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# Product Life Cycle (PLC) In Transportation Management And Speed Boat Ambulance Product Design as A Medical Solution to Realize the Sustainable Development Goals "Good Health and Prosperity" in Indonesia

**Jajang Supriatna[1], Apriatha Nur Fadhillah[2], Sarinah Sihombing[3], Aswanti Setyawati[4]**
[1]Management Departement, Institut Transportasi dan Logistik Trisakti, Jakarta, Indonesia, supriyatna.jajang@gmail.com
[2]Management Departement, Institut Transportasi dan Logistik Trisakti, Jakarta, Indonesia, apriathanurfadilah09@gmail.com
[3]Management Departement, Institut Transportasi dan Logistik Trisakti, Jakarta, Indonesia, sarinah.stmt@gmail.com
[4]Management Departement, Institut Transportasi dan Logistik Trisakti, Jakarta, Indonesia, aswantimurgiyanto@gmail.com

Corresponding Author: supriyatna.jajang@gmail.com[1]

**Abstract:** This study examines the application of Product Life Cycle (PLC) in transportation management and product design of Speed Boat Ambulance as an innovative medical transportation solution in the Indonesian archipelago. By adopting a descriptive approach and literature study, this study highlights the importance of innovation in medical transportation services to improve access to health, especially in remote areas. The speed boat ambulance is considered capable of reducing response time by up to 60% compared to conventional sea transportation modes, while also addressing Indonesia's geographical challenges. The analysis also highlights the importance of ergonomic product design, the use of digital technology (such as IoT and navigation systems), and its contribution to achieving Sustainable Development Goal (SDG) 3: Good Health and Well-Being. This study recommends cross-sector collaboration and policy development that supports service sustainability to strengthen the national medical transportation system.

**Keywords:** Product Life Cycle, Transportation Management, Speed Boat Ambulance Design, Medical Transportation Solutions, SDGs, Health and Wellbeing

## INTRODUCTION

In the era of growing globalization, the transportation and logistics sector is becoming increasingly important to support the economy and support trade and distribution activities. Efficient transportation and logistics management is needed to meet the increasingly diverse needs of customers who demand fast, precise, and affordable services. In this context, the Product Life Cycle (PLC) concept is an effective analytical tool for companies to understand

the development of their services or products over time (Daiyah et al., 2022). Through PLC analysis, companies can identify critical phases in the product or service cycle, such as the introduction, growth, maturity, and in some cases the decline stage. By understanding these stages, transportation and logistics companies can take the right strategic steps to maximize profitability, efficiency, and customer satisfaction. Modern transportation management demands continuous innovation to face the challenges of service distribution, especially in the context of an archipelagic country like Indonesia. One of the most effective analytical tools in understanding the dynamics of product and service innovation in the transportation sector is the Product Life Cycle (PLC) framework. PLC or product life cycle describes the stages that a product or service goes through, from introduction, growth, maturity, to decline. This framework helps companies and governments in formulating business strategies, product development, and resource management in order to be able to adapt to changing market needs (Vernon, 1966). In the context of transportation and logistics, the implementation of PLC allows each stakeholder to evaluate the effectiveness of products and services as a whole, especially in facing the demands of a fast-paced era that is oriented towards technology-based services. By understanding each stage of PLC, companies can take relevant strategic steps to maintain competitiveness, improve operational efficiency, and expand access to essential services, such as medical transportation to remote areas (Coyle et al., 2013).

## METHOD

In this study, the researcher discusses the problem by collecting, describing, calculating, and explaining a situation so that a conclusion and recommendations can be drawn that are considered necessary to make improvements to the problems considered by the company being studied. The analysis technique used in this study is analysis using descriptive analysis. It can be concluded that research shows that investing in speed boat ambulance services can reduce response times by up to 60% compared to conventional sea transportation (Reddy & Rein, 2020). This reduction in response time is very significant in the context of emergency medical care, where every minute can be a determining factor in patient safety. Operational efficiency can also be achieved through regular maintenance, training of operational personnel, and efficient use of fuel. Thus, the sustainability of services can be maintained, and the socio-economic benefits obtained can continue to increase along with the increasing scope of services.

## RESULTS AND DISCUSSION

Studies show that the use of Speed Boat Ambulance in coastal areas can reduce response time by up to 60% compared to conventional sea transportation. In addition, operational costs can be reduced with regular maintenance and efficient fuel use. To support sustainability, companies can partner with local governments or non-profit health organizations to finance operations and maintenance. Speed Boat Ambulance Product SWOT Analysis

1. Strengths (Strengths)
   a. Improving access to emergency medical services in hard-to-reach areas.
   b. Has features and specifications specifically designed for medical needs.
   c. Significantly reduce emergency response time.
2. Weaknesses (Weaknesses)
   a. High initial investment costs.
   b. Requires regular maintenance to keep it functioning optimally.
   c. Depending on weather conditions which may affect operational effectiveness.
3. Opportunities
   a. The need for medical services in remote areas is increasingly urgent.
   b. Can establish partnerships with government and health organizations.
   c. Improve the company's image as an innovative and caring service provider towards society.

4. Threats (Threats)
   a. Competition with alternative technologies such as telemedicine or medical drones.
   b. Fluctuations in fuel prices which can increase operational costs.
   c. Natural challenges and sea conditions that can affect operational safety and reliability. The success of implementing speed boat ambulance as a medical transportation solution is highly dependent on the synergy between product innovation, operational management, and public policy support. The government plays an important role in providing supportive regulations, expanding access to financing, and monitoring service quality. Meanwhile, the private sector and the community can contribute in the form of investment, operational management, and active participation in promotional and educational efforts regarding the importance of water-based medical transportation services (Indonesian Ministry of Health, 2019). The application of PLC principles in transportation management and speed boat ambulance design also makes a significant contribution to efforts to achieve the SDGs in Indonesia. Innovative, sustainable, and responsive products and services to community needs are important foundations in building an inclusive and equitable health system. With the presence of speed boat ambulances, access to health services becomes faster and more equitable, especially in areas that were previously difficult to reach (World Health Organization, 2015). This is in line with the government's vision to improve the quality of life of the community, reduce mortality rates due to delays in medical treatment, and accelerate the achievement of sustainable development targets.

This literature study underlines that product innovation in the transportation sector, especially water-based medical transportation, must always be oriented towards market needs, environmental sustainability, and operational efficiency. Inter-sector collaboration, digital technology integration, and adequate regulatory support are key factors in creating reliable and sustainable medical transportation services. By adopting PLC framework as an analysis tool, companies and governments can be more adaptive in facing market changes, managing risks, and maximizing the resulting socio-economic benefits (Vernon, 1966; Coyle et al., 2013).

## CONCLUSION

In conclusion, this literature study confirms that the Product Life Cycle (PLC) is a highly relevant and applicable management framework in developing and managing innovations in medical transportation products such as speed boat ambulances. With a comprehensive understanding of the stages of the product life cycle, companies and stakeholders can design appropriate strategies to improve access to health services, support the achievement of SDGs, and realize a responsive, efficient, and sustainable transportation and logistics system (Indonesian Ministry of Health, 2019; World Health Organization, 2015).

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