The first known reference dates to the 1960s and proposed the redevelopment of the site through the complete demolition of the industrial urban fabric and the construction of three large new blocks, according to a conceptual approach that attributed a negative value to the former industrial heritage, thus proposing its complete replacement with a new urban fabric (Figure 2b).

The 1980s made an important contribution to the emergence, in public opinion, of the need for riverfront regeneration with a new conceptual approach. Referring to a shift that took place in this decade, Ferreira (1997, p. 151) argues for the need to “bring out a collective awareness that recognises the past of the riverfronts linked to economical uses and its present linked to a sensitivity of an environmental, aesthetic and playful nature.” The results of the 1988 public competition promoted by the Architects Association for the redevelopment of the western and central riverfront of Lisbon were significant for this change, establishing the new cultural approach to the regeneration process and emphasising the need to reconnect the city with the riverfront.

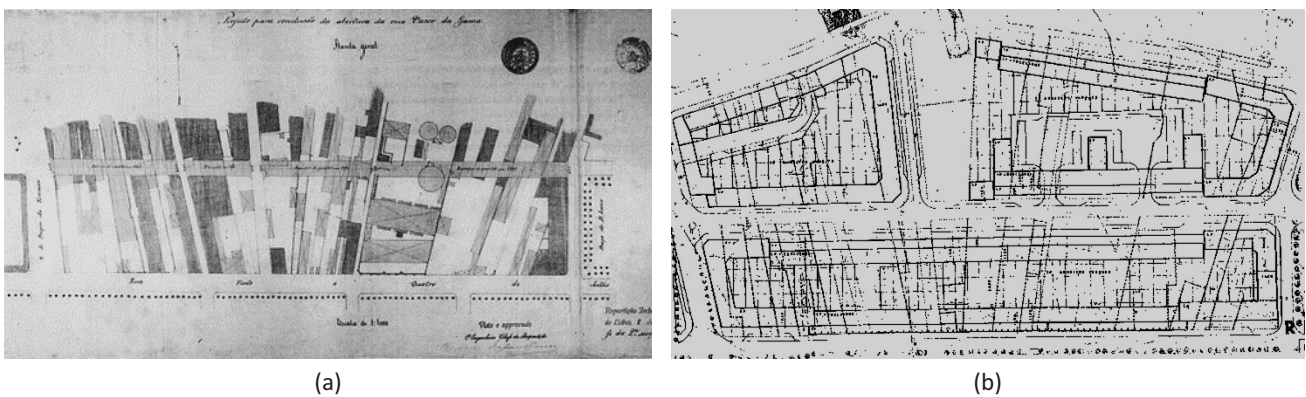
The 1990s was a decade of controversy. The 1994’s Spatial Plan for the Riverside of Lisbon proposed by the Port Authority tried to replicate, in the 20th century port landfill, a London Docklands “real estate” dense regeneration model, generating an intense public reaction that stopped this process. In 1993, Lamas carried out a preliminary study for the redevelopment of the Boavista area, exploring a different cultural approach. However, the regeneration process only began in the 2000s. The process adopted a medium-term approach that would respect the “spirit of the site,” mixing a new urban fabric that follows the transversal orientation of the historical building with some rehabilitated pre-existing structures. Since the 2010s, the Boavista urban fabric has been undergoing intense regeneration, nowadays supported by two approved detailed plans

(Figures 3a and 3b). This ongoing process (Figure 1e) represents the maturation of a regeneration process that took 50 years to see the light of day.

