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PORT-CITY CULTURAL INTERACTION'S INFLUENCE ON THE SUSTAINABLE COASTAL DEVELOPMENT

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Abstract

In the context of sustainability, ports often emerge as points of contention involving stakeholders from the maritime industry, local government, and communities. The interaction between ports and cities reveals that effective communication and the cultivation of maritime culture can serve as a potent combination for the transmission of information between the port and the city. This implies that the successful development of a port can be achieved by establishing a well-functioning communication channel for the exchange of knowledge, actions, experiences, and cultural values. The research idea postulates that the cultural component can serve as an additional dimension within the frameworks of sustainable development and resilience enhancement research, specifically within the domain of port organizational resilience and sustainable development. Notably, substantial attention is directed towards small and medium-sized ports, as these entities are particularly susceptible to the influence of the port on the surrounding social communities, owing to the intricate interconnections among culture, heritage, and environmental conditions. The subject of this study centres on the cultural interaction between ports and cities. The research goal is to explore the impact of port-city cultural interactions on the sustainable development of medium-sized port cities and their associated coastal regions. To this end, the research is guided by specific objectives, which include elucidating the concept of port-city interaction and situating this interaction within the broader context of sustainable development in coastal regions. Furthermore, the study aims to delineate the cultural component within the framework of port-city interaction and, subsequently, to propose potential trajectories for the development of port-city cultural interactions that could enhance the sustainability of coastal regions. The research methodology employed in this study adheres to the methodological principles of a theoretical approach. This approach encompasses the systematic exploration of concepts, theories, and existing knowledge within the chosen domain, thereby providing a robust foundation for the investigation. The main results found out that, the integration of culture into port-city interaction is vital for fostering sustainable development and resilience in coastal regions. As a dynamic and multifaceted component, culture influences communication, shapes organizational ecosystems, and contributes to the achievement of SDGs. Also, as it was suggested the port-city interaction's evolution trajectories not only enhance the socio-environmental fabric of port-city dynamics but also offer a roadmap for fostering enduring sustainability and excellence in coastal regions.

Keywords: port-city interaction, cultural interaction, sustainable development, coastal regions, resilience of ports.

JEL classificatory: L25, L32, M14.

Introduction

Within the global context, culture has garnered increasing recognition as a pivotal actor in the formulation of policies aimed at sustainable development and the enhancement of resilience. It serves as a catalyst for urban interventions that foster local cultural diversity and harness the transformative potential of creative initiatives in the realms of environmental sustainability and organizational resilience. Culture assumes a strategic role in the European policy landscape, particularly within the framework of sustainable development policies (CCIs, 2018; KEA, 2017). Cities have the capacity to establish linkages between their strategies for cultural preservation and heritage and the imperatives of climate change policies, drawing from established patterns within national and regional frameworks for sustainable development and resilience enhancement (Daldanise, Clemente, 2022). Cultural approaches offer valuable data, information, models, assessment methodologies, and a holistic perspective for decision-makers, scientists, practitioners, and citizens, providing support for climate change adaptation and mitigation efforts essential for sustainable urban development, particularly in coastal regions and the future development of port cities. The intersections between consumer behaviour, climate change, and culture have been the subject of exploration in various domains, including the arts, social sciences, and humanities with climate change narratives becoming a focal point in the latest scientific and applied research (Tyszczyk, Smith, 2018). These narratives encompass diverse mediums, such as multimedia content on social networks and other dissemination platforms, as well as presentations in broadcast, print, and online news media, literature, theatre and museums (Painter et al., 2016).

The maritime transportation sector plays a pivotal role as an engine of economic growth. However, it is also intrinsically entwined with the culture, traditions, and heritage of coastal regions. Consequently, within the analysis of a well-functioning, sustainable, and resilient organizational ecosystem, the cultural component is of paramount importance, on par with other technological and economic aspects. Recent scientific research has illuminated how distinct governance patterns and diverse business models influence ports and their associated organizational ecosystems (Valionienė, Župerkienė, 2023). These variations in governance and business models significantly impact the effectiveness and attractiveness of different ports (Valionienė, 2020). And one of the main attractiveness' parameters is strong and effective port and city interaction especially from the perspective of regional coastal development and sustainability. So, it becomes imperative to investigate the relationship between ports and cities. Based on these assumptions this investigation encompasses an additional dimension, namely, the evaluation of the cultural and heritage aspects of coastal regions. These aspects can be effectively developed through meaningful interactions between ports and cities, ultimately contributing to the holistic advancement of coastal regions. And according to the port's functionality, they exert significant influence on the well-being and quality of life within cities, while simultaneously engendering spatial, social, and environmental challenges. Moreover, ports play a transformative role in the evolution of cities, transitioning them from a socio-economic and technological framework to a socio-cultural one. Ports that contribute to a city's growth also play an instrumental role in its social and cultural development. This reciprocal cultural interaction between the port and the city underscores its significance, and it is essential to explore the most effective methods for realizing this interaction. It is noteworthy that the domain of port-city interaction has predominantly been scrutinized from a port governance perspective, with logistical, technological, and economic interactions often receiving comprehensive analysis. However, the cultural element, which holds substantial importance for the effective and sustainable development of coastal regions, remains relatively unexplored.

