

## Digitalization and its effect on business strategies in the maritime industry: An in-depth review

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**Objective** – The purpose of this paper is to examine the role of digital business in the ocean transportation industry and highlight the potential opportunities stemming from the Maritime 4.0 framework such as data analytics, artificial intelligence, and internet of things among others. These technologies can be used at strategic and operational levels enhancing the decision-making process of shipping management companies in analyzing shipping markets, cargo flows, and supply trends. Recent studies have approached the subject from various points of view, for example, from a business organizational perspective (Raza, et al., 2023) (Ichimura, et al., 2022) as well as a technology implementation perspective. These include applications of blockchain (Carlan, et al., 2022), artificial intelligence (Kontzinos, et al., 2022), additive manufacturing (Teweldebrhan, et al., 2022), autonomous vessels (Makkonen, et al., 2022), (Sandvik, et al., 2022) and so on. It is made evident that increasing interest in new technologies as we progress through the 4<sup>th</sup> industrial revolution necessitates that academia paves the way towards new theoretical frameworks and practices to support the industry. This study aims at contributing to the mapping of the digital transformation process of the shipping sector and tender added value to the extant academic literature via revealing existing gaps in models, frameworks and decision-making methods at strategic and operational level.

**Data/Methodology** – The current study is based on secondary sources focusing on academic literature review tangent to digitalization and the shipping industry. It consists the first step in a broader research initiative that additionally employs industry focused survey analysis and industry oriented discussion workshops.

**Results/Findings** – Among the key results is the provision of insights on how digital business applications and models can be adapted by shipping management companies and complement traditional decision-making techniques and methodologies. In addition, potential competitive advantage opportunities are also explored and reported.

**Implications for Research/Policy** – The current literature is steadily increasing the latest years and contributes to the broad research on the digitalization of the maritime industry. Although, more academic literature is required to call for deeper analysis of the digitalization related process which will drive decision making of maritime entities in the private sector as well as functions for governments and international maritime organizations. Apart from the above, the current lack of technical expertise and scarce knowledge of the proposed



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technologies along with vague implementation costs of digital tools, form a big challenge to the ongoing research and awaited progress for the future, enabling academia to proceed deeper in the analysis of how digitalization can enhance the abilities of players in shipping as well as the industry in its entirety.

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