



الأكاديمية العربية للعلوم والتكنولوجيا والنقل البحري
Arab Academy for Science, Technology & Maritime Transport



The International Maritime Transport and Logistics Conference “Marlog 9”
Impacts of the Fourth Industrial Revolution on Port-City Integration
“World Port Sustainability Program Aspects”



GREEN LOGISTICS – THE CONCEPT OF ZERO EMISSIONS PORT’S ENERGY MANAGEMENT

By: PROF. DR. N.NIKITAKOS
Professor of Shipping Informatics and New Technologies, University of the Aegean
Visiting Professor, Netherlands Maritime University College (NMUC)

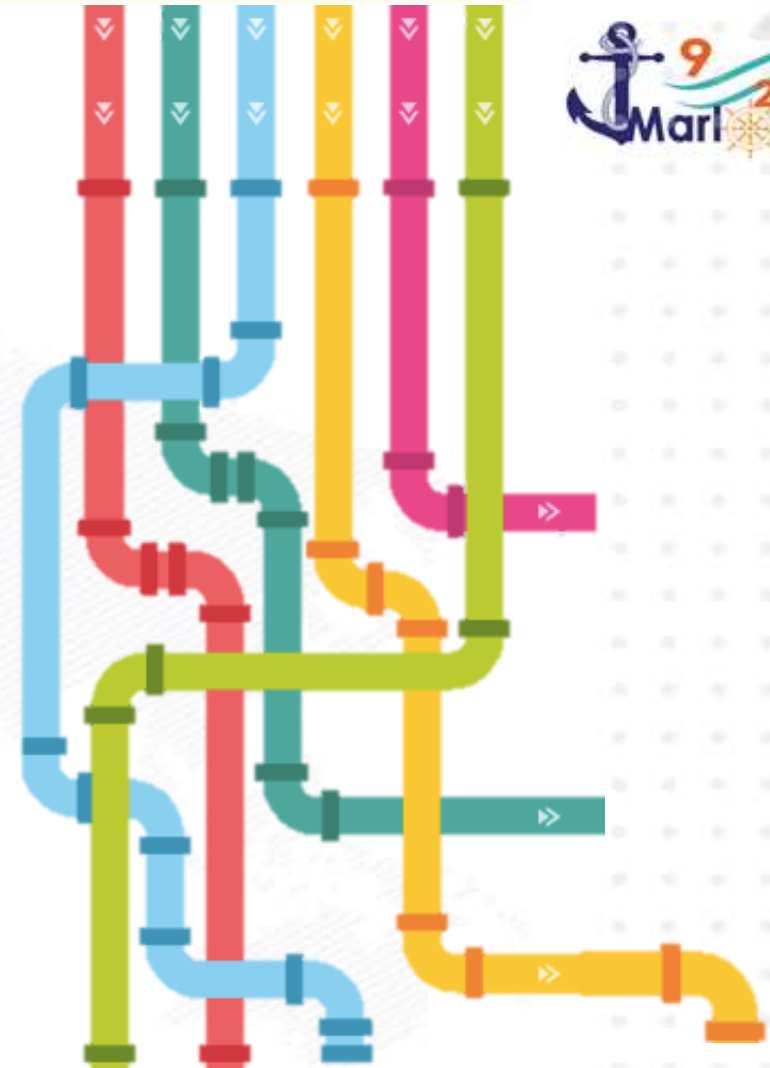
10-12- October, 2020



GREEN LOGISTICS – THE CONCEPT OF ZERO EMISSIONS PORT'S ENERGY MANAGEMENT

Content:

- Green Supply Chain Management
- Green Logistic
- Intelligent Methods for Energy Management
- Analysis
- Conclusions



GREEN SUPPLY CHAIN MANAGEMENT

- Focuses on environmental aspect of sustainability
- Integrate environmental concerns with supply chain management
- Control environmental impacts of products in its life cycle besides reducing supply chain's energy consumption sustainable supply chain



