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# Resilience, Disaster, and Rebuilding in Modern Port Cities

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## Abstract

Resilience has become a buzzword used to describe the capacity of cities to bounce back after disasters. It carries the hope of a robust and more sustainable future. Disasters can strike any region, but port cities face complex and particular risks due to their location at the intersection of sea and land, and their role in an international maritime system. This introduction to the special section on resilience, disaster and rebuilding in modern port cities first examines resilience as a concept and course of action in a heterogenous theory landscape. It then explores different dimensions of resilience—environmental, economic, institutional, social and spatial—and their importance in port city historiography. The articles collected in this special section explore case studies from three continents. Together, they demonstrate that there is no such thing as the resilient (port) city. But, they also show that the combination of maritime and urban interests can lead to creative planning for resilience, particularly when port and city authorities pursue the same strategies. In view of contemporary challenges, this special section demonstrates the value of further research on port city resilience and vulnerability. The section raises an important question: Is it possible to balance the wide-ranging economic interests of port actors and their view of waters as sites for shipping with those of local actors concerned about water quality and ecosystems?

## Keywords

resilience, sustainability, vulnerability, disaster, rebuilding, port cities

Die Stadt, zur Hälfte abgebrannt,  
Wird aufgebaut allmählich;  
Wie 'n Pudel, der halb geschoren ist,  
Sieht Hamburg aus, trübselig.

Die Bank, die silberne Seele der Stadt,  
Und die Bücher, wo eingeschrieben  
Jedweden Mannes Banko-Wert,  
Gottlob! sie sind uns geblieben!

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(Heinrich Heine, Deutschland ein Wintermärchen, 1844)

*They're slowly rebuilding Hamburg-one half*

*Was burnt in the fire disaster.*

*The town's now like a half-shorn dog,*

*Looking sadly up at his master.*

*The Bank, the city's silver soul,*

*And those books with the information*

*On what each man is worth, praise be!*

*were saved from the conflagration.<sup>1</sup>*

The German poet Heinrich Heine famously reflected on the three-day Hamburg fire of 1842: though it had burned down half of the city, the financial records were saved. In the months following the fire, local elites turned the destruction into a chance to reorganize the city center: expropriating owners, improving infrastructure, changing land patterns, and developing new sites for administrative functions.<sup>2</sup> Their rebuilding of the city after the fire can be seen as a prime example of (port) city resilience, the capacity to bounce back after disasters and to adapt to political, economic, social, or other challenges. But Heine's comments were also ironical, pointing to another side of such a reading: he implicitly critiqued the decisions that put the safety of the stock market and its securities over the lives, health, and buildings of less well-off families; he might well have added that trade continued too, as the port kept on working despite the disaster.<sup>3</sup> He clearly recognized the failure of local merchants to take preventive action for the port and city at a larger scale. Such investment might have clashed with their economic interests. Their decisions benefited some, promoting the economic well-being of port and city leaders, but also furthered inequalities between traders, land owners, and the rest of the population.

Hamburg, the North German port city with Hanseatic roots, has a long history of port and city transformation that can be read as resilience in the face of diverse natural and man-made disasters. Politicians and traders collectively shaped the city through the ages. A good example of close collaboration between trade and civic leadership is the bridge that connects two buildings—the stock exchange that survived the fire and the town hall built after the fire (Figure 1a and b). Throughout history, Hamburg's elite weighed the interests of trade and shipping with those of the local population as they fostered the workings of the port. The city's history also raises questions about the flip side of the local elite's continued pursuit of port city resilience: the price paid by some population groups such as the city's working-class population. After the fire of 1842, the elite left the working class to its own devices. Heine understood that the benefits of resilience of port city functions—trade and urban form—are not necessarily shared by all citizens. His poem anticipated by almost one hundred fifty years a 2012 World Bank report stating that risks and disasters directly and indirectly affect all urban residents, but that elites let those at the bottom of income distribution—those disadvantaged by discrimination on the basis of class, race, and gender—face the greatest challenges.<sup>4</sup> The primary focus on port city activities and their resilience may also work against the resilience of other aspects of port city development, including notably the environment.

