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Rising Seas, Changing Coastlines, Safety Threats and the Need for Ecosystem Planning on the Sea-Land Continuum

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ABSTRACT

Diverse actors have built port city regions at the edge of land and water, often over many centuries. Through their collaboration they have helped develop creative solutions to problems faced by port cities in the past. Their patterns of engagement have led to paradigms that can promote or hinder transitions. Identifying these paradigms and developing new ones for the ports of the future requires an understanding of culture.

Contemporary challenges of climate change and sea-level rise, but also of new technologies or new logistics demand new approaches, especially those that consider institutional, social and cultural factors.

As globalization has facilitated global flows of goods and people, it has bypassed the question of its impact on the territories and localities hosting these flows. An ecosystem approach is needed that recognizes the impact of people on and in space and the cultural mindsets that have evolved over time and that influence the present and the future.

The six articles in this special issue provide theoretical and methodological insights. They speak to the importance of collaboration along the sea-land continuum and the need for inclusive and design-based approaches that include a cultural dimension at all scales.

Rising Seas, Changing Coastlines, Safety Threats and the Need for Ecosystem Planning on the Sea-Land Continuum

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KEYWORDS
Port city ecosystem, Port city culture, Port city region, Paradigm change, Path dependence

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The 2020 massive explosion in a warehouse in the Port of Beirut killed more than two hundred people, injured several thousands and caused large-scale urban destruction. The tragedy exemplifies safety challenges resulting from the close proximity of industrial ports and densely built urban areas. Since containerization took off in the 1960s, many ports have moved away from large cities, but even ports disconnected from cities need infrastructures that cross neighboring urban and rural spaces; they compete for space with other stakeholders, and present a risk for people and nature in their vicinity. The environmental impact of ports extends far beyond the borders of the port. Environmental threats such as water, noise and air pollution emanating from industrialized ports negatively affect large areas—about 18% of Dutch emissions, for example, are produced by the Port of Rotterdam[1]. Ports can pose risks to their neighboring territories, but they are much needed hubs for global trade: the European Union (EU) depends on its seaports for trade with the rest of the world (74% of goods imported and exported), for exchange within the EU (37%) and for transporting 400 million passengers per year[2].

Figure 1. Ports, cities and their neighboring regions have multiple, often conflicting interests, and need strategies to find shared values. (PortCityFutures 2018).

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[1] Port of Rotterdam, "All roads lead to a sustainable port by 2050" https://www.portofrotterdam.com/en/news-and-press-releases/all-roads-lead-to-a-sustainable-portby-2050 (last accessed 22 November 2020)

[2] European Commission, "European Ports, An Engine for Growth" https://ec.europa.eu/transport/modes/maritime/infographics_en (last accessed 22 November 2020)

Port city regions exemplify the positive and negative spatial and social impacts of globalization. Climate change and sea-level rise add yet another challenge to port cities and regions. Water-related challenges are not limited to select territories; new dykes, canals, dredging or floodgates need coordination among diverse actors in port city regions. The impact of new technologies or new logistics extends across different spaces and governance borders, yet there are no institutions or stakeholder platforms that meaningfully govern or mediate between competing interests across the sea-land continuum. As globalization has facilitated global flows of goods and people, it has bypassed the question of its impact on the territories and localities hosting these flows. Overcoming friction and developing solutions requires a historical understanding. Design thinking is also needed is needed to initiate long-term transition processes and develop new perspectives. As globalization impacts territories around the world in diverse ways, creating winners and losers, strategies are required to facilitate port activities in collaboration with local actors. Strategies are also necessary to facilitate and reimagine the workings of the port in a way that allows for sustainable, socially just development, while facilitating the port's role as key infrastructure that serves large hinterlands and sometimes entire nations by enabling the distribution of medical supplies, food and other essential commodities.

Port city regions have grown due to select actor constellations between city and port at the edge of land and water. They are the expression of often century-old investments in the spaces of sea and land. Their institutions have developed to facilitate trade and overcome tensions between flows of goods and people. The port is a place of transit and transformation, but it also relies on fixed spatial systems and stable institutions. Port cities have faced extreme challenges in the past and have found creative solutions. This historic resilience[3] can inspire holistic and effective ways of addressing contemporary transitions, especially if they include paradigm changes and the transformation of production and consumption processes. Over the past half century, many ports have become disconnected from the needs of their urban and rural neighbors. Contemporary challenges demand rethinking that situation so that the port provides value to the people in the city and region. Co-habitation of the port and the city requires comprehensive planning of the interconnected multiple functions of port and city—including transportation. Sustainable, inclusive, socially just development and the transition of port cities requires more than sectoral, technological approaches. In line with UNESCO, we need to set about "Changing Minds not the Climate"[4].