GREEN SUPPLY CHAIN MANAGEMENT

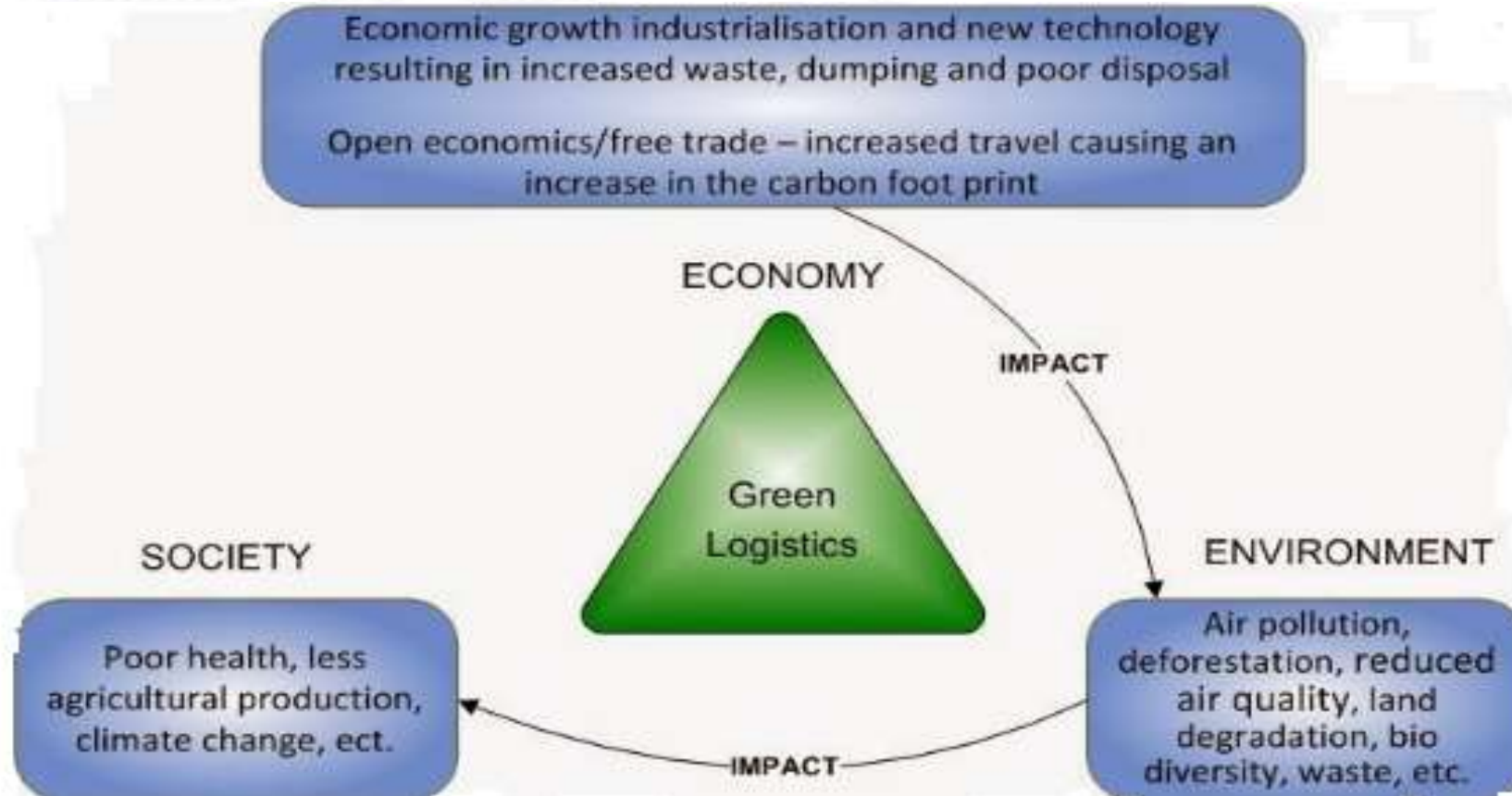


GREEN LOGISTICS

- Describes all attempts to measure and minimize the ecological impact of logistics activities
- All activities of the forward and reverse flows of products, information and services between the point of origin and the point of consumption