Port city regions around the world today face a number of complex problems that require reconceptualization and collaboration from port, city, and region actors to allow for integrated spatial and social planning and design measures so the port and city (and region) can jointly



(a)



(b)

**Figure 1.** (a) and (b): The Hamburg City Hall and the bridge linking it to the stock exchange (aerial view, Google Maps); and photo seen from the Northwest (author: Carola Hein).

evolve in this limited space. The OECD (Organisation for Economic Co-operation and Development) Port-Cities Programme calls for any vision for the port to be “imaginative rather than technocratic.”<sup>5</sup> Their research hints at the need for port, city, and other actors to prepare the

ports and their surrounding regions for coming challenges of climate change, digitization, or migration, instead of the economic and port-competition criteria that have long dominated port city infrastructural and planning decisions. Citizen support is a key element to re-establishing links between ports and regions, and tools are needed to establish them. A better understanding of historic resilience in port cities and the role of citizens therein can help foster ongoing and future (port) city resilience.

In light of such conflicting interests, scholars must explore the question of resilience of cities in general, and port cities in particular, in a nuanced way. We need to ask: What does the term mean to whom? Elites and workers, decision makers and citizens, port and city stakeholders all have different perceptions and experiences. What does resilience mean at different geographic and political scales? Spatial and governance transformation play out differently at local, city-wide, metropolitan, and regional levels. What type of resilience is in play—environmental, economical, institutional, social, or spatial? Finally, what time frame is most important for resilience and possible (planned) interventions? Inquiring critically into the history of port city resilience can provide insights into adaptability and preparedness as well as inequalities over time. Therefore, this special section uses multiple case studies to ask: Are port cities, as a particular type of territory and governance system, better equipped to deal with moments of change than other types of cities? If so, what practices, plans, or institutions are most important to fostering this resilience?<sup>6</sup> In particular, this special section considers patterns of resilience in terms of complex systems of scales, actors, governance structures, policies, temporalities, inequalities, and cultures; it seeks to identify moments of decisive change.

This kind of long-term comparative analysis of historic predicaments provides decision makers with a broader understanding of how resilience works. Studying historic cases of reorganization, rebuilding, and restructuring in port cities gives important context to current risks and potential responses. It facilitates comparative investigations of port cities' responses to climate change, migration and demographic transformation, major economic shifts, and new societal challenges including terrorism.

## Resilience as a Term, a Concept, and a Course of Action in a Heterogeneous Theory Landscape

Research for this special section started in 2013, when Carola Hein, Dirk Schubert, and Pedro Garcia proposed a session on “Disaster and Reconstruction in Modern Port Cities” with a focus on resilience at the conference of the European Association for Urban Historians (EAUH) in Lisbon.<sup>7</sup> Discussions continued at the conference of the International Planning History Society (IPHS) in 2016 in Delft. At the time, the term resilience had only started to find its way into urban and planning history. Over the past several years, scholars in various disciplines—from urbanism and planning to history—have started to use the term *resilience* abundantly and with a broad range of interpretations and definitions. Effectively, the term seems to have replaced or supplemented earlier concepts such as “sustainability.” Many of the writings have presented resilience and vulnerability as concepts that are encompassing and politically neutral, and they often left out a critical reflection on resilience that engages with political interests and ideological content. Such a reflection needs to engage with other current theoretical approaches. Here we refer briefly to some current concepts, methods, and analysis, discussed notably by English- and German-language scholars to analyze the history of urban and port developments.

The *concept* of resilience has received a lot of attention in urban and planning history in recent decades. In the early 1970s, ecologist Crawford Stanley Holling introduced the dynamic as part of flexible, adaptive regulation of ecosystems.<sup>8</sup> Concepts of resilient *urban* development first emerged in countries where earthquakes and other natural disasters were more prevalent and

dramatically underscored the vulnerability of cities. In fact, planning for resilience in most cities is very difficult, given the high degree of incalculable dangers, or *uncertainties* as defined by the German sociologist Ulrich Beck,<sup>9</sup> and unclear spatial implications of disasters. Responses to disasters vary extensively over time and through space. Planning historians Lawrence Vale and Thomas Campanella describe the traumas of diverse crises, including earthquakes, fires, floods, storms, as well as wars, terrorism, financial crises, and they address the politics of reconstruction after such events.<sup>10</sup> The planning historian Sir Peter Hall has connected even planning disasters with uncertainty.<sup>11</sup>