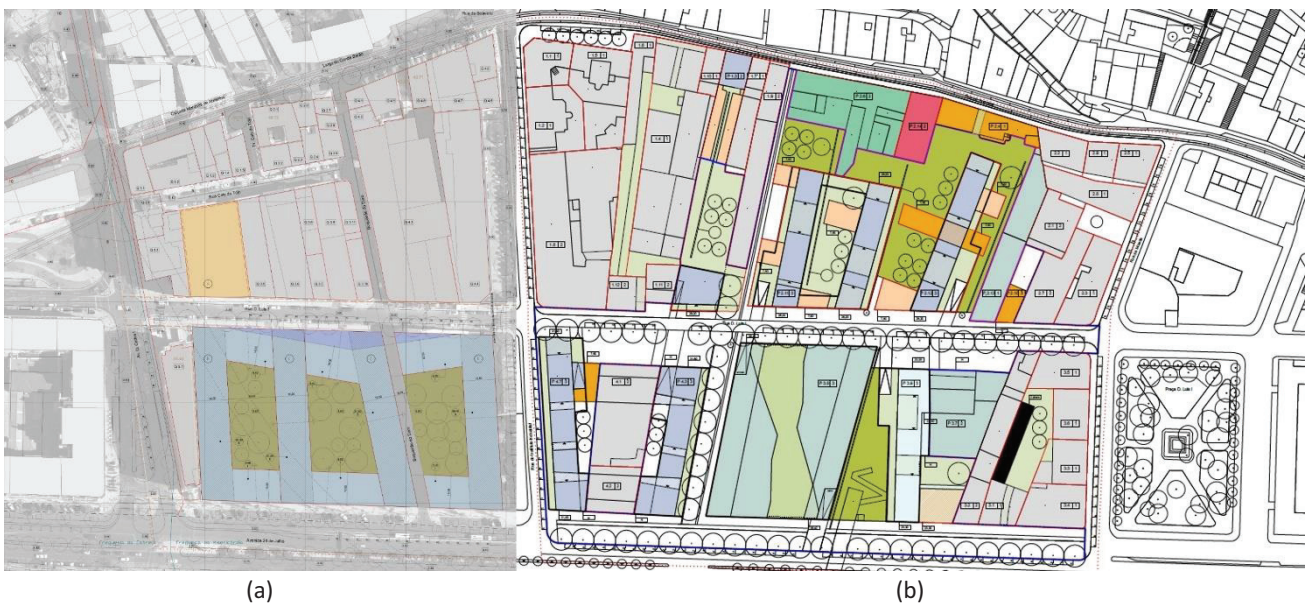
Although incomplete, the brief story presented on the Boavista riverfront clearly demonstrates the accelerated dynamics of an urban space of mediation between water and land. It evidences a permanent pressure for spatial change, accompanying a transformation dictated by the evolution of technology and the economy, to which the man-made environment has had to adapt. Since the beginning of the 19th century, this space has verified a continuous process of reinvention, with several non-realised projects and plans that have contributed to the maturation of changes that later ended up taking place.

It can be argued that, as a space of water/land mediation, the Boavista riverfront has been a fluid territory, in space and in time. Permanence has been rare during the last 200 years, and although a regeneration process is underway, new agendas emerge for the future. Climate change adaptation is one of these agendas, obliging these spaces to face new problems, such as sea level rise, increased flash floods and changes in the patterns of extreme weather events.

The relationship between the culture–natural system of the territory and the economy and its cycles has been as intense as the sequence of dominant agendas demonstrates. Informal industrialisation, urban reorder attempts, sanitation, formal industrialisation, regeneration of formal industrialisation, port expansion, reindustrialisation, urban renovation approaches, heritage approach to urban regeneration, urban regeneration focused on new economies and environment, and climate change adaptation, were eleven successive main cultural approaches to the riverfront spaces, in accordance with the needs of the economic cycle and the societal priorities. Under this perspective, the transformation of the natural system of mediation between water and land was also a continuously “fluid” changing process.



**Figure 2.** The Boavista riverfront. (a) Project for the conclusion of the opening of Vasco da Gama Street, general plan, connecting Duque de Terceira Street on the left with D. Luis I on the right, the City of Lisbon, unreadable date (1867?). Source: Silva (1993). (b) Revision study of the blocks, a municipal plan developed for the Boavista area, City of Lisbon, 1962. Source: City of Lisbon (2017, p. 13).



