YACHTING'S ROLE IN ADVANCING SUSTAINABLE ECO LOGISTICS

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This article provides an experience of sailing yachting with a focus on sustainable logistics, transport, and renewable energy. It actively encourages young people and stakeholders to embrace these concepts to protect our environment. This comprehensive article underscores the pivotal social impact of yachting's evolution. It actively educates and engages people by offering eco-tourism experiences that provide insights into sustainable green nature protection and the challenges posed by climate change. This educational aspect is fundamental to fostering a deeper understanding of how logistics impacts both the environment and society. The article presents successfully realized events and activities that attracted people of different interests, ages, and nationalities. Special attention is given to disadvantaged children, who are presented with the positive experience of how modern eco-technological transports such as sailing yachting powered by ecological solar, wind and water energy can interact with an emphasis on nature conservation. At the same time, sharing experiences with young people further promotes their motivation for a fulfilling life in line with responsibility towards nature. The article presents a full extended paper that covers a range of positive practices beneficial to stakeholders.

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1 Introduction

In an era characterized by escalating global challenges and growing environmental concerns, the role of yachts in marine transport and logistics has risen to prominence as a sustainable solution to address pressing issues [Giusti et. all 2021, Guo et. all 2022, Degiuli et. all 2023, Kim, J.; Kim, H. 2021, Mauro et. all 2021, Xiao et. all 2023, Xu et. all 2023]. The adoption of ecological transport and renewable energy aligns with the imperative to transition towards more sustainable, eco-friendly logistics and transportation systems. The critical challenges of climate change, resource depletion, and environmental degradation resulting from conventional transportation methods have catalyzed the quest for innovative and sustainable alternatives. It is against this backdrop that sailing yachts have emerged as a potent force for change (Longarela-Ares et all. 2020, Mancuso and Tumino 2022, Pintér et. all 2021, Tsai and Lin 2023).

The modern yachts offer a distinctive proposition within the realm of marine transport and logistics. Powered by the natural forces of wind, water, and sun, they symbolize a green vision for relationship with the environment. In response to the urgent need to reduce greenhouse gas emissions, transition to renewable energy sources, and safeguard fragile marine ecosystems, sailing yachts occupy a pivotal position at the intersection of these global challenges, offering a sustainable path forward.

This article seeks to promote the important role of yachting as a crucial component of the solution to the global problem of unsustainable logistics and transport. By actively engaging young people and stakeholders, it encourages the embrace of sustainable concepts and practices that are essential for preserving our environment. The article delves deeper into the significant social impact of yachting's evolution, with education and engagement emerging as the keystones of change. Furthermore, it presents practical experiences and events that vividly illustrate how yachting's transition to ecological solar, wind, and water energy sources harmoniously interacts with nature and contributes to its conservation (Guo et. all 2021, Minak 2023, Trstenjak et. all 2020).

2 Synergy between nature and social environment and maritime logistics

The conventional transportation of goods (foods, cargo and etc.) via large ships, propelled by outdated technologies, has had a detrimental impact on both the environment and nature. These conventional ships often rely on fossil fuels, emitting significant greenhouse gases and contributing to air and water pollution. Their use can result in oil spills, damaging marine ecosystems, and causing long-lasting harm to coastal areas and wildlife (Koboević et. all 2022, Ortigosa et. all 2022).

In stark contrast, modern yachting represents a positive shift towards eco-conscious maritime logistics and eco-tourism (Dragičević et. all 2023, Łapko et. all 2019, Yao et. all 2023). Yachts are equipped with advanced technologies such as solar panels, wind turbines, and hydrodynamic generators, minimizing their carbon footprint and reducing emissions. This transition to renewable energy sources significantly mitigates the environmental harm caused by conventional ships.

2.1 Yachting's role in logistics

The yachting's role in logistics epitomizes the fusion of sustainability and innovation. By harnessing renewable energy sources and instilling eco-conscious practices, yachting offers a forward-looking solution to the pressing challenges of modern logistics. This evolution reflects a broader trend toward greener and more efficient supply chain management, paving the way for a more sustainable and responsible future.

2.1.1 Importance of yachting sustainable design for logistics

The focus on high-strength yacht design within the realm of eco-friendly logistics represents a pivotal element in the evolution of sustainable marine transportation. This emphasis on the physical structure of yachts, characterized by durability, resilience, and adaptability, has far-reaching implications for the logistics industry. At its core, a high-strength yacht is engineered to prioritize safety and longevity. Its robust construction ensures that it can withstand the unpredictable forces of the sea, providing a secure and dependable mode of transportation. This is of paramount importance, not only for the well-being of passengers and crew but also for

minimizing the risks of accidents or environmental damage that may result from structural failures.