Some scholars across several disciplines have recently started to qualify the term “resilience.” They note that resilience is not always a positive thing, and that it does not happen automatically or by chance. The American sociologist Diane E. Davis has pointed to the need to also identify *negative resilience*, as in the case of urban violence, in which citizens learn to live under violent conditions and continue their daily activities; but in doing so, they unintentionally allow a bad system to continue functioning.<sup>12</sup> Similarly, in the current energy transition, major oil companies promote developments that support their own survival and that are derived from their historic investments, though these developments actually perpetuate dynamics that damage others.<sup>13</sup> For example, carbon capture and storage technologies aim at reducing CO<sub>2</sub> in the air, but they effectively continue or even facilitate a carbon-based economy. In a post-disaster setting, one might even speak of *counter-productive resilience*, in which traditional patterns and behaviors oppose urban redesign. For example, after an earthquake, people might wish to rebuild on their traditional lots rather than wait for a new larger scale design that could facilitate the functioning of the city as a whole.<sup>14</sup> Who can or cannot rebuild, for whom resilience is productive or counter-productive: these are major aspects of inequality. In this light, resilience is also a set of competing discourses, narratives that different actors create to advance specific ideas about resilience.<sup>15</sup>

Although competing, these multiple narratives, or types of resilience, can contribute to the emergence of an imaginary of resilience. Stories of resilience come from citizens who experienced it; they are also constructed by media and politicians for changing audiences. Depending on who interprets the disaster and to which audiences they speak, different narratives of physical reconstruction can co-exist and shape the views of those in charge of the rebuilding, as well as those of subsequent viewers. Individual people will reflect on the architecture and urban forms as well as the key narratives to construct narratives around destruction and rebuilding in the context of their own life. Thus, once buildings and cities become part of a resilience narrative, these stories inspire future rebuilding projects. The number of books published after New York’s 9/11 and Fukushima’s 3/11 on resilience in architecture and urbanism testify to the ways in which pivotal moments of rebuilding have come to influence subsequent designs.<sup>16</sup> In complex systems, such as port cities and their regions, the narrative of resilience may be different for each stakeholder, potentially even in contrast to each other. In fact, those with more power can effectively impose their preferred interpretations. Some narratives dominate others, becoming pathways to the future.<sup>17</sup>

Resilience narratives can help the leadership in developing and enforcing a specific *course of action*. The city of Hamburg, for example, has constructed a narrative of its role as a leading port city that the leadership calls upon when potentially divisive projects are developed such as the potentially environmentally damaging dredging of the river needed to accommodate large ships. In order to keep the Hamburg port competitive and “a leader,” the Elbe River has been deepened a total of eight times since 1860. Most recently, in April 2019, the dredging project was awarded to the Belgian company DEME.<sup>18</sup> Approximately 238 million Euro was slated to be spent to widen and deepen the 116 km of the waterway between Cuxhaven and Hamburg to a level of –14.5 m. This meant transporting some 40 Mio cubic meter sediment to the entrance of the North Sea including the German Wadden Sea which is part of the UNESCO world heritage site. A group of non-governmental organizations heavily critiqued the dredging for a range of reasons, notably on the grounds of protecting the environment and nature.<sup>19</sup> They feared that the constant

cleaning of the river bed kills young fish and sea creatures and that the disposal of sediment destroys the ecosystem of the outer river and bay. They proposed a combined initiative for the North German ports of Hamburg, Bremen, Bremerhaven, and Wilhelmshaven instead, and they took legal action, ultimately unsuccessful, against the dredging project. Their fight to protect the environment could not overcome the powerful, historically anchored discourse of resilience of the port as driver of the economy.

Many scholars have come to question the focus on the resilience of a single actor. Planning scholars Ayda Eraydin and Tuna Tasan-Kok, for example, have proposed a planning process that “focuses on ‘building a self-organisation capacity’ alongside a change in the value system that can overcome unequal power relations.”<sup>20</sup> This process can occur within Rockefeller Foundation’s pioneer network of “100 resilient cities (100RC),” The website states:

Building urban resilience requires looking at a city holistically: understanding the systems that make up the city and the interdependencies and risks they may face. By strengthening the underlying fabric of a city and better understanding the potential shocks and stresses it may face, a city can improve its development trajectory and the well-being of its citizens.<sup>21</sup>