The **research idea** postulates that the cultural component can serve as an additional dimension within the frameworks of sustainable development and resilience enhancement research, specifically within the domain of port organizational resilience and sustainable development. This notion hinges on the establishment of a well-functioning relationship between the governance of the port and the local governance of the port city. Notably, substantial attention is directed towards small and medium-sized ports, as these entities are particularly susceptible to the influence of the port on the surrounding social communities, owing to the intricate interconnections among culture, heritage, and environmental conditions. Several factors underscore the need for an analysis of the interaction between small and medium-sized ports and city governance. Firstly, medium-sized port cities exhibit robust infrastructural integration with port activities, leading to a strong dependence of the residents' quality of life on the quality of port operations. Furthermore, medium-sized port cities typically possess more limited financial resources for supporting and compensating the disadvantages associated with port activities. Moreover, these smaller cities and ports tend to be less attractive to potential investors, resulting in slower development of technological innovations aimed at improving the quality of life for residents compared to their cosmopolitan counterparts. Consequently, these disadvantages can manifest as active resistance to new port projects, and in some instances, even transform into proactive measures aimed at impeding the progress of such projects and diminishing their prospects. This often culminates in conflicts involving various stakeholders in the port-city interface.

The subject of this study centres on the cultural interaction between ports and cities. The overarching **research goal** is to explore the impact of port-city cultural interactions on the sustainable development of medium-sized port cities and their associated coastal regions. To this end, the research is guided by **specific objectives**, which include elucidating the concept of port-city interaction and situating this interaction within the broader context of sustainable development in coastal regions. Furthermore, the study aims to delineate the cultural component within the framework of port-city interaction and, subsequently, to propose potential trajectories for the development of port-city cultural interactions that could enhance the sustainability of coastal regions.

The **research methodology** employed in this study adheres to the methodological principles of a theoretical approach. This approach encompasses the systematic exploration of concepts, theories, and existing knowledge within the chosen domain, thereby providing a robust foundation for the investigation.

1. Port-city interaction's role in the field of sustainable development of coastal regions

Ports are main export and import node for the implementation of goals of international trade and integration to the global supply by keeping high level of connectivity and creation benefits for national economy. But also, ports are some organizational ecosystems which are highly complex and have complex environment, starting from their microenvironment, and going through the mezzo, macro, mega and giga environment because port organizational ecosystems are multilayered complex organizational ecosystems combining a big amount of private and public

capital players with the aim to be highly involved in global supply chain (Valionienė, Župerkienė, 2023). From this perspective it is useful to develop the functioning of these organizational ecosystems for the gaining of maximal benefit for the national and regional economies. Problem will arise in the cases than the port cities are not capitals and centres of countries and port cities are in a distance from main transport corridors or from the central governance because the potential conflict of interests will arise between the benefits and negative impact on national and regional levels. It is very important in small and middle-sized port cities developments where material and human resources are limited and where social role of society is very high and expectations from port activities are also high not only in the economic domain, but also in the environmental and cultural heritage domains (Notteboom et al., 2022). These domains and their integration become more actual in the climate change context and in the context of environmental challenges in the form of high uncertainties (Lees et al., 2023). And this integration allows to analyse the problem of coastal regional development and keeping resilience which is strongly related with the conditions of living quality in the areas nearby the port including natural hazard functioning of surrounding natural ecosystems. It is important to mention that the sustainability and resilience are like direct two-sided patterns of human behaviour and organizational functioning: sustainability for the keeping the stability in surrounding environment and the resilience to keep balance inside organizations in the conditions of uncertainties in the external environment. These conditions could be found also in the newest research on the interaction between urban territories and ports where question about sustainable and resilient development of coastal regions are investigated, and usually only negative impact of port activities is analysed (Oniszczyk-Jastrzābek et al., 2018) especially on the regional level where relationships between port and port city's communities are stronger. So, ports become a line of confrontation and many projects develops slower or not develops at all because the strong negative position of communities or opposite.