The efficiency of high-strength yacht design is closely intertwined with its ergonomic features (Begović et. all 2023, Ingrassia et. all 2021, Mitkov and Dovramadjiev 2022, Santos et. all 2016). These yachts are conceived to harness natural forces, such as wind and water currents, with remarkable effectiveness. Their streamlined form reduces resistance and enhances their ability to glide through the water with minimal energy expenditure. This, in turn, translates to lower fuel consumption and reduced greenhouse gas emissions, aligning with the broader goals of sustainability and environmental responsibility. The construction of high-strength yachts frequently involves lightweight yet durable materials, resulting in a vessel that is not only strong but also resource-efficient. The reduction in weight contributes to a decrease in energy consumption during the construction phase and throughout the operational lifespan of the yacht. These yachts are not just enduring but also sustainable, fostering a more eco-conscious approach to marine transportation.

The versatility and adaptability of these yachts further enhance their appeal within the logistics sector. Their construction can accommodate innovative technologies and modular systems, making them agile and capable of meeting various logistical requirements. This adaptability is crucial for navigating the dynamic landscape of modern logistics. From a logistics standpoint, the high-strength, eco-conscious design of yachts optimizes cargo capacity, allowing for efficient storage and transportation of goods. This efficiency is invaluable, as it streamlines the movement of cargo, reducing the need for additional vessels and transport methods. High-strength yachts have a positive impact on logistics efficiency, contributing to cost savings and enhanced supply chain management.

The ergonomic and logistics-compliant design of these yachts adds a layer of appeal to their functionality. They adhere to industry regulations and guidelines, ensuring seamless integration into logistics processes. This adherence to standards is fundamental for logistics companies to operate efficiently and in compliance with governmental and international regulations.

2.1.2 Importance of renewable energy in yachting for autonomous logistic movement

The importance of renewable energy in yachting for autonomous logistic movement is multifaceted (Akiyama et. all 2021, An et. all 2023). It encompasses environmental preservation, reduced reliance on fossil fuels, energy independence, economic efficiency, technological progress, and the promotion of sustainability. By embracing renewable energy sources, yachting is not only advancing autonomous logistics but also leading the charge in fostering a more sustainable and environmentally responsible future for marine transportation.

Autonomous logistic movements powered by renewable energy embody the values of sustainability and eco-consciousness. They set an example for other transportation sectors and logistics operations to follow, encouraging the adoption of green technologies and practices. This include:

- Environmental Stewardship: Renewable energy sources, such as solar panels and wind turbines, offer a clean and sustainable means of powering yachts. By harnessing these natural energies, yachting embraces a greener approach to logistics, significantly reducing carbon emissions and minimizing its environmental impact. This eco-conscious approach aligns with global efforts to combat climate change and protect marine ecosystems.

- Reduced Dependence on Fossil Fuels: Yachts powered by renewable energy reduce their reliance on fossil fuels, which are a major source of greenhouse gas emissions. This transition away from traditional fuel sources plays a critical role in mitigating climate change and reducing the carbon footprint of autonomous logistic movements.

- Energy Independence: The adoption of renewable energy sources enhances the autonomy and self-sufficiency of yachts. They can generate their own energy from the sun, wind, or other eco-friendly methods, reducing the need for frequent refueling stops and minimizing logistics disruptions. This energy independence is particularly advantageous in autonomous logistic operations, where sustainability and reliability are paramount.

- Economic Efficiency: Renewable energy sources provide a cost-effective solution for powering yachts. While there may be an initial investment in the installation of solar panels or wind turbines, the long-term savings on fuel costs and maintenance make autonomous logistics economically efficient. This cost-effectiveness can translate into more accessible and sustainable logistics solutions.

- Technological Advancements: The integration of renewable energy sources into yachting for autonomous logistic movements drives technological innovation. Advanced energy storage systems, efficient power management, and smart grid solutions become pivotal in optimizing energy use. These technological advancements are not only beneficial for yachting but also have broader applications in the logistics industry.

2.2 Advancement of yachting

The advancement of yachting represents a dynamic progress toward a more sustainable and innovative maritime future. It encompasses the integration of cutting-edge technologies, renewable energy sources, and eco-friendly design, transforming yachting from a traditional leisure activity into a force for positive change in logistics and transportation. This progress underscores the pivotal role yachting plays in the evolution of sustainable marine solutions, embracing a harmonious relationship between nature and logistics.