Ensuring that contemporary challenges are addressed in a comprehensive way requires a cultural change, nurturing collaboration among multiple stakeholders across institutional borders and along the sea-land continuum. These stakeholders have developed over long periods of time. Institutional forms, legal tools and policies are anchored in historical processes and developments, and stakeholders are often vying for the same territories and have competing goals. Even the ways in which they interact have been shaped over time by interactions and experiences. They form an ecosystem that needs to adapt and drive change. Important changes have taken place in the impact of globalization and the expansion of the foreland and hinterland reach of ports on maritime spaces, cities and landscapes. In line with the concept of planetary, or extended urbanization[5], and the concept of the urbanization of the sea[6] new approaches are needed that recognize socio-spatial processes on the sea and the coast.

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[3] Carola Hein and Dirk Schubert, "Resilience, Disaster and Rebuilding in Modern Port Cities", *Journal of Urban History* (2020).

[4] UNESCO. (2020). Changing Minds not the climate: The role of education, https://en.unesco.org/system/files/private_documents/2571_18_e_depliant_cop24_cce_web.pdf

[5] Neil Brenner and Christian Schmid, (2011). Planetary Urbanization. In M. Gandy (Ed.), Urban Constellations. Berlin: Jovis.

[6] Nancy Couling "The Role of Ocean Space in Contemporary Urbanization", École Polytechnique Fédérale de Lausanne, 2015. Nancy Couling and Carola Hein, The Urbanization of the Sea, nai010/BK Books 2020.
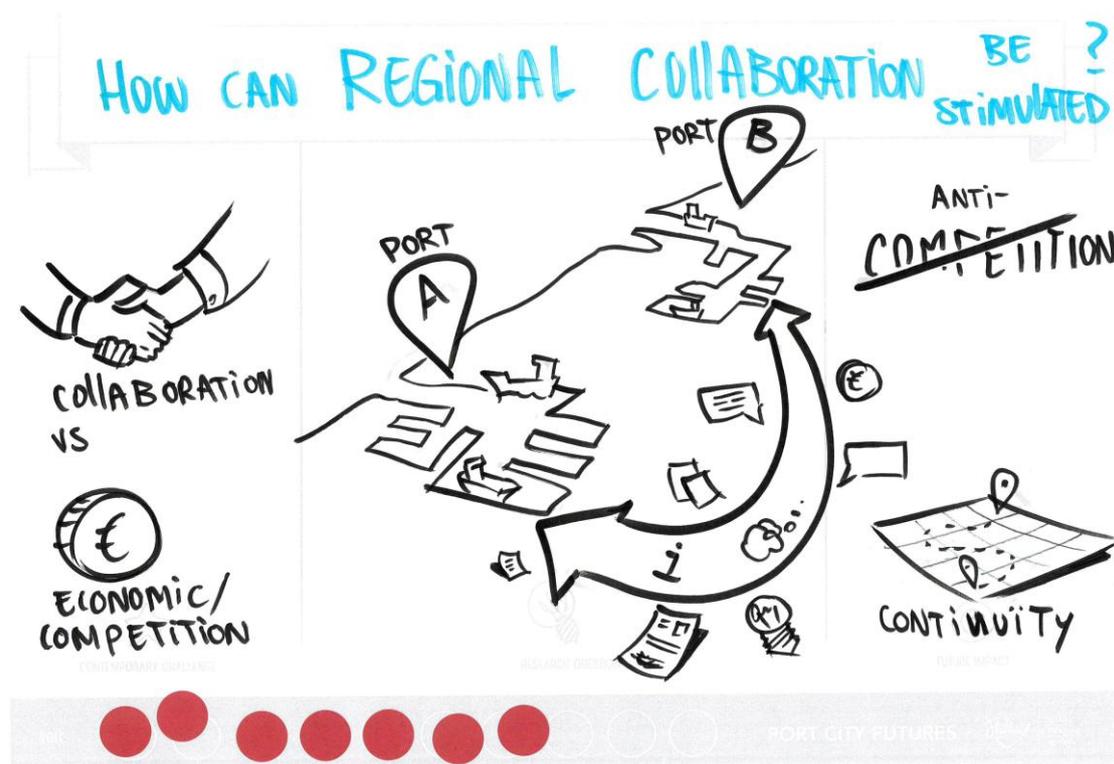
Figure 2. Collaboration among stakeholders and institutions on a regional scale can help design spaces and institutions for port city regions of the future.