The interpretation of the term resilience has been questioned by various planning scholars. Simin Davoudi, for example, critiques both engineering resilience, which assumes a single equilibrium to which a system bounces back, and ecological resilience, which assumes multiple systems. She argues that both also assume that there is a normality to bounce back to. She instead reflects on the potential of a critical integration of the concept in the planning discipline.<sup>22</sup> She looks beyond earlier approaches to propose “evolutionary resilience,” which

suggests that the very nature of systems may change over time with or without external shocks. It sets the resilience of a system in the context of the evolution of that system, which is non-linear and self-organizing. This evolutionary process happens in a series of nested adaptive cycles with complex spatial and temporal feedback and interactions.<sup>23</sup>

Such an assessment is in line with what the U.S. planning historian Larry Vale terms *critical resilience*, in which *critical* means increased attentiveness to issues of power and politics in pivotal moments of disaster and rebuilding.<sup>24</sup> These reflections on resilience show that a more systematic analysis is needed. Swedish social scientists have picked up on this, inquiring into the meaning of the term with explicit questions about agency, conflict, knowledge, and power. They note that “one person’s resilience may be another person’s vulnerability.”<sup>25</sup>

In light of this discussion on resilience and theory, we ask if a thorough investigation of port city historiography through the lens of resilience can shine a new light on port city development.

### *Port Cities as Places of Resilience*

Cities are generally resilient entities, at least in the sense that their physical existence has endured. Globally, very few urban settlements have completely disappeared. Even sites of repeated destruction have been rebuilt multiple times. The investment in infrastructures and the built environment has often attracted new people and served changing institutions. Port cities, with their emphasis on trade and the historic entanglement of port and city actors, have a particular capacity for economical, institutional, and environmental resilience. Port cities are indeed a distinctive urban type, different from other types of cities such as capital cities, factory towns, or university hubs. Port cities are tied to a specific kind of location, at the meeting of sea and land. They require finance-intensive large specialized infrastructure built for the long term, such as docks, wharfs, cranes, and warehouses. The erection of these structures requires long-term planning and collaboration, as well as a process of adaptation that may be exemplary for the kind of



**Figure 2.** The opening of the seaport of Brugge celebrated in 1907 (artwork by J. Gilbert).  
Source: [https://nl.wikipedia.org/wiki/Zeehaven\\_van\\_Brugge#/media/Bestand:Brugge\\_Zeehaven001.jpg](https://nl.wikipedia.org/wiki/Zeehaven_van_Brugge#/media/Bestand:Brugge_Zeehaven001.jpg)

evolutionary resilience proposed by Davoudi. Negotiation and collaboration among multiple partners has made port cities culmination points of innovations in business, society, and culture. Port cities are often characterized by the entanglement of public and private stakeholders: national, regional, and municipal agencies and port authorities have to collaborate to guarantee the flows of goods, people, and ideas that are the ultimate goal of port cities.

Port cities have preceded many international developments. They can be considered places that anticipated subsequent globalization: maritime networks always had a local involvement while operating internationally. They have dealt with a broad range of external and internal shocks. These include the following: natural challenges, such as earthquakes, fires, or hurricanes; changes in neighboring water levels, including rising seas or the accumulation of silt; war; official neglect of infrastructure; and shifts in global trade and shipping patterns, new technology, and political challenges that push them to circumvent restraining national boundaries. They have survived local conflicts, such as port city workers strikes<sup>26</sup>; discord between local elites and traders; and clashes between citizens and large companies (such as petroleum companies) over environmental challenges. Over and over again, they have bounced back physically, economically, and environmentally.

Port city resilience also relies on the capacity of a port and its city to change in scale and location. The historic city of Bruges, once a key node in the Northern Hanseatic League, is a well-known example of a port city that lost its prominence due to the silting up of the river. It is also an example of the adaptation capacity of port cities, as the Belgian state and the City of Bruges built a new sea port, Zeebrugge (Brugge on the Sea), which opened in 1907 and is now a gate to Belgium (Figure 2). In fact, until the 1960s, most port cities survived and adapted to new functions in this way, with only a few losing their shipping role altogether (and then often as a result of extensive and rapid natural transformation, such as water level change or erosion). This resilience may come as a surprise to traditional economists who might argue that, as monostructures,



ports are not particularly resilient.<sup>27</sup> Especially vulnerable, they argue, are specialized port areas (container terminals, seaport industries, and logistics hubs, for example) and port cities dedicated to single purposes (say ferries, fishing, or oil). Such thinking misses resilience because it ignores the importance of drivers of long-term growth including the diversification of regional economies, developmental differences, external effects, or local involvement, as Jane Jacobs recognized decades ago.<sup>28</sup>