GREEN LOGISTICS

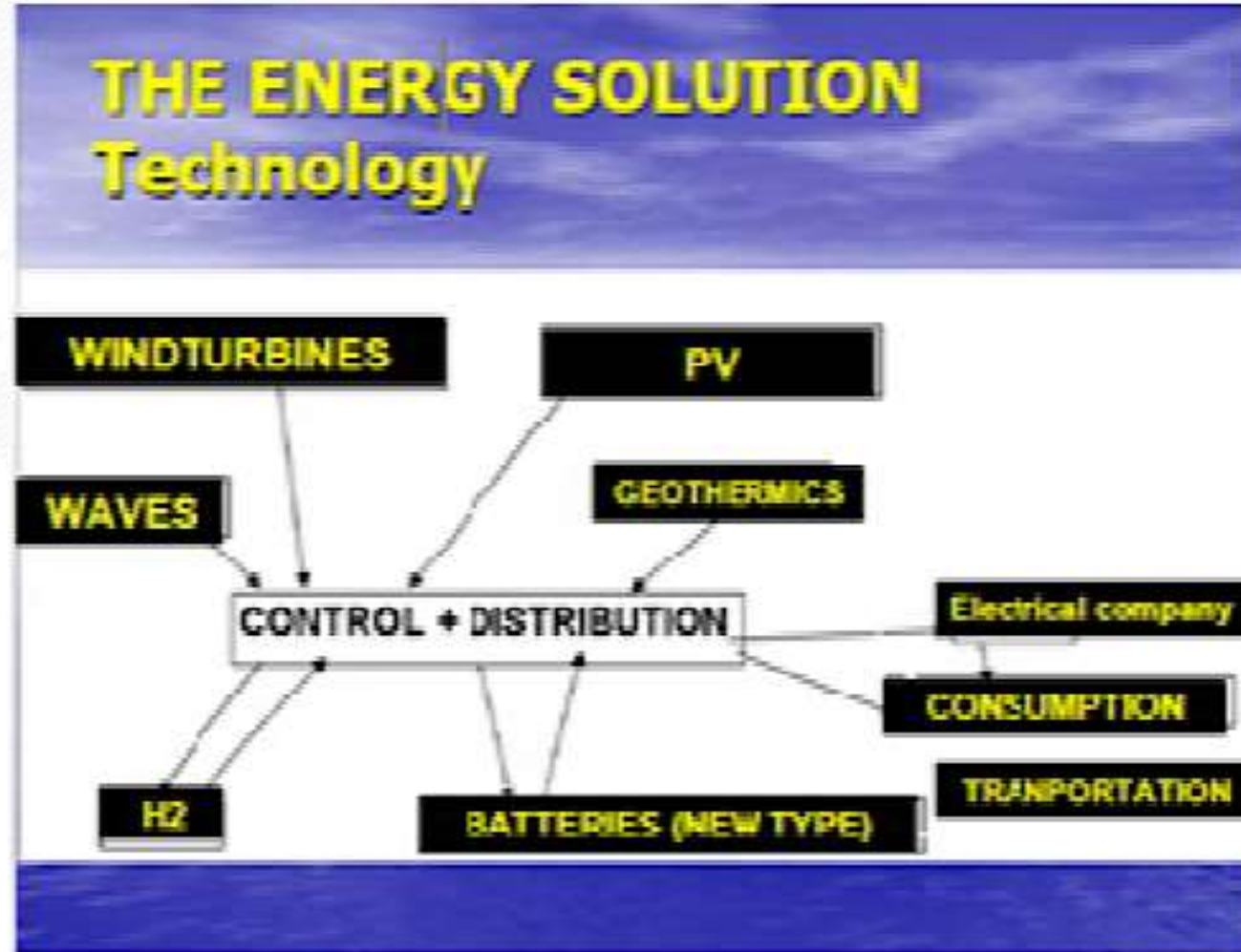


GREEN LOGISTICS

- Green Supply Chain
- Positive impact on financial performance
- Sustainability of Resources
- Lowered Costs/Increased Efficiency
- Product Differentiation and Competitive Advantage
- Adapting to Regulation and Reducing Risk
- Improved quality and products