Such a transformation requires rethinking the cultures of institutions and people. Culture is understood here as the values, practices and mindsets that have shaped institutions, policies and laws over time and that guide the social, spatial practices in port cities. In port city regions, for example, the paradigm of the port as a staple port or as a transit port[7] influences decisions regarding investments in infrastructures, in storage, and in hiring. Understanding the diverse forces and sectoral interests at play in port city regions is a first step toward identifying paradigms and maritime mindsets. Identifying these paradigms and developing new paradigms for the ports of the future thus requires a cultural understanding and ultimately a transformation. Such an approach goes beyond that of culture as an artifact linked, for example, to a heritage object. Instead it requires recognizing long-standing values, practices and mindsets connected to the politics, economics, and socio-spatial patterns of port cities and changing them.

Innovation requires collaboration of multiple stakeholders across multiple scales and sectors at the scale of the landscape beyond territorial and institutional boundaries. It requires a human-centered approach, one that shows awareness of the spatial, social and cultural dimensions of port city regions and how they have changed over time. Social scientists have started to conceptualize the particular character and the self-logic of cities[8], offering new approaches; but a clear understanding of the particularities of port cities has yet to emerge. There is a clear need not only to measure the economic or infrastructural impact of the port, but also its presence in the societal and cultural context of its larger region, including from the perspective of identities. Such an engagement is important to educate the port workers of the future (human capital) and to engage with the business community as well as professional actors, but also to interact with the population at large and to create a maritime mindset, where the creativity of the larger population

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[7] Carola Hein and Paul van der Laar, "The Separation of Ports from Cities: The Case of Rotterdam", in *European Port Cities in Transition.*, ed. Angela Carpenter and Rodrigo Lorenzo (Springer, 2020).
[8] Martina Löw, *The Sociology of Space. Materiality, Social Structures, and Action* (Palgrave, 2016).

engages with maritime practices and contributes to long-term port city resilience[9]. Beyond short-term marketing efforts, what is needed is long-term engagement with local publics through education, spatial integration, social investment[10], cultural engagement and questions about how lifestyles and culture can contribute to (re)building shared values[11] of port, city and region.
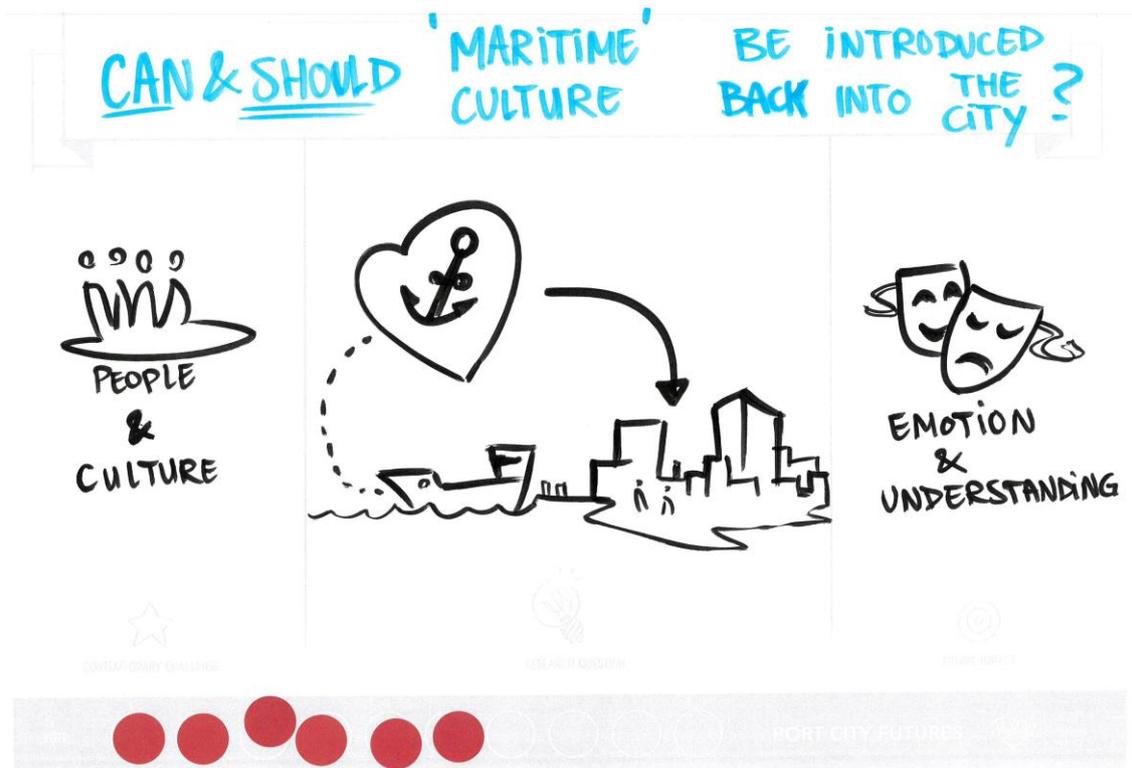