Whether port cities still have this capacity to respond to disaster remains a question, and this special section explores it. The interaction of humans and port infrastructure in ports came to an end in the 1960s due to the external shock of the “container revolution.” In this worldwide structural change in logistics, shippers packed cargo into standardized containers that could move between trains, ships, and trucks without being unloaded. The maritime industry dismissed dock workers en masse, redesigned port spaces, and actually created entire new ports in deeper water for larger ships. Formerly bustling working ports now stood empty and still. Over time, some local administrations around the world restructured and gentrified the former port areas of their cities, creating new areas for leisure, commerce, administration, and housing. As port authorities focused on global trade, that is, some of their neighboring cities adopted non-maritime urban strategies. Thus, two separate resilience strategies were pitted against each other: one geared toward the continuation of maritime activities and the other toward the development of other urban practices. Port cities had split into ports and cities.

This split has garnered more economic opportunities for the port in the last decades than for the city; it may not be a model of resilience for future port and city regions. It has led, for example, to a segregated planning approach to waterfront revitalization and to river and coastline development.<sup>29</sup> One may argue that there are separate development paths (referring to the concept used in historical institutionalism and developed in the political sciences) that no longer engage and support each other. In such a constellation, different institutions address water and shipping challenges (such as rising sea levels) separately, even though both involve water. But the port sometimes shares its spaces in whole or part with the city, their administration entangled. The governance of these extensive landscapes, the logistics of multiple flows, and the multi-layered use of these complex spaces, notably at the regional level, requires a collective approach.<sup>30</sup>

### *Dimensions of Port City Resilience*

Port cities may be inherently resilient because of their role as nodes between water and land, this assessment still raises the question of how actors in port cities foster or historically have fostered resilience, and what the respective positive and negative implications have been for different actors and in light of the three interlinked, sometimes conflicting, pillars of sustainability (environmental, economical, and social), as introduced in the Brundtland report of 1987. Resilience encompasses notably environmental, economical, institutional, or social but also technological and spatial aspects. First, it is *environmental*. Ports and port cities have to develop permanent and temporary solutions to shape their urban structure and function to address the challenges of proximity to large bodies of water (river, delta, sea, ocean), including the constant threat of water-related disasters. They have to devise structures to prevent coastal erosion, to protect against waves and storms, floods, and rising or receding waters. They have to provide port infrastructure that allows for loading and unloading of ships in safe conditions (including docks, wharves, and tidal ports). Given their shared geography, ports can also share some of these responses, but local environmental specificities—for example, ice, currents, urban development—also require specific innovation. The port, including its infrastructure and industries, creates its own environmental effects, including water, soil, air, and noise pollution; sea- and land-based transport add more. Port-related practices, such as dredging, can be disastrous for fragile nature zones and are often disputed between environmental preservationists and economic leaders of port and city authorities around the world.

Many trade-driven port cities around the world prioritize *economic* resilience. Port actors, often in collaboration with local and sometimes national leaders, will invest in continuing port-related functions (such as shipping, trading, storing, producing, and administration) that are key to economic growth. Similarly, scholars and port actors often define port city resilience primarily in *economic* terms: optimizing continued growth, higher tax revenues for communities, jobs, and cargo-handling and other logistics processes. In this context, the port city exemplifies what the American sociologists Harvey Molotch and William G. Domhoff have called the “local growth machine”<sup>31</sup>: local elites in port cities connected with shipping and trade promote entrepreneurial city policy in line with their own development goals by creating a “pleasant business climate” (consisting of no corruption, recruitment of companies, no unions, cheap labor, and low taxes).<sup>32</sup> In particular, local real estate actors benefit financially as their properties gain value when new commercial interests, policies, or narratives emerge. Elites assume that growth will create new jobs and generate wealth; prosperity will then trickle down and benefit workers as well and balancing out social injustices.