GREEN LOGISTICS



INTELLIGENT METHODS FOR ENERGY MANAGEMENT

- A neural network for energy management in residential applications
- A hierarchical energy management scheme with a central coordinator in grid connected microgrids
- An energy management system consisting of a central controller which controls both loads and battery to assure energy balance at peak times



INTELLIGENT METHODS FOR ENERGY MANAGEMENT

- A Q-learning algorithm with a two-step ahead horizon for energy management of a grid connected wind generator system, which composed by a battery, a variable electrical load and a wind generator
- A photovoltaic system using a Q-learning algorithm with three-step ahead horizon in order to schedule the battery usage
- A multi-agent system for power management of a stand-alone residential grid by shedding loads

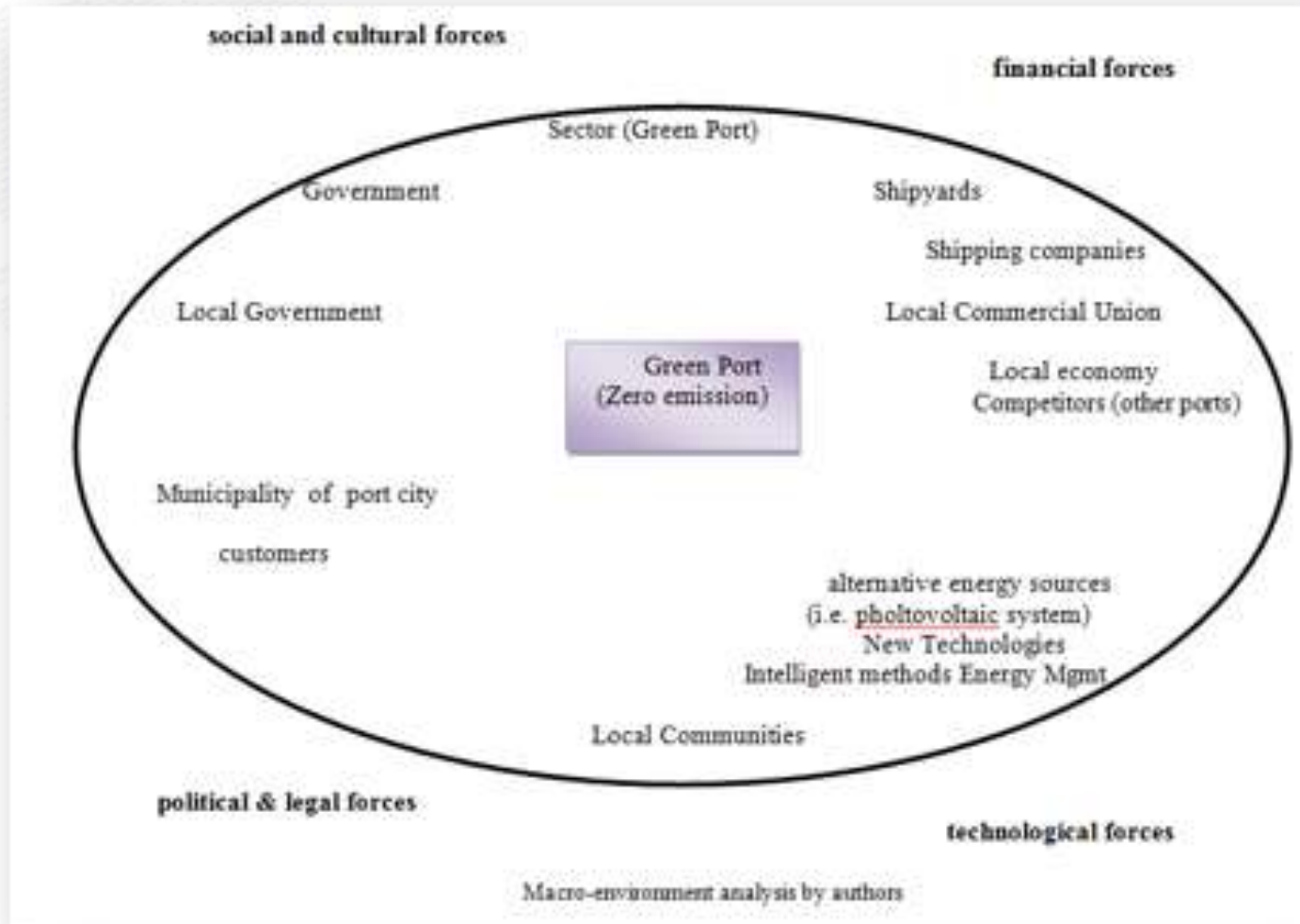


INTELLIGENT METHODS FOR ENERGY MANAGEMENT

- A deep reinforcement learning framework for energy management of storage units in a photovoltaic system