Figure 3. (Re-)creating maritime mindsets facilitates the development of new port paradigms.

Developing transition strategies requires a rethinking of port city regions, their scale and governance on the seaside and on the landside. There is growing awareness of the role of people, institutions, planning, laws, heritage and culture in the development of port city regions as a larger eco-system. More and more institutions are emerging that aim to solidify the collaboration among diverse stakeholders on the sea-land continuum and along shared waters. Two port city associations play a leading role here by bringing together public and private, port and city partners.

The AIVP (Association Internationale Villes et Ports—The Worldwide Network of Port Cities) Agenda 2030 specifies five goals that speak directly to the port-city relationship and the role of shared, spaces, institutions, culture and people therein:[12] renewed governance, investing in human capital, port culture and identity, port city interface, and health and life quality. These aspects are key to realizing the other goals identified by AIVP: climate change adaptation, energy transition, circular economy, sustainable mobility, quality food for all, and protecting biodiversity.

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[9] Carola Hein, Port City Resilience: (Re-)Connecting Spaces, Institutions and Culture, https://www.portcityfutures.nl/news/port-city-resilience-re-connecting-spaces-institutions-and-culture (last accessed 22 November 2020)

[10] Andrew Littlejohn, Are Cities, Ports, and Port Cities Systems? From Optimizing to Co-Creating Resilience, https://www.portcityfutures.nl/news/are-cities-ports-and-port-cities-systems-from-optimizing-to-co-creating-resilience (last accessed 22 November 2020)

[11] Port-City-Regions in a Time of Transitions: Value deliberation on port city futures, https://portusonline.org/port-city-regions-in-a-time-of-transitions-value-deliberation-on-port-city-futures/ (last accessed 22 November 2020)

[12] AIVP Agenda 2030, https://www.aivpagenda2030.com/

RETE, the Association for the Collaboration between Ports and Cities, also focuses on the role of different stakeholders in the port city region, as it promotes the scientific collaboration of experts and scholars regarding the major challenges facing the world's port cities around four cross-cutting themes: knowledge, spatial design, governance, and environment. At the same time RETE works through Advanced Nodes that join local stakeholders facing specific challenges in focused working groups in different contexts.

Other organizations, platforms and activities similarly promote a rethinking of the scales and values of port cities. The OECD has hosted a port cities program to identify how ports can facilitate urban development. In the Leiden-Delft-Erasmus (LDE) consortium, the PortCityFutures research program aims to combine spatial, social, and cultural development of port cities[13]. To varying degrees, all of these platforms work to connect ports as international and industrial complexes with the adjacent cities and regions that adjoin those ports. The role of the port city hinterland as the region that is directly served and transformed by port actions requires further conceptualization and intervention, as emphasized in the special issue of PortusPlus in 2019[14]. Many politicians and practitioners agree that to (re)-anchor the port in its larger physical context, the port needs to engage again with the needs and interests of local stakeholders and engage with the spaces they occupy.

Given their shared interests, actors of port, city, and region must come together to develop new spatial and social concepts. Inclusion of diverse local stakeholders is essential.
Port authorities are becoming more and more aware of the need to connect to the cities. The International Association of Ports and Harbors (IAPH 2020) has launched the World Ports Sustainability Program (WPSP). This program is based on the premise that "Ports are nodal points in global supply chains. At the same time, they are embedded in local and regional communities. As a result, ports must respond to worldwide, regional and local challenges, such as climate change, mobility, digitalization, migration and social integration"[15]. "Guided by the 17 UN SDGs the program wants to enhance and coordinate future sustainability efforts of ports worldwide and foster international cooperation with partners in the supply chain"[16]. The program recognizes that logistic chains reach deep into urban and rural spaces and affect societal and cultural functions.