Stable relationships and close collaboration among all the institutional stakeholders and governance agencies in port, city, and region can assure *institutional* and *social* resilience. The presence of appropriate legal systems, educational institutions, and structured recreation and leisure can help cities recover from disasters. The institutional interests of the port and those of the city or region are often intertwined, but they are not identical. National actors may be interested in a port as a gateway to the country, but have little interest in the adjacent city. A local government might prioritize other economic priorities. Port authorities control their own space and can pursue strategies for environmental, and spatial resilience without consulting their urban or regional counterparts. Yet, they also depend in many ways on the neighboring territorial governance. City and region have often developed with, for, and next to or around the port, but they also have pursued their own goals and interests, some opposed to those of the port. Urban and regional interests are not uniquely related to the port and local aims can counter global and port interests. Moreover, the governance of ports differs around the world, as does the governance of the cities and regions alongside ports. The institutional resilience of ports, cities, and regions—in all its facets—depends on managing this entangled institutional collaboration.

Port cities establish *social* resilience to include non-institutional and often disadvantaged actors. Historically, ports—often large industrial entities—employed regional workers, bolstering the economy. In response, neighboring city, municipal, and regional institutions facilitated the growth and, if necessary, the rebuilding of ports, even where port functions abutted lived-in urban spaces and other important built-up or natural areas. As long as this symbiotic relationship lasted and ports had positive economic effects, they had broad support from key parts of the population. In those cases, local governments and citizens ignored ports’ negative environmental effects (i.e., emissions, noise, nature destruction, security risks) and inequalities. Their joint development depended on choices and large-scale investment by stakeholders in port infrastructure.<sup>33</sup> This growth coalition often excluded minorities and other groups not directly associated with port city work, as the coalition did not view their contribution as essential to the resilience of the port city.

Environmental, economical, institutional, or social resilience intersected with technological and spatial development. At times when the needs and interests of port and city leaders as well as the regional and national agencies in charge of the countries overlapped, they have pursued and invested collectively in *technological* interventions, including *spatial* structures. Ports have needed rail, road, and waterway systems to deliver goods from other lands into the hinterland. These have to cross neighboring territories, often competing with urban infrastructural needs. Cities near ports have depended in part on the global interests and forces that shape port development. Their leaders and citizens in urban areas bordering the port accepted externalities such as infrastructural thoroughfares, noise, and air pollution in exchange for job opportunities.

Technological innovation in shipping, warehousing, communications, and port logistics included sea and land elements and their interconnection. The change from sail ships to

steamboats, and from coal to petroleum as fuel, required innovation in ship construction and in on-land fuel storage facilities. To carry a load of petroleum through the Suez Canal, for example, people had to invent and construct a tanker ship. The constant increase in the size of ships has pushed port cities to enlarge and deepen harbor basins and develop new technologies for dredging and disposing of sludge. When natural harbors were no longer deep enough to accommodate large ships, cities and ports created artificial harbors using breakwaters or concrete walls. New communication lines, such as the telegraph in the nineteenth century and digital communication at the turn of the twentieth century, changed ships' patterns of arrival, and of unloading and transferring cargo to the hinterland infrastructure, and thus port logistics. The continued improvement of transshipment facilities (docks, wharves, cranes) for moving cargo between ship and shore, and other support facilities like warehouses and logistic centers—most recently through automation—has been key to the economic development of individual ports as part of the global system.

As political, economical, and geographical changes (re)-shaped shipping patterns, and after natural or human-made disasters, port actors—ports and waterfront institutions, leaders of ports and cities, and their citizens—adjusted, refocused, and rebuilt the port and the city, often building on and continuing rather than disrupting historical patterns. The technological and spatial choices and investments of past port and city elites shaped planning going forward, often for several hundreds of years. The choice of local port leaders, with the support of local municipalities, to build docks in London, a tidal port in Hamburg, or finger-piers in Philadelphia in the nineteenth century has had a strong impact even on waterfront redevelopment today (see chapter Hein/Schubert). At the same time, containerization, automatization, specialization, and scalar growth have ended the traditional close relationship between ports and cities. The new period requires innovative shared planning in line with evolutionary resilience.