Numerous cities worldwide maintain a symbiotic relationship with their port complexes, as these ports have historically been instrumental in shaping their development (Daldanise, Clemente, 2022). The economic vitality of cities has traditionally been intricately intertwined with the fortunes of their ports, which serve as sources of employment and gateways for commercial engagement with the global market (Hein, 2016). Harbour areas have consistently occupied valuable space in close proximity to urban activities, offering both opportunities for dynamism and potential sources of conflict. The allocation of land and water use in waterfront zones, serving as crucial interaction areas, necessitates a collaborative approach between the port and the city to mitigate social and environmental externalities (Juggie, 2014) In recent decades, a prevailing trend has been the growing divergence between ports and their host cities, a phenomenon partially attributed to the forces of globalization and containerization. Key factors contributing to this detachment between the port and the city include: the relocation of several terminals to peripheral regions; containerization's impact on labour requirements, security concerns, internationalization of labour sourcing, and improved inland accessibility. Globalisation of international trade enabled the needs for ports to get more space and deeper waterways, so with the land limitation some of terminals were relocated to the regions where middle iced cities and ports operate. Also, in the context of automation and innovations the needs for labour forces decreased and ports adopted to operate in regions well. Consequently, ports have become increasingly integrated economic entities within global supply chains while simultaneously distancing themselves from urban environments, resulting in environmental challenges (Notteboom et al, 2022). Ports now face the imperative to secure a social license to operate, gaining public trust and support for expansion initiatives. Paradoxically, the same processes responsible for the detachment between ports and cities have also created opportunities for the rejuvenation of previously neglected or underutilized port areas. These problems become deeper as the communities and maritime business relationship becomes closer (Girard, 2013).Based on the research results of Miola et al (2009), each port activity huge amount of negative influences on the components of environmental ecosystems, and it is about 60% of all maximal possible negative impact. Detailed point of view, presented in research of A. Oniszczyk-Jastrzābek et al. (2018), allows to make some assumptions for the future research on the sustainability of port development. First of them, that activities could be optimised by their negative impact's nature: for example, the port expansion projects could be developed together with the waste management problems' solving with the integrated infrastructural decisions on waste management because these activities have almost the same negative impact measured by the same criteria. But infrastructural development strongly relies with the need to rejuvenate city's infrastructure if the logistical connectivity and waste management and disposal problems are solving as the example. Second assumption is related with living conditions citizens, especially in the field of air pollution and congestions in the city, but these problems effectively could be solved in cooperation with the municipalities because their fields of interests are interconnected in this field. And third assumption is related with the pressures from global business and public organizations in the form of green

logistics, circular economy principles, strict environmental regulations, intensive evolutions of port and digital technologies influencing progress of automation etc.

As it could be seen these three assumptions are related with the complexity of port organizational ecosystem's environment: first assumption is located inside the ecosystem in the micro and mezzo environment of port ecosystem. Second one is transmitted to the regional level or national level and defined in the macro environment. Third assumption is going to the mega and giga environment because describe problem on the global supply chain level (Valionienė, Župerkienė, 2023). And based on the pressures for the sustainable development and resilience of port organizational ecosystem also are going from the local business working in the port, from the surrounding territories and citizens, from the national economies, from the international business community and other global conditions such as climate change, sustainable development in all areas of human life, social responsibility, global digitization and automation, and other global processes. And the nature of the citizens and global communities are very clear, because air and water pollution decrease the quality of life in port cities and negatively influence the diversity of natural ecosystems and in this way the negative impact is felt not only in port cities but in all coastal region and worldwide. And these assumptions allow to describe the importance of port and city interactions not only for the integrated and sustainable infrastructure development, but also for the protection of natural ecosystems and citizens wellbeing and ensuring the sustainability of development the green logistical supply chain's connectivity for the economic benefit ensuring on the national level.

For the development of the port and city interaction the sustainable development goals and ideas should be revised. The sustainable development goals refer to the wide area of human life and activities and 17 goals are published in the United Nations' prepared sustainable development goal declarations. It could be seen at least half of SDGs could be directly related with port organizational ecosystem activities, other have indirectly relationship with the influences of port activities on social systems of environment. And all of them are placed in other documents, which are prepared on the base of SDG action 2030 plan according to circular economy principles and are detailed explained in the blue economy framework and green port conception, including circular green logistics phenomenon (United Nations, 2015). Main principles of blue economy present the importance of port and city interaction for the implementation of SDG in maritime transportations and for the resilience enhancement of the whole coastal region. Principle „to recognize that the maritime and land based economies are interlinked and that many of the threats facing marine environments originate on land“ (WWF Baltic ecoregion programme, 2016). be as start point for justification of the need to develop port-city interaction. This point of view enables not only port and city cooperation on the creation and development legislative field, but also in the sharing knowledge, information, practices for all stakeholders including citizens and nongovernmental organizations. Other principles of blue economy also create preconditions for the port and city interaction's development:

