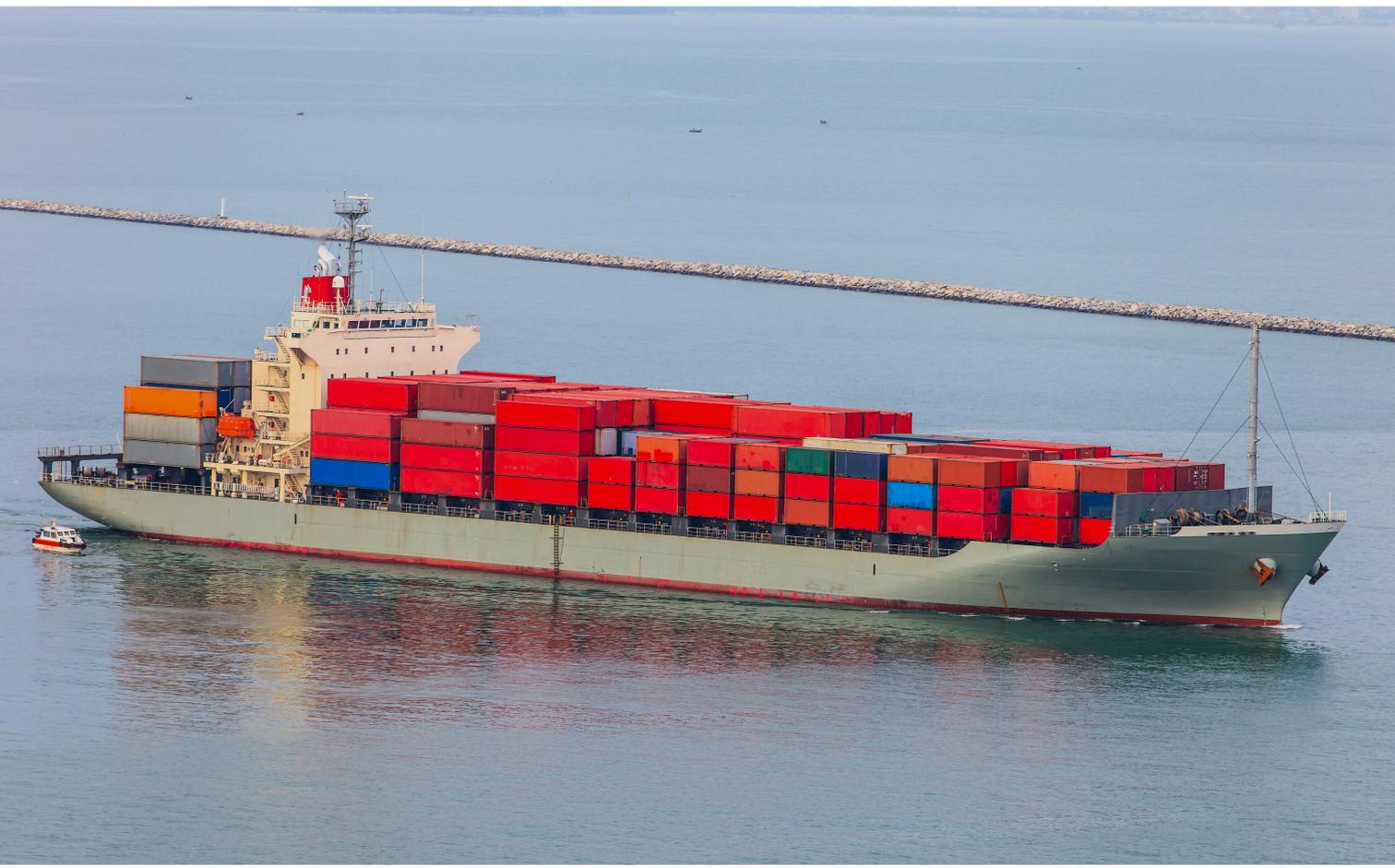


TOWARDS DECARBONIZATION AND ZERO-EMISSION IN THE NORTH SEA REGION

A Master's thesis by Hamidreza Hansen
Management Engineering, Aalborg University



Which SDG does your project relate to?



Sustainable Development Goal 9
- Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation



What is the concrete problem you have worked with?

The shipping industry is one of the largest and fastest growing sources of global carbon dioxide (CO₂), nitrogen oxides (NO_x), and sulphur oxides (SO_x) emissions, putting decarbonization and zero emission ships on the political agenda. Decarbonizing and zero emission is a necessity for sustainable growth, and it can guarantee a better and more sustainable future for all.

What is your solution to the problem?

In this research, the author aimed to: Formulate an applicable framework for screening venturing ideas in the North Sea Region (NSR). Introduce entrepreneurial opportunities for decarbonizing and zero emission to investors. And provide a basis for a strategic foresight to manage strategic decisions for decarbonizing and zero emission in the NSR to achieve a sustainable growth.

Four venturing ideas screening criteria were identified:

1. Feasibility.
2. The ability to solve emission problems and meet need to decarbonize and zero emission in the NSR.
3. Creating value for the NSR.
4. Time to commercial availability.

Then, the author identified 32 plausible venturing ideas for decarbonizing and zero emission and clustered them to three clusters: Infrastructure, Shipbuilding and Technology. Based on the venturing ideas screening criteria, the researcher recognized 15 out of the 32 venturing ideas, are entrepreneurial opportunities for decarbonizing and zero emission in the NSR. The 15 entrepreneurial opportunities for each cluster are:

1. Infrastructural entrepreneurial opportunities: This cluster includes microgrids at large ports, prolonging life and repurposing O&G assets, wind park repurposing, fully electric fish farm and offshore vessel charging stations.
2. Shipbuilding entrepreneurial opportunities: This cluster includes Exhaust scrubber, Solar-powered charging vessel, Renewable methanol vessels, 100% Renewable energy vessels and Tide-powered hydrogen vessels.
3. Technological entrepreneurial opportunities: This cluster includes Charging at offshore wind parks/farms, Virtual arrival agreements, AI for cargo stowage, International MRV monitoring and Offshore maintenance drones.

There are a lot of variables affecting the realization of the entrepreneurial opportunities, among these, strategic variables are very important. Using qualitative and structural analysis, the researcher identified 36 strategic (key) variables affecting realization of the opportunities.

The research showed profitability of such opportunities and their effectiveness in decarbonizing and zero emission is necessary if it is to be a sustainable investment. Moreover, financial, and non-financial support for entrepreneurs have a vital role in realization of the entrepreneurial opportunities. The findings demonstrated a strategic collaboration between all actors in the NSR (Governments, shipbuilding companies, ports, shipping companies, entrepreneurs, incubators and so on.) is necessary; and government incentives can guarantee decarbonization, zero emission and sustainable economy.