The European Sea Ports Organisation (ESPO), serves a primary function of representing port interests. It has also built a knowledge network focused on the themes of environmental sustainability and port-city relations, representing port interests in the major European institutions. Their survey of environmental and social priorities among their members provides insight concerning the values that drive port institutions[17]. Other tools in place, such as the Green Guide, the ESPO award or the Codes on Good practices on societal integration and on cruise and ferry ports highlight various praise-worthy practices of ports. ESPO notably awarded its 2020 prize to the Port of Algeciras, recognizing its efforts to attract innovation and start-ups[18].

Other associations for waterborne traffic, such as the World Association for Waterborne Transport Infrastructure, PIANC, or Cruise Lines international Association (CLIA), are additional potential partners that deal professionally with sustainable development and with links between sea and land, countries and cities. In the Mediterranean for example, the Medports Association, created in

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[13] PortCityFutures, https://www.portcityfutures.nl/home (last accessed 22 November 2020)

[14] PORTUSplus - Special Issue: Governance in Port City Regions, Vol. 8 (2019), https://portusplus.org/index.php/pp (last accessed 22 November 2020)

[15] WPSP. "World Ports Sustainability Program (WPSP) Charter", (14. March 2018) (last accessed 22 November 2020)

[16] WPSP. "About WPSP", https://sustainableworldports.org/about/ (last accessed 22 November 2020)

[17] ESPO. "ESPO Environmental Report 2019 Ecoportsinsights 2019", (2019).

[18] ESPO. "Port of Algeciras Wins ESPO Award 2020!" ESPO, https://www.espo.be/news/port-of-algeciras-wins-espo-award-2020 (last accessed 22 November 2020)

2018, aims "at creating a new area of collaboration, production and exchange between the Mediterranean ports on common issues and is also promoting the international visibility of the Mediterranean maritime and port area, a true connected and connecting platform between Asia, Africa and Europe"[19]. Meanwhile, Medcruise, a federation that supports the cruise industry in the Mediterranean and adjoining seas, provides an additional framework for collaboration. Cruises depend on access to port cities and the hinterland and are thus an important link from sea to city and region.

Port authorities are starting to reach out to their neighboring cities and regions in diverse ways, but often this engagement is based on sectoral approaches. Interest in the hinterland is a key driver for many port authorities. Their spatial and infrastructural requirements and larger political and economic demands, but also their interest in human capital and citizen support, drive their engagement with port city regions. Examples of port authorities reaching into the hinterland include the creation of port regions, such as Central Tyrrhenian Sea Port system in Naples with Salerno and Castellammare, or growing awareness of regional dimensions in Valencia[20]. While port authorities mostly focus on logistics and transport, they acknowledge that their workings affect maritime and marine needs and interests, as well as those of nearby communities or the hinterland that they serve. As highly efficient and networked entities with long experience in the transformation of water and land-based spaces and institutions, ports and port authorities, as well as their network organizations can play a key role in the sustainable development of port city regions, including in regard to water, energy, or migration.

Connectivity between sea and hinterland is a key element in the emergence of stakeholder collaborations on the sea-land continuum. Sectoral initiatives, such as Motorways of the Sea (MoS) the maritime pillar of the Trans European Transport (TEN-T) network, an EU tool to connect to peripheral regions, "consists of short-sea routes, ports, associated maritime infrastructures, equipment, facilities and relevant administrative formalities. MoS contributes towards the achievement of a European Maritime Transport Space without barriers, connecting Core Network Corridors by integrating maritime links with hinterland"[21]. On the land side, transnational rail, road and river infrastructures facilitate the transport of goods and people. Sea and river ports are core nodes in this infrastructure. Discussions on the development of infrastructure and sustainable mobility on the sea-land continuum and nodes therein are part of ongoing discussions on the European Commission's European Green Deal. The proposed revision of the TEN-T Core Network addresses questions of sustainability, resilience and future-oriented mobility[22].

These sectoral collaborations can help coordinate activities among ports, cities and regions that are interconnected through maritime networks, share access to the same waters and often have common interests. Yet, sectoral collaborations alone are not sufficient. An ecosystem approach is needed that recognizes the impact of people on and in space and the cultural mindsets that have evolved over time and that influence the present and the future. The articles in this special issue provide theoretical and methodological insights and introduce relevant case studies. They speak to the importance of collaboration along the sea-land continuum and the need for inclusive and design-based approaches that include a cultural dimension at all scales.