*Spatial* resilience, partly due to the longevity of costly and expansive (port) infrastructure, can thus have both positive and negative connotations: it can help a port city maintain its role as a center of shipping, maritime expertise, administration, and logistics; it can also lead to a continuation of environmental, economical, social, or other practices that were relevant and accepted as part of a paradigm historically, but that are no longer in line with unfolding needs and views and that can become detrimental to resilience. Historic structures can produce a so-called lock-in effect, in which continuation is more cost-efficient than change. As a result, spaces such as the vast petroleum areas in many industrial ports continue to function because of existing investments, long contracts, and larger energy networks that support them. The Philadelphia refineries on the Schuylkill River were an example of polluting practices that continued for such reasons. The refineries, which started in the 1870s, continued to work despite their age, environmental hazards, and location in a dense urban area. Only a catastrophic fire in 2019 led to the shutting down of the site.<sup>34</sup> In the language of historical institutionalism this would mean that a particular development path prevents change and requires a critical juncture for new technological, institutional, or planning-related interventions to appear. For example, a paradigm change has started to happen in the Netherlands where resistance against water was long the foundation for water planning. The 32-km-long Afsluitdijk that has enclosed the Zuiderzee bay since 1932, separating it from the North Sea, stands as example. This concept has been partly replaced by an approach that aims to respond flexibly to floods and changing water patterns, exemplified by the Room for the River program that manages flood risks without dykes. This is also an example of evolutionary resilience in the field of planning, or resilience itself as a system that continuously adapts and changes.

## **Resilience, Past, Present, and Future of Port Cities: Case Studies**

Public and private actors have faced multiple, intertwined challenges in port cities for centuries. The papers in this Special Issue are case studies exploring the ways in which local institutions in port cities have prepared for crises, addressed disruptions, and rebuilt after crises. The authors

inquire into the forms of urban planning after natural or man-made disruptions, and into the actors, institutions, tools, forms, and timing of rebuilding the port and its adjacent city.

Many articles of the special section further explore the meaning of resilience, some of them using historical institutionalism to understand it. In his contribution, Stephen Ramos, for example, points to a city's ability to adapt as a key element in its resilience after disasters. His analysis of the development of *Savannah's port* since 1733 explores, in line with the language of historical institutionalism, concepts of path dependence, critical junctures, and adaptation. Ramos identifies three key junctures (including the period when the United States deepened the Panama Canal) that highlight the city's geographical, institutional, and cultural resilience. He concludes by suggesting that we need additional theoretical frameworks to analyze historical port city resilience; he proposes actor network theory and urban design aesthetics.

Kirill B. Nazarenko and Maria A. Smirnova reflect on the resilience of *St. Petersburg port and city*. The authors discuss the multiple challenges facing the St. Petersburg port and city and explore rebuilding from the city's origin in 1703. The city's location—at the junction of sea, river, and railway—made it a key node for traders and several layers of government. Leaders and citizens developed solutions to overcome floods, ice, fires, wars, and other challenges over many centuries. The port and city's resilience is largely a factor of state support for innovations (including the first icebreaking ship, flood control, and a sea channel) as well as for rebuilding after the siege in World War II. Geostrategic location is also key to the resilience of the ports of *Koper*, *Trieste*, and *Rijeka* (located in Slovenia, Italy, and Croatia, respectively) on the Northern Adriatic, discussed by Lucija Azman. With a comparative perspective, this article explores how these three port cities have withstood natural disasters, financial crises, social vulnerability, and political instability. The destabilizing factor in the region is the incessant struggle between countries, cities, and ports for political and economic dominance. Koper is an exceptional example with its unexpected resurgence after the Second World War.

Two contributions address questions of resilience in Japan. Jessa Dahl adds the story of *Nagasaki*, a city that became known as a failed treaty port. When, after two hundred years of seclusion, Japan joined the global system in the mid-nineteenth century, Nagasaki (including its foreign settlement, Dejima) lost its unique position as the gate to Japan. Exploring this moment not as a failure but as a moment of resilience in the face of world-changing events, Dahl provides a nuanced understanding of Nagasaki's nineteenth century experience. In turn, Izumi Kuroishi examines rehabilitation projects after the Showa Sanriku Tsunami of 1933, focusing on the report titled *Housing Reform Research in the Tohoku Agricultural, Mountain and Fishery District* (Tohoku Nosangyoson Jutaku Kaizen Chosa). This study set an important precedent for reconstruction strategies for *Kesennuma City* and its fishery port after the Great Northern Japan earthquake in 2011.

