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Technological Innovations in International Seaports,  
Period 2015-2025: Systematic Literature Review

**Project prior to obtaining a Bachelor's Degree in  
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To God, for guiding my every step.

To my family, for their unconditional support, trust and  
love.

To my friends, for believing in me, pushing me to be  
better and moving forward.

This achievement is yours too.

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# Technological Innovations in International Seaports, Period 2015-2025: Systematic Literature Review

## ABSTRACT

In the current context of global trade, are among the fundamental pillars of international logistics. Forging a role not only as points of exchange of goods but also as complex systems where there is a flow of information and strategic decisions. The constant pressure to improve efficiency, reduce costs and respond to increasingly dynamic scenarios has driven a profound transformation in this sector. In this context, the incorporation of technologies including Artificial Intelligence (AI), data analysis and automation has evolved the management and operation of ports. These new models allow processes to be optimized in a smarter and more interconnected way. However, this transformation does not occur uniformly, since, while some ports reach deep levels of digitalization, others face limitations that make it difficult to adapt to new technologies. Given this reality, it is essential to understand the scope of these innovations, their main applications within the development of the port system at an international level. To this end, this research was developed through a systematic literature review based on the PRISMA method, which allowed the identification, selection and evaluation of relevant primary studies. As a main result, there was an important implementation of technologies based on AI and automation for maintenance management, operational optimization and logistics control, contributing significantly to the improvement of port competitiveness and efficiency.

**Keywords:** Artificial Intelligence, Smart Ports, Port Operations, Machine Learning, Digital Transformation, Port Automation.

# Innovaciones Tecnológicas En Los Puertos Marítimos Internacionales, Periodo 2015-2025: Revisión Sistemática De Literatura

## RESUMEN

En el contexto actual del comercio global, los puertos se han consolidado como uno de los pilares fundamentales de la logística internacional. Forjando un papel no solo como puntos de intercambio de mercancías sino también como sistemas complejos donde existe flujo de información y decisiones estratégicas. La constante presión por mejorar la eficiencia, reducir costos y responder a escenarios cada vez más dinámicos, han impulsado una transformación profunda en este sector. En este contexto, la incorporación de tecnologías como Inteligencia Artificial (IA), el análisis de datos y la automatización han evolucionado la gestión y operación de los puertos. Estos nuevos modelos permiten optimizar procesos de una forma más inteligente e interconectada. Sin embargo, esta transformación no ocurre de forma uniforme, ya que, mientras que unos puertos alcanzan niveles de digitalización profundos, otros enfrentan limitaciones que dificultan la adaptación a nuevas tecnologías. Ante esta realidad, resulta fundamental comprender el alcance de estas innovaciones, sus principales aplicaciones dentro del desarrollo del sistema portuario a nivel internacional, con el fin de aportar una visión clara que permita analizar el estado actual y las perspectivas futuras.

**Palabras clave:** Inteligencia Artificial (IA), Puertos Inteligentes, Operaciones Portuarias, Aprendizaje Automático, Transformación Digital, Automatización Portuaria.