**Figure 3.** The Boavista riverfront: Assembled extracts of the two implementation plans. Both plans support the ongoing urban regeneration of the former industrial area. (a) The Boavista Landfill Detail Plan West. Source: City of Lisbon (2017). (b) the Boavista Landfill Detail Plan East. Source: City of Lisbon (2021).

*2.2. The Alcântara Riverfront as a Fluid Territory: Five Different Moments of the Industrial Port-City in Question*

The Alcântara riverfront reinforces the evidence of how, in the last 200 years of industrialisation, the mediating space between water and land presents characteristics of “fluidity.” Being one of the birthplaces of Lisbon’s industrialisation, it has also experienced at least five different generations of spatial configuration, although not exactly corresponding to those of the Boavista riverfront. Not having had a stabilised industrial configuration, the Alcântara redevelopment has been constantly questioned, especially since the mid-20th century. The succession of unrealised plans and projects and the public debate on the conceptual options can be understood as a maturing process that anticipated the most recent approved versions and urban regeneration works. The evolution of conceptual approaches also reveals “fluidity” characteristics, in a delicate balance between the culture–nature system and the economic demands.

The industrial transformation of the Alcântara riverfront can initially be referred to as the preindustrial occupation of a large tidal mill and lime kilns, as can be seen in Figure 4a. The second half of the 18th century saw one of the first industrial transformations of the city, with the regularisation of the Alcântara riverside and the occupation of the mill’s former water area by a new Tagus landfill (Figure 4b). The first industries located on the landfill were replaced in 1865 by the large União Fabril company, which expanded its site facilities in 1898 (Faria, 2001). At the end of the 19th century, the construction of the large port landfill radically changed the Alcântara riverfront. Not only was a significant territory conquered

from the river, but also two new docks were built, Santo Amaro, on the left, and the large Alcântara Dock on the right (Figure 4c). These new areas were intensively occupied by port and industrial facilities in the first decades of the new century (Figure 4d).

In the 1926 description, the Alcântara Dock landscape was marked by warehouses, depots, and various factories, the port disinfection, and by the Colonial Navigation Company; the Alcântara riverfront pier was dedicated to intensive passenger traffic; and the Santo Amaro Dock to the railroad goods deposits and the Vacuum Oil Company facilities (Sousa, 1926). With the improvements made by the port in 1946, the Alcântara occupation was enhanced, with the construction of several standardised industrial or storage buildings measuring, 65 × 13 to 15 m, along five wharf corridors, and the two new maritime stations on the riverfront piers (Figure 4d). In line with the observation of the Boavista riverfront, the mid-century transition to the second industrialisation was accompanied by the rapid obsolescence and abandonment of former industrial and port facilities. The transformation of the industrial area of Alcântara on the former tidal mill was envisaged at least by the Lisbon Master Plan of 1967, approved in 1977, which classified it as an area of tertiary activity to be reconverted through territorial spatial planning instruments. On the contrary, the area under the jurisdiction of the port authority was mainly maintained for port activity.

