

Smart Ports' Influence on Coastal Sustainability

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Abstract

Nowadays, ports are actively seeking ways to improve their safety and operational activity. An essential driver in this context is digitalisation. Since seaports are also key actors for the sustainable development of coastal regions, it is important that they transform into smart port ecosystems. Hence, the automation and digitisation of ports' operations are important not only for the ports themselves, but also for the regions and countries hosting regional port ecosystems. Studies on the digitalisation level of ports bear the potential to detect optimal ways for increasing safety, security and visibility in terms of the digital transformation, as well as attracting passengers and freight flows, which in turn positively affects not only the ports, but particularly also the sustainable development of coastal regions.

Therefore, the paper presents the results of a conducted assessment of small and medium-sized ports' digitisation level as well as introduces ways and recommendations how to improve the level of digitisation on the path towards becoming a smarter port ecosystem. The research builds upon key insights from the Connect2SmallPorts project, part-financed by INTERREG South Baltic Programme 2014–2020. Thereby, the research utilises collected primary data concerning ports located in the Baltic, North and Mediterranean Sea Regions. Thus, the study bases on well-grounded theoretical and practical findings in the maritime science field in the nexus of digital transformation.

KEY WORDS: *smart port; port digitalisation; digitalisation level; port ecosystem*

1. Introduction

Small and medium-sized ports are important for the sustainable development of regions and even countries, because they represent essential parts of the local and regional economy [1-5]. Hence, a smart regional development is directly linked to (port) logistics performance improvements [6-8]. Concerning small and medium-sized ports, recent studies noticed that they face big challenges in comparison to their larger counterparts due to limited financial resources and the lack of suitable human capital [9, 10]. Especially the latter two pitfalls represent grave problematic aspects regarding the digital transformation – i.e. smart port development. The main objective behind the smart port concept is to reach the highest digitalisation status [11], which – in turn – is expected to have a powerful influence on regions' sustainability, due to arising radical spill-over effects emanating from ports' strong interrelationships to other key industries.

Next to this, regional sustainability areas are immediately affected by ports' potential to – for instance – attract passengers and cargo flows, favour regional labour market via the creation of additional working places, as well as encourage tourism plus education and research in transport and logistics [12-14]. The digitisation in terms of smart logistics operations is not only important for ports, but also for the corresponding regions and countries that strongly depend on the regional port ecosystems [15-18]. In this context, studies on the digitalisation level of ports bear the potential to detect optimal ways for increasing safety, security and visibility in terms of the digital transformation, as well as for attracting passengers and freight flows, which in turn positively affects not only ports, but particularly also the sustainable development of coastal regions [19-22].

In line with this, the current paper aims to present the findings of a performed assessment of small and medium-sized ports' digitisation level as well as to introduce ways and recommendations how to improve the level of digitisation on the path towards becoming a smarter port ecosystem. The study builds upon key insights from the still ongoing