- **create** a level economic and legislative playing field with an adequate incentive and rules;
- **set** clear, measurable, internationally consistent goals and targets;
- **assess** and **communicate** the performance;
- **develop** and **apply** standards, guidelines and best practices that support a Sustainable Blue Economy;
- **plan, manage** and effectively **govern** the use of marine space and resources, applying inclusive methods and the ecosystem approach;
- actively **cooperate**, *sharing information, knowledge, best practices, lessons learned, perspectives, and ideas*, to realize a sustainable and prosperous future for all.

Such type of recognition of these principles enables not only port and city cooperation on the creation and development legislative field, but also the sharing knowledge, information, practices for all stakeholders including citizens and nongovernmental organizations. And as it could be seen in these main principles of blue economy the sustainable development of maritime business and transportation is related with the recognition, creation, setting, assessing, development and application, planning, managing, governing, cooperating, and communicating actions. And these actions could be called as the predicators for the port-city interaction's development for the enhancing resilience of coastal regions on the base of implementation of SDG.

By the combining definitions and descriptions of port city interaction in the previous research (Warsewa, 2017; Sacco et al., 2018; Hein et al., 2021; Vroomars et al, 2022) it could be seen that port organizational ecosystem, driven by port authority, and surrounding natural and social urbanized ecosystems are related by their territorial and functional principles. And the result of this relationship could be measured by impact factors and criteria on the status and changes of stability of coastal region in all its fields. The interaction between port and city is presented in the figure 1 and this visualization is based on the modern explanation of ports as port organizational

ecosystems. Based on the theory of the adaptive complex system, the maritime transport ecosystem could be explained as network of interconnected business and public units working together in the cooperative competitiveness mode with their organizational interests for the main one goal of the whole ecosystem to keep high logistical connectivity in the global supply chain by gaining the maximum benefit and creation of added value for the stakeholders of this ecosystem. As it is showed, port and city are parts of this ecosystem and they are parts of stakeholders with their states and relationships with other units in this ecosystem, with their self-interest and general interest of all of them. The important facts are that based on the results of previous research it is proved that sustainable development is a part of maritime transport attractiveness strongly dependent on the governance effectiveness, which is strongly dependent on the quality of port-city relationships' development because on the base of this relationship the resilience of the whole coastal regions could be enhanced. Such result of cooperation is the added value created by the effective interactions between port and city and their integrated development.

As the J. Vroomars et al. (2022) mentioned, that conflictual relationship is precondition for the changing development strategy and for the looking for the effectively working relationships forwarding to the symbiosis, as it is presented in figure 1.

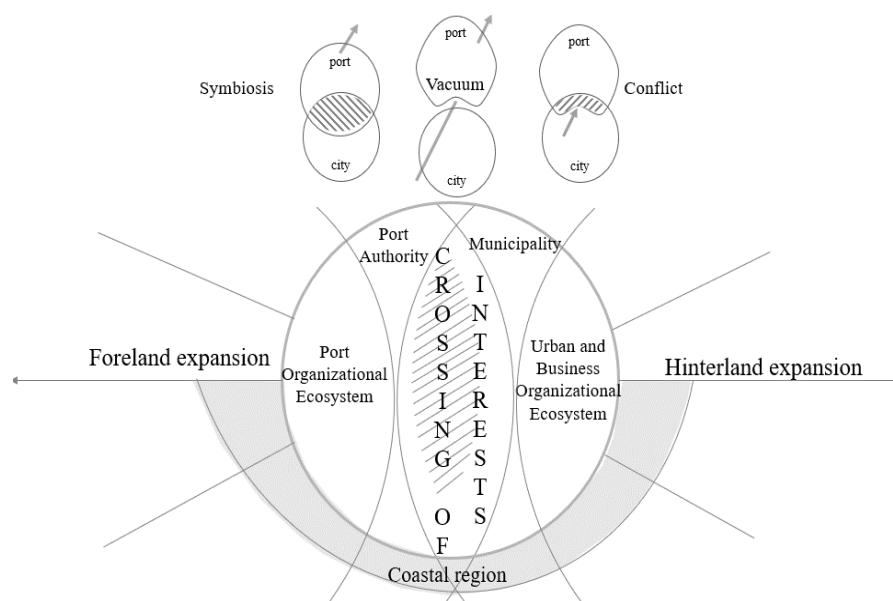


Figure 1. Definition of port and city interaction in the context of sustainable development (Juggie, 2014; Vroomars et al., 2022)