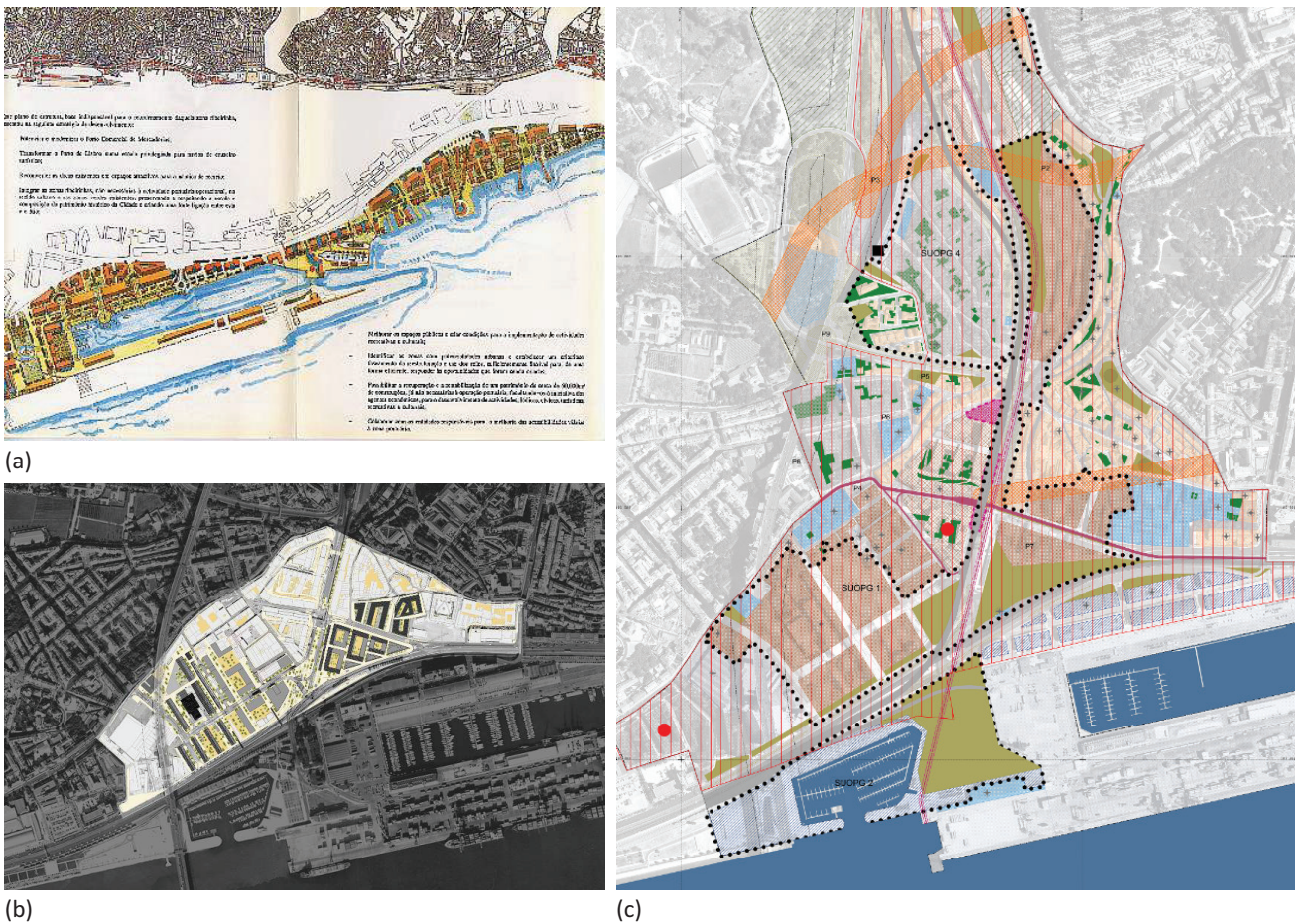
This was a very intense period of public discussion on the regeneration process. The controversy over the 1994 Spatial Plan for the Riverside of Lisbon’s “docklands redevelopment model” also reached Alcântara (Figure 5a), freezing the transformation ambitions for the Alcântara Seaside. In opposition, several versions for





**Figure 4.** The Alcântara riverfront evolution in maps: The first half of the 18th century, 1807, 1909, 1963, and 2023. Drawings by João Pedro Costa, 2007 and 2023.