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[19] Medports, About us, https://medports.org/about-us/ (last accessed 22 November 2020)

[20] Paolo De Martino and Carola Hein (2020) The Creation of the Central Tyrrhenian Sea Port Authority: A critical juncture for the Naples port city region?, PortCityFutures, 2020, https://www.portcityfutures.nl/news/the-creation-of-the-central-tyrrhenian-sea-port-authority-a-critical-juncture-for-the-naples; Chapapria, Vicent Esteban. "Disruptions and the Effects of Covid-19 on City and Port Plans. Valencia." PortCityFutures, 2020, https://www.portcityfutures.nl/news/disruptions-and-the-effects-of-covid-19-on-city-and-port-plans-valencia.

[21] European Commission, Commission, European. "Motorways of the Sea", https://ec.europa.eu/transport/themes/infrastructure/motorways-sea_en (last accessed 22 November 2020)

[22] European Commission. "Ten-T Review", https://ec.europa.eu/transport/themes/infrastructure/ten-t/review_en (last accessed 22 November 2020)

Overview

In their article "Building Transformative Capacities: Integrating design research into port-city transformation", Caroline Dahl and Lisa Diedrich underscore the importance of conceptualizing port city regions as a "complex human-environment system." Such an approach, they argue, requires transdisciplinary approaches and design thinking at the landscape scale. Through the examples of port areas in the Ile de Nantes in France, Frihamnen area in Gothenburg and the unrealized BayCity project for Providence, USA, the paper explores the potential impact of design approaches for dynamic planning.

Massimo Clemente, Gaia Daldanise, Eleonora Giovene di Girasole, and Simone Stella similarly take a landscape approach and emphasize the need for collaborative governance, focusing on the coast and the sea as a maritime cultural landscape. Recognizing "cultural ecosystem services" and diverse values is an important step, as the authors explain through the case of Cilento in the province of Salerno (Campania). Collaborative governance among institutional and non-institutional actors is needed to enhance the coastline as a maritime cultural landscape.

The impact of globalization and the increased numbers of goods transported across ports and the resulting need for more land is at the core of the contribution by Matteo Ignaccolo, Nadia Giuffrida and Giuseppe Inturri. They critique the sectoral approach to maritime transport and environmental impact on nearby communities and advocate a holistic approach to key environmental problems that considers air quality, energy and climate change, relationship with the local community, ship waste and garbage, but also noise, dredging and water quality. The article provides some best practice examples for addressing these challenges.

The necessity of rethinking stakeholder relationships across institutional boundaries in line with the new territorial needs is also the focus of the contribution by Paolo De Martino. Building on the concept of path dependencies and the historic relationship between diverse stakeholders, De Martino examines the ways in which the creation of the Central Tyrrhenian Sea Port Authority has become an instrument of change in a port city region that has been characterized by inertia.

Institutional culture is highly relevant also for waterfront regeneration. Former maritime heritage sites can help rebuild a maritime mindset, a sense of the need and urgency of maritime practices. Enrico Tommarchi discusses "maritime cultural quarters" and argues that these are distinct from other forms of waterfront regeneration, as they include cultural offerings connected to water and maritime practices. Through the lens of case studies from the North Sea and the Mediterranean, Tommarchi shows how these sites engage specifically with local maritime culture.

The question of culture in port cities needs to be extended to institutional formations as well as to less well-known and recognized heritage sites. Vincent Baptist takes up this challenge to explore the theme of culture and a rethinking of maritime mindsets through the lens of pleasurescapes, the public spaces of entertainment. He argues that debates on the future of port cities would benefit from recognition of the particularity of port city culture. Maritime life has completely changed, yet studying these spaces reminds us of the need to revive the connection with water and maritime practices to rebuild a *maritime mindset* or *port city culture* based on a strong and dedicated collaboration among diverse groups of public and private actors.

Together, these articles stress the the need for stakeholder engagement, cultural change, and approaches that focus on long-term historical developments, large-scale connections and on maritime culture[23]. They demonstrate that addressing the diverse environmental, economic, safety

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[23] Carola Hein, Port City Resilience: (Re-)Connecting Spaces, Institutions and Culture, PortCityFutures, https://www.portcityfutures.nl/news/port-city-resilience-re-connecting-spaces-institutions-and-culture (last accessed 22 November 2020)

and other challenges on the edge between land and water, port and city requires a rethinking of maritime mindsets, development of multidisciplinary approaches and a focus on multi-stakeholder engagement.