As it could be seen in the picture port and city have the same direction of expansion, but sometimes expansion's directions are opposite. If port has interest in hinterland expansion, and city in foreland expansion, we can define the special area of crossing interests. And this area could be used for establishing of interaction between city and port. The same way could be identified then relationship is in symbiosis: each time then the development of city or the port goes to the zone of crossing interests the conflict happens and discussions are needed. As the result the next stage of symbiosis could be found (fig. 1). The cases of conflict could be decreased by the idea of the development directions in the same way together between the port and city by the creating integrated development strategy as it was mentioned in the research of J. Birkman et al (2016), J. H. Juggie (2016), J. M. P. Sanches (2019). And the minimising the conflict cases between the port and city on the background of their strong cooperation leads the enhancement of the resilience of coastal regions, because the effective port and city cooperation ensure sustainable development of regional business and social ecosystem in the balance with the surrounding environment and in accordance to the strategic documents such as blue economy or sustainable development goals or other national and international environmental regulation.

By resuming the role of port and city interaction in the implementation of SDG described in the blue economy principles the effective communication and effective cooperation between these organization is required because the effective conflict solving could be found by adopting of the modern and complex models for port sustainable development and resilience enhancement by keeping all interests of port cities and their citizens. And in opposite, strengthening of port cities infrastructural, social, and other fields should keep interests of port organizational ecosystem, which is a part of port city, it's business and citizens.

The examination of port and city interaction within the framework of Sustainable Development Goals (SDG) reveals that recent economic and technological analyses are insufficient for resolving conflicts between citizens and port activities. To address confrontations and minimize conflicts in the realm of port or city development and expansion, communication and experience-sharing functions emerge as crucial elements. These functions, aligned with dissemination functions, play a pivotal role in establishing cultural interaction between ports and cities, facilitating the more effective implementation of blue economy principles in the region. Cultural interaction serves as a conduit for the exchange of information and knowledge, fostering feedback. Given the blue economy's emphasis on information-sharing and knowledge dissemination, it can be inferred that all actors within the port organizational ecosystem, including municipalities and citizens as stakeholders, are interconnected through the communication function. Consequently, the potential pathway for cultural interaction is theoretically open and can be evaluated using established port-city interaction indicators, encompassing recognition, creation, setting, assessment, development and application, planning, management, governance, cooperation, and communication.

2. Explanation of the culture component in the port-city interaction's context

Researchers investigating port-city interaction highlight the significance of effective communication and maritime culture for information exchange between the port and city (Merk, Dang, 2013; Sanches, 2019; Kowalewski, 2021; Vroomars et al., 2022). The cultural component in this interaction is evident in various sources, analysing global sustainable development regulations (Hanson et al., 2011; Chiu et al., 2014; Jugovic et al., 2021; Krosnicka et al., 2021), port governance patterns (Serry, Loubet, 2019; Valionienė, 2020; Notteboom et al., 2022), business excellence (Valionienė, Župerkienė, 2023), and general consuming tendencies (Girard, 2013). Conceptualizing the port as an organizational ecosystem underscores the cultural component as a crucial connecting point through organizational culture and supporting maritime heritage. Each unit within the port organizational ecosystem has its own understanding of culture and cultural heritage, contributing to a broad and contextually unrestricted ecosystem understanding. This underscores the presence of a cultural relationship in the maritime transport ecosystem, necessitating identification, grounding, and stabilization in the context of port and city interaction for coastal region sustainable development and resilience.

Key indicators, as identified by Merk and Dang (2013), encompass port development, port-city development, transportation, research and innovations, spatial development, environment, and communication. Successful port and city interaction development involves enhancing port-related functions in municipalities, cluster reactions to uncertainties, economic diversification in maritime regions, creating synergy and coordination committees for sustainability action plans, and comprehensive cooperation in maritime activities. Communication emerges as one of the seven crucial pillars, emphasizing that effective communication channels are indispensable for successful port and city interaction. These channels encompass heritage and culture events, communication and dissemination channels, collaboration with maritime museums and galleries, development of water tourism and leisure services, and projects promoting maritime culture and heritage on national, regional, and international levels. Developing and utilizing communication channels are essential not only for port, city, and regional development but also for ensuring the sustainability and resilience of coastal regions. This approach enhances social participatory actions and mitigates pressures on future port development

Analysing the Sustainable Development Goals (SDG) reveals that the cultural component plays a pivotal role in sustainable port-city development, impacting coastal sustainability and resilience across all goals (United Nations, 2015). Specifically, relevant for small and medium-sized ports and cities are SDG 8, focusing on "Decent work and economic growth," emphasizing policies supporting productive activities, decent work creation, entrepreneurship, and innovation. SDG 9, "Industry, innovation, and infrastructure," connects ports and cities through resilient infrastructures, industrialization, and environmentally friendly technologies. SDG 11 addresses urban transformations, emphasizing cultural and natural heritage for minimizing the impacts of urban agglomerations, and is closely related to SDG 14, which underscores the sustainable management of ports and logistical activities.