- A multi-agent system with local agents and a central coordinator for optimal response to emergency power demand
- A multi-agent system for power generation planning and energy management (8 different types of agents, separated by their operation)



ANALYSIS

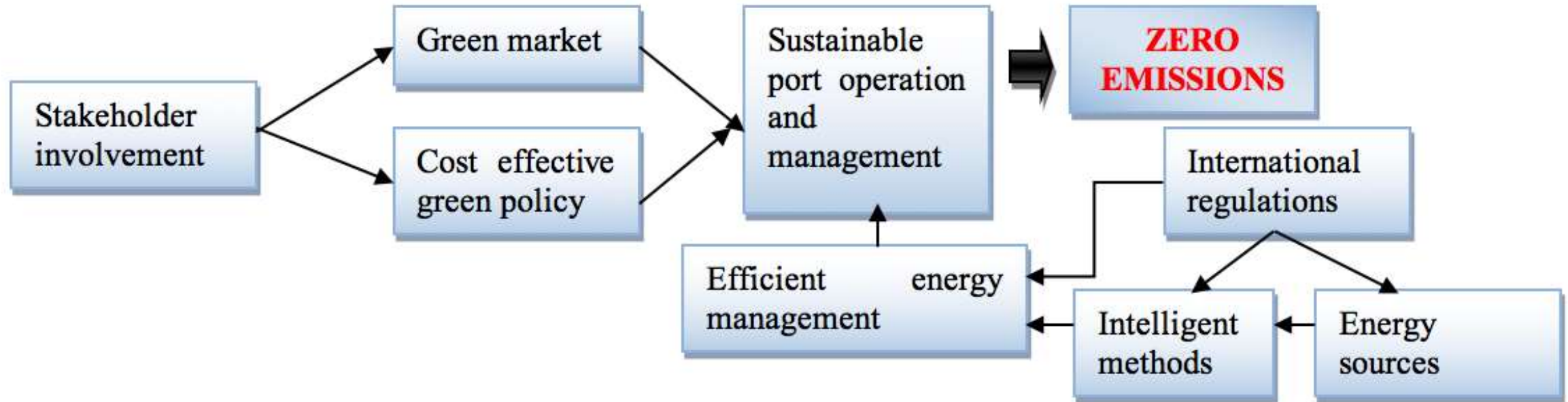


ANALYSIS

PIESTEL Analysis

| POLITICAL | ECONOMIC | SOCIAL | TECHNOLOGICAL | ENVIRONMENTAL | LEGAL |
|---|---|---|---|--|---|
| <p>Taxation (high taxation is disadvantage)</p> <p>Energy policies (friendly in environment)</p> <p>Political stability</p> | <p>GDP</p> <p>Investments in alternative energy sources (i.e. sun, air etc.)</p> <p>Local economy & Commercial Unions</p> | <p>Living condition in city of port is difficult (air pollution, etc.)</p> <p>the local community is receptive to environment</p> | <p>Research & Technology (exploitation of new technologies i.e. Artificial Intelligence etc.)</p> | <p>the natural environment near the port is in danger (marine pollution, air pollution etc.)</p> | <p>Environment protection laws</p> <p>unsatisfactory protection for constructions and the natural environment</p> |