**Figure 5.** The Alcântara riverfront spatial planning. (a) Spatial Plan for the Riverside of Lisbon, elements of the exhibition held at the Alcântara Maritime Station, extract of the brochure. Source: Port of Lisbon (1995). (b) Urban study for Alcântara Río. Source: Valssassina et al. (2005). (c) Alcântara Urbanisation Plan, extract of the Zoning Plan II, Fernandes de Sá. Source: City of Lisbon (2015).

the redevelopment of Alcântara Land were proposed, such as the 1996 Alcântara River Urbanisation Plan by Margarido Pires, which supported the first realised landmark in Alcântara: the reconversion of the former União Fabril company facilities, by Valssassina, in the transition of the century. Furthermore, the Alcântara Land side has also known proposals that never got off the ground, such as the 2003 Three Towers project by Siza Vieira or the 2004 Two Towers project by Sua Kay.

The complexity of the Alcântara area contributed to the slow advancement of the redevelopment process, once it was obliged to make the urban proposal compatible with the new key railroad, port, and road nodes, all overlapping in the same space at the mouth of the Alcântara riverside, a water line known for its intensive flash flood events. Consequently, the debate on spatial planning in Alcântara has also been very intense. Promoted by the municipal agency Ambelis, the 2005 urban study Alcântara XII, by Valssassina, Mateus, and Nunes answered the initiative of five major landowners and articulated common intervention principles with the municipality (Figure 5b). For the Alcântara riverside, the 2008 Integrated Plan for Interventions in the Riverfront of Lisbon identified Alcântara as an area of study carried

out by the Municipality and the Port Authority, pointing out the promotion of a common green redevelopment project.

In tandem with the discussion on the “hard” redevelopment of Alcântara, the rehabilitation of the two hectares of the former Lisbonense spinning and fabric company marked an opposite approach to the old industrial structures. Applying the Rs policy to spatial planning and architecture, it utilised the existent structures in an “aesthetic of reuse,” evoking the principles of sustainability. The LX Factory space has been, since then, a mixed-use area combining offices with culture, creative industries, art, restoration, and leisure, being a must-visit site in the city.

The spatial planning definitions for Alcântara were finally stabilised with the approval of the 2015 urbanisation plan, by Fernandes de Sá, after seven years of elaboration and discussion (Figure 5c). It is with this instrument that recent advances in the regeneration process have been implemented, such as the Hospital CUF Tejo, developed between 2015 and 2020, or the two frontline office buildings, by Saraiva, built between 2020 and 2023.

In a common dynamic with the Boavista riverfront, the Alcântara Sea areas also continue to be under the

port's authority management responsibility, although in this case, the port remains active. Alcântara has the deepest pier in the estuary, adequate for container exploration, although its location within the city does not allow for logistical space and makes rail and road connections with the hinterland difficult.

Finally, the climate change adaptation agenda has recently emerged on the Alcântara riverfront. Tackled since the 2010s, the "what if" agendas and the ethical responsibilities of spatial planning are on the table nowadays (Costa et al., 2013), reminding us that the emergence of new agendas on the urban transformation processes did not end in the past, but, on the contrary, are perhaps part of the genetic heritage of "fluid territories."

Representing a fast overview of a denser transformation process, the brief history synthesised for the Alcântara riverfront again demonstrates the dynamics of an urban space of mediation between water and land. Since the early industrialisation stages, Alcântara has been under pressure for spatial change, moving, in each cycle, between new ideas, unrealised plans and projects, public discussions, and finally realised plans and projects. Alcântara has lived under a regular process of industrial, port, and urban reinvention, questioning the culture-nature environment in the scope of the evolutive technology and economic perspectives. Informal industrialisation, industrial infrastructure, industrial regeneration, port expansion, port industrialisation, city reindustrialisation, urban renovation approaches, heritage approach to urban regeneration, urban regeneration focused on new economies and environment, and climate change adaptation were 10 cultural approaches observed. As in the Boavista riverfront, it can be argued that, as a space of mediation, the Alcântara riverfront has been a fluid territory, also balancing the culture-natural system approaches with the economic cycles.

### 3. Discussion: Urban Waterfronts as Fluid Territories?

As has been demonstrated, Lisbon and the Tagus have had a dynamic relationship throughout history. The nexus between the territory's culture-natural system and the economy and its cycles has been dynamic, inducing the transformation of the natural system of mediation between water and land as a continuous process of "fluid" change. The observation of the specific cases of Boavista and Alcântara was fundamental to understanding this "fluid territory" condition.

