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From Cleanup to Prevention: A Systems and Strategic Management Perspective on Ocean Waste Management

Prof. Dr. Salman Ali

Indian Institute of Management Kozhikode

Abstract

Marine plastic pollution has emerged as one of the most pressing environmental challenges of the twenty-first century, threatening marine ecosystems, biodiversity, economic productivity, and human health. Despite substantial investments in coastal cleanups and waste collection initiatives, global plastic leakage into oceans continues to rise, suggesting that downstream remediation alone is insufficient to address the problem. This paper argues that ocean waste management should be reconceptualized as a strategic systems challenge rather than merely an environmental cleanup issue. Drawing upon systems thinking, circular economy principles, and strategic management perspectives, the paper proposes a prevention-oriented framework that emphasizes interventions at the production, consumption, governance, and waste management stages of the plastic value chain. The study adopts a conceptual research design based on an integrative review of interdisciplinary literature to identify key leverage points for reducing marine plastic leakage. It further discusses the enabling role of emerging technologies, particularly artificial intelligence, in improving waste monitoring, forecasting, and policy implementation. The paper contributes to the strategic management literature by demonstrating how systemic coordination among governments, businesses, and civil society can generate long-term environmental and organizational value. The proposed framework offers practical insights for policymakers and managers seeking to shift from reactive cleanup initiatives toward proactive prevention strategies capable of delivering sustainable and scalable solutions to marine plastic pollution.

Keywords: Ocean Waste Management; Strategic Management; Systems Thinking; Circular Economy; Artificial Intelligence