The SDGs provide direct guidance for implementing sustainable development projects, highlighting the importance of the cultural and heritage component. The interplay between SDG orientations for cooperation between municipalities and ports and the SDG's cultural component underscores the cultural aspect's importance in fortifying port-city interaction for the resilience of port activities and coastal regions.

Additionally, the "Agenda 2030" by the "Association Internationale Villes Et Ports (AIVP)" further emphasizes the cultural component in sustainable development. Ten goals within this agenda, linked to 46 actions, underscore

the significance of port culture and identity. This includes fostering a sense of belonging within the city-port community and promoting cultural and recreational services for residents near ports, strengthening the port-city interface. Effective interaction between port and city authorities, as outlined in the document, facilitates support for institutions to develop projects and strategic plans that promote sustainable development by reinforcing the port-city interface through community engagement with culture and regional heritage (AIVP, 2020).

Culture, as identified by C. Hein (2016) and M. Kowalewski (2021), is a multifaceted component traversing organizational and social networks, embedded in material and spatial practices, and serves as a key resource for sustainable future development. It encompasses more than folklore and sailor town stereotypes, encompassing visual representations, symbols, values, and popular narratives. The culture component significantly influences human behaviour, spreading knowledge and practices into daily life, business activities, and routines. It acts as a driver for strengthening inter-institutional cooperation for sustainable development, evolving through communication, dissemination, and routines established at successful port and city interfaces.

Recent trends addressing climate change and integrating scientific ideas into daily life are reflected in culture creative actions for sustainable urban development (WCCF, 2018). Key actions include leveraging cultural movements with renowned artists and musicians to promote awareness of sustainable choices, enhancing citizen involvement in policymaking for addressing environmental issues, consumption culture, and fostering creativity in participatory policymaking. Bottom-up participatory activities facilitate the transfer and adoption of sustainable behaviours, emphasizing the importance of environmental knowledge and sensitivity in cultural creative services. These actions underscore the pivotal role of culture in decision-making processes for the sustainable development of coastal regions, particularly in small and medium-sized cities with intensive logistics operations, where strong community-business relationships are established.

The research conducted by Guo et al. (2020), Cerreta et al. (2021), and Vroomars et al. (2022) underscores the significant role of culture in decision-making processes related to port and city planning and development. This influence is particularly pronounced in middle-sized port-cities, where strong regional communities engage extensively in maritime and local governance processes. The cultural component in port and city interaction emerges as a catalyst for strengthening collective actions within communities, businesses, and governance structures.

Studies by Sacco et al. (2018), Tyszczyk and Smith (2018), and Lees et al. (2023) explore the impact of cultural and natural values on the sustainability of coastal regions. Integrating these values into business and governance processes enhances the effectiveness of connections between ecological and social functions of surrounding ecosystems. This integration fosters an environmentally friendly lifestyle by altering the mindset of residents and visitors, creating a modern culture of sustainability and consumption. The cultural component in governmental interactions influences the conscious and subconscious understanding of the relationship between individuals and their environment in the regions.

In summary, culture plays a pivotal role in connecting individuals to their surroundings and fostering cohesion, community, and collective actions. This underscores the mutually reinforcing nature of port and city interaction, serving as a tool for integrating natural and cultural values among port, foreland and hinterland, municipal representatives, and the broader regional society. These integrated values illuminate the connections between ecological and social functions of the landscape, promoting environmentally friendly practices and lifestyles (Appadurai, 2013; Sanches, 2021). Ultimately, these factors contribute to the promotion of sustainable development, not only within ports and cities but across entire coastal regions.

3. Port-city cultural interaction's development scenarios for the sustainable coastal development

The study of port city cultures invites researchers to reconceptualize 'culture' beyond its association with bounded communities and systems of thought. We argue that culture is not solely located in the collective social identities of port cities and citizens but also in the spatial and infrastructural characteristics shaped by port authorities. These authorities are responsible for the development and utilization of port infrastructure, including connecting infrastructures with port cities, driving sustainable usage within the context of coastal resilience. Given the social histories of spatial and infrastructural developments in port cities, it is crucial to expand the concept of 'infrastructure' to encompass social, regulatory, and technological features. This holistic approach is necessary as culture is viewed as a hybrid component traversing social networks, connecting internal organizational and external social cultures within the port community. Culture is embedded in material and spatial practices, where

creativity and responsibility play essential roles as elements of a culture of sustainability, serving as a key resource for future development and ensuring coastal resilience. In addressing the challenges of port city futures, culture must be considered to include all material and spatial practices, visual representations, symbols, values, and popular narratives relating to past, present, and future port-city transformations. This inclusion could be presented in the business model of port authority under the different levels of expanded functions' realisation (Fig. 2).

