

Article

Small and Medium-Sized Ports in the TEN-T Network and Nexus of Europe's Twin Transition: The Way towards Sustainable and Digital Port Service Ecosystems

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Abstract: Despite high competition among big EU ports, such as Rotterdam, Hamburg, or Valencia, acting as Core Ports in the Trans-European Transport Core and Comprehensive Network (TEN-T), this paper addresses the marginalized decision-making capability for environmental and digital transition immanent in the Small and Medium-Sized Ports (SMSPs) ecosystems in the EU. Irrespective of topical research, little is said about SMSPs ecosystem sustainability robustness and how SMSPs can pursue the transformative way. Here, management and strategic port decision levels are rather patchy and disconnected from the operational port performance. SMSPs are bound to limited resources and low cognitive, organizational, or institutional proximity, compared to their bigger counterparts. This situation provides a lot of room for critical demarche, since in the TEN-T Network, there are 225 Comprehensive and only 104 Core Ports, the majority qualifying, thus, as SMSPs. This research aims at reducing this research-to-practice lacuna by improving limited managerial capacity of SMSPs on environmental responsibility and digital efficiency. Using an ecosystem concept and aggregated empirical data in three EU macro-regions—the Baltic Sea Region, the Adriatic-Ionian Sea Region, and the Mediterranean Sea Region, three specific decision-making tools are suggested for managerial applications to facilitate and reinforce transition in SMSPs for environmental responsibility, social equity, and economic efficiency.

Keywords: small and medium-sized ports; comprehensive ports; port ecosystem; European Green Deal; strategic management; environmental and digital transition; sustainable ports; green ports



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1. Introduction

Ports play a crucial role in logistics and supply chain management as well as economy on a regional, national, and international level. Ports enable accessibility to essential resources through transportation and services, in terms of energy, health, labor aspects, passenger mobility, and accessibility, especially when it comes to the land-locked or island regions, as well as providing safety and security. Irrespective of their size and location, ports always serve as gateways and act as epicenters of economic and social interactions. They pave the way for regional economic development and social inclusion. Yet, ports are subject to growing interdependencies and imperatives to leverage interests of nature preservation, economic efficiency, legal compliance, and social equity [1,2].

Today, ports, and especially Small and Medium-Sized Ports (SMSPs), are jeopardized due to increasing pressure on them, as they (capacity-based) are not able to face growing pressure in terms of showcasing both environmental credentials, security and policy conformity as well as policy compliance [1]. New initiatives, such as the European Green Deal (EGD) (2019) or the Sustainable and Smart Mobility Strategy (2020) of the European Commission (EC) are increasing the pressure level on ports, in particular when it comes