2.2.1 Advancement of yachting for nature protection

The progression of yachting for nature protection reflects a transformative approach in the maritime domain. It embraces sustainable technologies, renewable energy sources, and ecologically conscious measures to shield marine ecosystems, coastal environments, and natural habitats. This evolution underscores yachting's dedication to optimizing logistics with the preservation of environment, solidifying its position as a steward of environmental integrity (Byrnes and Dunn 2020, Wu 2021).

2.2.2 Advancement of yachting for education

The advancement of yachting for education represents a dynamic shift within the maritime industry (Łapko 2023, Okşaş et. all 2022). It leverages sailing experiences to actively engage and educate individuals, particularly young people and stakeholders, about sustainable practices, marine conservation, and the importance of responsible logistics. This transformation positions yachting as a catalyst for a deeper understanding of the environment, logistics, and society, nurturing a new generation of environmentally conscious persons.

2.2.3 Advancement of yachting for socialization

The advancement of yachting for socialization signifies a compelling evolution within the maritime world. It transforms yachting experiences into opportunities for individuals to connect, engage, and build meaningful relationships. By fostering social bonds and shared adventures, yachting becomes a catalyst for enhanced human interaction, promoting unity, and camaraderie among diverse groups of people. The advancement of yachting for socialization takes on an even more profound dimension when considering individuals, including children, with disabilities. It represents an inclusive shift in the maritime world, where yachting experiences become avenues for people from all walks of life to come together, bond, and create lasting connections. In this environment, individuals with disabilities find not only acceptance but also opportunities for enriched social interactions, fostering a sense of belonging and unity among diverse groups of people. Yachting, in this context, transcends its traditional role, becoming a powerful tool for social integration and inclusivity.

3 Real examples of the positive application of yachting

Real-life examples of the positive application of yachting are difficult to cover and are not limited. Given the multifaceted activities, the photographic material presents carried out activities related to transport, ecology, social activity.

3.1 Yachting's role in transport

Yachting's role in transport is undergoing a notable transformation with an emphasis on sustainable design and sizes (Petacco et. all 2023). This shift prioritizes sustainable technologies and vessel dimensions that enhance efficiency, reduce fuel consumption, and minimize environmental impact. Figure 1 shows a sustainable design of sailing yacht with wooden teak elements.

Figure 1: Sustainable design of sailing yacht with wooden teak elements.
Foto: Mitkov, Dovramadjiev, 2023

3.2 Yachting's role in ecology

Yachting's role in ecology is evolving as it embraces sustainable practices and eco-friendly technologies. By prioritizing environmental protection and responsible logistics, yachting contributes to the preservation of marine ecosystems and coastal landscapes (Paramana et. all 2023, Vogel et. all 2018). It embodies a harmonious relationship between logistics and nature, fostering a more ecologically conscious approach in the maritime industry. Figure 2 shows part of a sailing yacht where the use of wind energy is of great importance.

Figure 2: Part of a sailing yacht where the use of wind energy is of utmost importance.
Foto: Mitkov, Dovramadjiev, 2023

3.3 Yachting's role in social interactions

Yachting's role in social interactions is about bringing people together in a unique setting, fostering connections, and promoting teamwork and communication (Kwon et. all 2021, Lim and Park 2023). It offers inclusive opportunities for individuals of diverse backgrounds and ages to share experiences, form lasting relationships, and create memories, making it a powerful catalyst for social engagement and unity. A particularly important place is the role of yachting for disadvantaged children who, for one reason or another, do not have the opportunity and/or access to yachting. It is the social responsibility of all yachting stakeholders to attract and support young people. In Fig. 3 shows a photo from a real event supporting young people to yachting.

Figure 3: A real-life activity supporting young people to yachting.
Foto: Mitkov, Dovramadjiev, 2023

4 Conclusion

This article covers the advancement of yachting's role in sustainable eco logistics. It delves into the dynamic interplay of design, transport, environmental stewardship, eco-conscious practices, renewable energy, and the pivotal social impact of yachting.

To represent yachting's contribution to sustainable eco logistics through its innovative design, which prioritizes efficiency, safety, and environmental responsibility, is recommended as very important and useful for modern logistics responsiveness. By harnessing renewable energy sources such as solar, wind, and water, yachting has become a leader of eco-conscious transportation, reducing carbon emissions and minimizing its ecological footprint.

This article extends beyond logistics, highlighting the social impact of yachting by actively engaging young people and stakeholders in embracing sustainable practices and marine conservation.

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