In the context of infrastructure development, the nexus of interests presents an opportunity to fortify interaction, rooted in sustainable development principles within regional settings. This involves a coordinated approach between two organizational ecosystems, each traversing their respective activity fields and interests. While municipalities wield comprehensive access to communities through direct functions of local governance, encompassing diverse projects such as artistic endeavours, infrastructure development, spatial planning, and the advancement of urban and pre-urban areas, the port ecosystem operates within an entrepreneurship model. This model extends functionality through communication and cooperation channels, fostering effective development extensions in the communication domain and establishing a foundation for cultural interconnection.

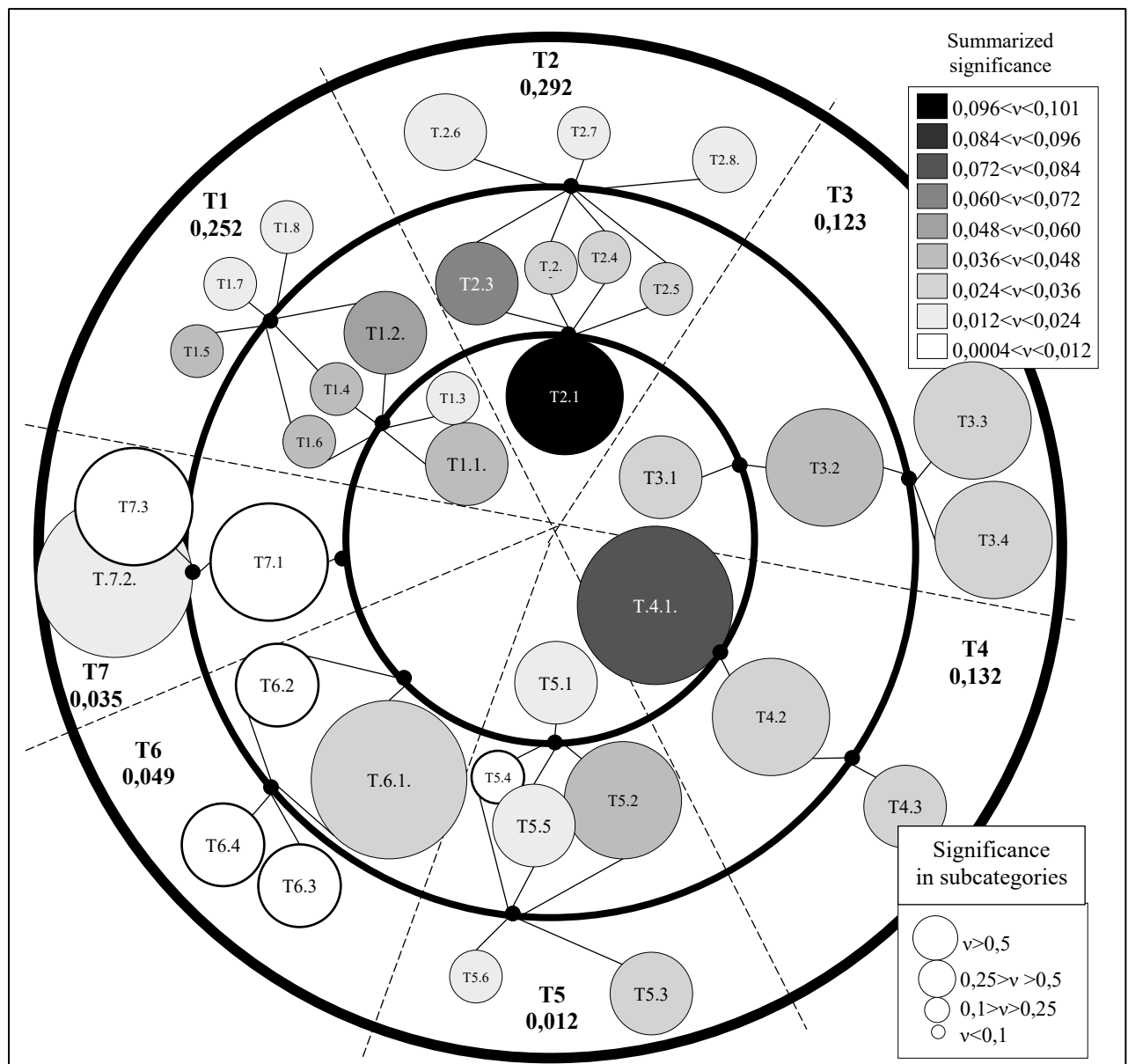


Fig 2. Empirical business model of port authorities according to mapped functions by their significance (Valionienė, Župerkienė, 2023)