Although the concept of "fluid territory" has been discussed focusing on the two case samples, it is considered to be a first step towards, firstly, understanding the mutability of spaces between land and water, and the subsequent application of the study to other geographical contexts. A study that provides insight into how it is necessary, in the face of future challenges posed by the effects of climate change, not to consider these spaces as having a rigid and fixed boundary, but rather as fuzzy-edged areas, where the first characteristic is spa-

tial, temporal, and conceptual "fluidity." Therefore, the concept of "fluid territory" allows to describe the coexistence of different systems in time and the space, reinforcing the variability that defines the territories between land and water.

Understanding this specific characteristic of the water/land mediating spaces is relevant for the present. As dynamic and regularly reinvented spaces, spatial planning, public space, and architectural design processes on "fluid territories" should increasingly seek adaptability, flexibility, and openness to change. In times of extensive urbanisation, when infrastructure is addressed as a socio-culture object, "fluid territories" have transition as a continuous feature and reinvention as a permanent challenge. Furthermore, the present-day transformations might be only one more short-term step in the evolution of these very dynamic territories.

Questioning the broader representativeness of the Lisbon case, the different urban realities naturally observe their own specific characteristics and moments, but the hypothesis that can be open at this point is that those waterfronts might also be fluid territories, observing, in their own forms and times, a continuous dynamic of accelerated reinvention until the present day.

As argued, the exploration of the characteristics of physical waterfront spaces, at different temporal and spatial scales, helps to understand the cycles and agents that operate there (Hein & Schubert, 2021). Increasingly, the challenges are on a larger scale in shorter times, and "fluid territories" have the adaptive capacity to absorb these changes.

The special condition of the waterfront as a mediating space, in sections where urban and port land are significantly valuable, confers a particular pressure on the waterfront, justifying its permanent rethinking. As Hein (2021) explains, in port-city territories, the port and the city engage in multiple ways, not just along a single thin line as historically, physically, and governmentally defined. The study of the port-city interface space is useful for understanding the different urban and spatial dynamics that occur in the waterfront space. Related to the concept of porosity that Hein (2021) deals with, Moretti's (2019) definition of these spaces can be framed as thresholds. Intimately linked to these concepts of porosity and threshold is the reflection on these mediation spaces as "fluid territories," which requires rethinking the limits between them and the planning of ports and cities. As dynamic spaces that are periodically reinvented, spatial planning, public space, and architectural design processes in "fluid territories" must increasingly seek adaptability, flexibility, and openness to change. It is in this dynamic of changing spaces that the permanent elements must be flexible, if not physically or morphologically, then through adaptive reuse. Therefore, this concept of fluid territory reopens the debate on the flexibility, adaptability, and resilience of these spaces of mediation that must respond to the demands of different realities that coexist in this interface. These are



exceptional spaces, with greater public exposure, and this gives greater relevance to the article's argument. As Gehl (2010) states, soft edges are privileged areas where citizens can safely observe and enjoy the landscape and enjoy the city's best climate.

Indeed, the spatial form of urban interfaces demonstrates its most relevant attribute, namely being mutable, not stable, to respond to the needs of the two systems that connect. Dynamism, both spatial and temporal, becomes increasingly important in a present time characterised by the effects of climate change, as it allows the system to adapt to change. As Hein argues (2021), at a time of climate change, sea-level rise, and shifting coastlines, it is especially important to understand how porosity, or its absence, affects port cities' functioning over time. Boundaries are built, torn down, and rebuilt, continuously creating new patterns of engagement between port, city, and territory.