ANALYSIS



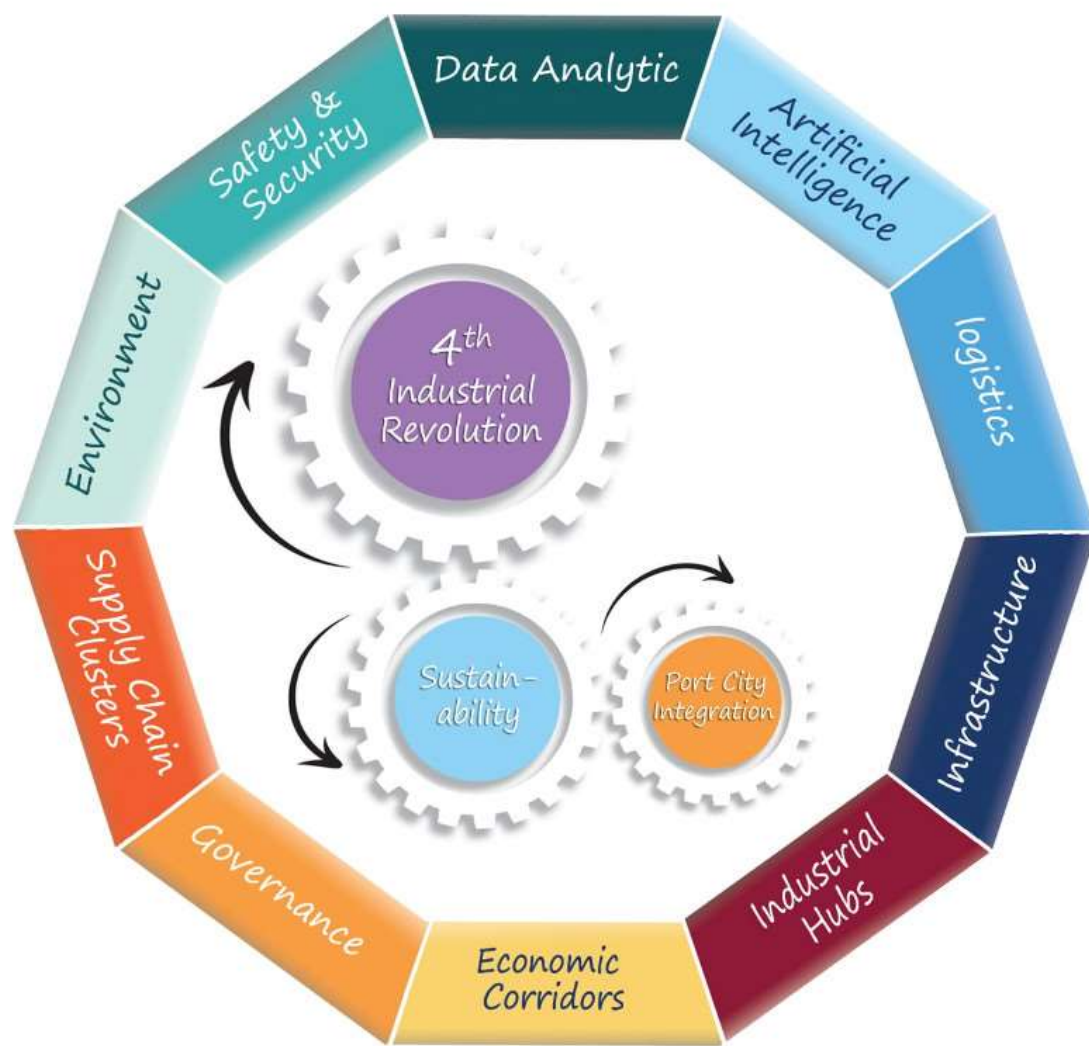
Intelligent Energy Management and Green Port framework (IEMGPF)

CONCLUSIONS

- Ports are a key element to the supply chain and the green logistics
- The concept of zero emissions' port is referred to a port powered mainly from renewable energies in order to fulfill its power requirements and to reduce the air emissions
- The IEMGPF is effective and sustainable framework for ports which focus in Zero emissions and sustainable ports operations and development



THANK YOU



UNIVERSITY OF THE AEGEAN



** Formerly known as Netherlands Maritime Institute of Technology*