It is also important to mention that in the majority of success stories, the port governance model included municipal representatives in the management structures, or the ports operated under the municipality port

governance pattern. This implies that representatives of local authorities need to be included in the governance of the port organizational ecosystem for the creation of co-development projects. It signifies that culture in these entrepreneurial models could be connected through participative authority functionality.

As found in the research on port governance effectiveness and port attractiveness (Valionienė, 2020), the communication factor is an important element for the implementation of the entrepreneurial port authority's business model, and participative, active, and effective communication plays a special role in increasing maritime attractiveness for all stakeholders, including the society of coastal regions. It means that successful port development could be possible by creating a properly working communication channel for the knowledge, actions, experience, and culture sharing. Maritime culture and cultural components could be effectively working elements transferred through the communication channel only in cases where port-city interaction also includes these components. Analysis of the entrepreneurial business model of port authority as a driving entity in the port organizational ecosystem found that communication is an important component in the business model, which could be used for transferring maritime culture, sustainable development, co-development of coastal regions' knowledge, maritime training, general education practices, and also engagement of citizens. In the entrepreneurial model of port authority, these functions are located at the expanded functional level in subcategories 7.3, 7.2, and 6.4 (Fig. 2), representing these opportunities:

- effective communication for citizens on the sustainable use of marine and land space and resources, justified by results of a scientific approach of the ecosystem approach;
- active communication and transfer of information about port activities, environment monitoring results, and new innovative port projects;
- organizing events on maritime culture and heritage.

In conclusions it could be said that a theoretical analysis of port-city cultural interaction justified that it is an important and powerful tool which enabling to seek the business and societal excellence and environmentally friendly actions, which are the main part of sustainable development. Also, it was identified that the effective working communications channel is not only the part of entrepreneurial business model, but also as an effectively working channel for the cultural components transferring between port, city and communities, which could strengthen the interaction. An especially these findings are actual for small and middle-sized port cities because the relationship between business, municipality and society is very strong here. And as it was mentioned before for the successful development of port infrastructure huge amount of investments are required and the strong interaction between port and city working together in symbiosis are the main component of attractiveness for the direct national and foreign investors...

Conclusions

In exploring the concept of port-city interaction within the broader context of sustainable development in coastal regions, it becomes evident that effective communication and maritime culture play a crucial role in facilitating information transmission between ports and cities. The analysis of scientific sources emphasizes the significance of the cultural component in port and city interaction, which encompasses global regulations of sustainable development, port governance patterns, business excellence, leadership, and general consuming tendencies. In the face of climate change, culture becomes a powerful tool for sustainable urban development. Creative cultural actions, involving artists and musicians, citizen involvement in policymaking, and greening cultural services, demonstrate the potential for culture to influence decision-making processes and encourage sustainable behaviours in coastal regions, particularly in small and middle-sized cities with intensive logistics operations. In conclusion, the integration of culture into port-city interaction is vital for fostering sustainable development and resilience in coastal regions. As a dynamic and multifaceted component, culture influences communication, shapes organizational ecosystems, and contributes to the achievement of SDGs. Recognizing the cultural dimension is essential for building stronger and more resilient port-city interfaces and ensuring the long-term sustainability of coastal regions.

This study adeptly achieved its aim to delineate the cultural component within the port-city interaction framework and subsequently proposed dynamic trajectories for the development of port-city cultural interactions, contributing significantly to the discourse on coastal sustainability. By transcending conventional notions and recognizing culture's pervasive influence in spatial and infrastructural domains steered by port authorities, this research establishes a multifaceted understanding of cultural dynamics. The proposed trajectories emphasize the holistic integration of material practices, spatial considerations, and societal narratives, forming a comprehensive

foundation for sustainable port-city cultural interactions. Acknowledging the intricate interplay between culture, resilience, and development, the study advocates for innovative approaches that empower coastal regions. These proposed trajectories not only enhance the socio-environmental fabric of port-city dynamics but also offer a roadmap for fostering enduring sustainability and excellence in coastal regions. The study, by intertwining cultural insights with developmental pathways, contributes substantively to advancing the understanding and implementation of sustainable practices in port-city interactions.

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