The proven adaptability of these "fluid territories" throughout history (Costa, 2007; Schubert, 2017) guarantees its reinvention and flexibility in the face of future challenges. Therefore, present and future development opportunities lie in the adaptability established in a dynamic boundary between water and land. Research on the history of cities, ports, and waterfronts, including dimensions of resilience and path dependence, can help us to better grasp the relationship between spatial and social development (Garcia, 2021; Hein & Schubert, 2021).

As it has been possible to verify, "fluid territories" have demonstrated their resilient character, adapting not only their edges and their physical spaces but also the adaptive reuse of the industrial buildings themselves and the land use (Añibarro et al., 2023; Vizzareri et al., 2021). Thus, there is a resilience capacity in this territory both from a physical and functional perspective, adapting to the different economic cycles, as well as social, constituting representative spaces of the city of great historical, scenic, and environmental value. In fact, from a broader perspective, resilient thinking can find a useful application in "fluid territories." All the seven attributes of resilience are particularly adjusted to these areas: recovery, connectivity, capital building, adaptability, robustness, flexibility, and transformability (Pinho et al., 2012).

Nevertheless, the concentration and densification of urban and industrial land use have resulted in the disappearance of the natural resilience capacity of deltas (Meyer et al., 2016). These territories have an increasing flood risk that is reinforced by sea level rise caused by climate change. A fundamentally new approach is necessary, creating more room for natural and social processes which can contribute to increasing the resilience of these urbanising deltas. Meyer et al. (2016) propose that, in the long term, "building with nature" delivers the conditions for delta regions to adapt to climate change continuously, by using the formative power of nature as the strategy's foundation. He affirms that the role of urbanising deltas in the world's economy and ecology can change radically: From being the crucial hubs of the old fossil fuel-based

economy, urbanising deltas can become the engines of a new, clean energy-based and circular economy.

Understanding the transitoriness of the occupation of these mediation spaces, historically, points out a characteristic that might continue in the present and the near future. By doing so, the contemporary intervention on the riverfront water and land mediation spaces can clearly assume it will not be definitive and that the changing dynamic continue to intensify. Adaptability, flexibility, and the incorporation of change become a criterion of sustainability in the transformation of the riverfront, both in the spatial planning and (re)design of the public space and urban fabric.

#### **4. Conclusion: (Re)Shaping the Industrialised Culture-Nature Estuary in Fluid Territories**

Presented as the main argument, the article discusses how the interface areas between water and land can be understood as a "fluid territory," having as a case study two samples from the Lisbon riverfront. In the approximately 200 years of industrialisation, the spaces mediating the city with the Tagus Estuary have regularly been the subject of processes of reinvention, through realised and unrealised plans and projects, and public discussions, as if a collective and continuous maturation process was undergoing. Furthermore, as this intrinsic water and land connection continues in the present, new agendas emerge, such as climate change adaptation, which oblige mediating spaces to address different problems.

It can be argued, by extrapolation, that the mediation spaces between water and land present "fluidity" characteristics. These edge spaces face permanent pressure to change, in space and in time, but also dynamic perspectives on how the man-made culture-nature system can answer the economic demands. These areas can be understood as "fluid territories" that regularly (re)shape the industrialised culture-nature estuary. As a result, a hypothesis emerges for the application of the concept to other waterfront cities, particularly the river and delta ones.

This argument can be relevant to the subject both with a theoretical and practical application. If the water and land interface spaces are "fluid territories," their dynamic, transitoriness, or reinvention characteristics can recommend attributes of adaptability, flexibility, or openness to change to the spatial planning, public space, or architecture design processes. The culture-nature water space (re)shaping is an ongoing continuous process that does not end in the present, permanently addressing the port and water economies, infrastructural scenarios, regional (re)structuring, cultural heritage, (re)urbanisation, ecosystems quality, nature reserves, agriculture, and all the activities related to the "fluid territories" between water and land.

In times of extended urbanisation, when infrastructure is seen as a sociocultural object, "fluid territories" are transitory and reinvention is a permanent challenge.



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## Conflict of Interests

The authors declare no conflict of interests.

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