Questions of leadership in creating port city resilience are key to the piece by Christoph Strupp, who explores how key figures from politics and the port economy of *Hamburg* responded to the disasters of 1945: global political change and the long-term political consequences of the trauma of the lost hinterland. It focuses on the response by port and city leaders in Hamburg to the construction of a border dividing both Germany and Europe just some 70 km inland, and the emergence of an inner-European market that potentially favored the Dutch and Belgian ports. Pedro Ressano Garcia studies a city's ability to face the decline of the port, looking through the lens of regional plans from central and local government authorities for the *Lisbon Waterfront* between 1973 and 2013. Each plan set out to relocate port facilities and to redevelop and improve waterfront territories for the community and the environment; their larger goal was to make Lisbon competitive enough among other global cities to attract global investors.

Finally, Carola Hein and Dirk Schubert conclude this Special Issue with a comparative study of resilience in three seaport cities: *London*, *Hamburg*, and *Philadelphia*. They link long-term port and city resilience to the explanatory approach of path dependence to provide insight into the need for planning for an uncertain future. Through case studies, this article explores the multiple

geographical, economical, political, cultural, and other conditions that are part of port city resilience. Each case study exemplifies a different development path of port city relationships: London saw the port move out of the historic location in the city center, leaving room for urbanization; Hamburg as a city-state carefully maintained the maritime sector in its urban space and developed a multifunctional waterfront; meanwhile Philadelphia largely gave up on its maritime role, both in terms of port function and in using the waterfront as background for urban transformation. Such research is promising for the history of cities and ports, and of resilience. It shows how different approaches—individualizing, microanalytical, empirical-phenomenological—can be combined with generalizing, structuralist, and theoretical problem-oriented ones.

In short, the contributions collected here investigate the multiple actors and histories of resilience in port cities, including Savannah, St. Petersburg, Koper, Trieste, Rijeka, Nagasaki, Kessenuma, Lisbon, Hamburg, London, and Philadelphia. They show how port cities, small and big, have experienced human and natural catastrophes and have often re-emerged as even stronger trading hubs afterwards. Each author touches upon aspects and interpretations of resilience and provides insight into local developments. Many more key moments of disaster and rebuilding in port cities can be named and ought to be studied: London in 1666, Lisbon 1755, Rotterdam and Tokyo in 1945, Kobe in 1995, New York 2001, New Orleans 2005, and New York again 2012. New examples can be found every year. In 2019, a cyclone destroyed large parts of the port city Beira in Mozambique. In the absence of planned resilience, up to 1,000 people died and nearly half a million people were rendered homeless. In contrast, other major port cities suffered extensive destruction but assumed global leadership after rebuilding. But all problems recede against the background of the current global COVID-19 (coronavirus) crisis. The topic of resilience has not lost its importance in this context, but has gained. New methods, parameters, and policies will be required, which (hopefully in a timely manner) can be developed.

Issues of inequality in resilience, vulnerability, and planning must be raised, as the poet Heinrich Heine already saw. The case studies compiled here on port cities on three continents paint a diverse picture of resilience at different moments in time. These articles are glimpses into the question of port city resilience, and a call for further historic exploration of transitions. The articles show that there is no such thing as “*the*” resilient (port) city. Cities, especially port cities, and their populations, are too different, too complex, and too diverse to provide general standards for any one form of resilience or any singular approach to resilience.<sup>35</sup> But, the pieces included here integrate approaches with different temporal references, scales of government, and governance perspectives on how port cities have planned for resilience. The temporal and thematic diversity of the contributions also demonstrate the value of further research on port city resilience and vulnerability. As the case studies show, port, city, and regional actors have pursued often common, but occasionally diverging interests, together addressing environmental, economical, institutional, social, technical, and spatial aspects of resilience. Heine’s poem underscored the relevance of social networks to economic resilience; it also highlighted the ease with which some population groups were ignored after disasters. For port cities this raises the question as to how to balance the wide-ranging economic interests of port actors and their view of waters as sites for shipping with the interests of local actors in water quality and the role of waters as ecosystems. A careful assessment of different types and definitions of resilience in historical analysis and planning practice raises the question: Will we acknowledge the need for planning shared spaces, partnerships, and cultures? Can we learn from history how to plan a more sustainable and more resilient future?

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## Notes

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