181ᵃ DEFESA DE DISSERTAÇÃO EM ENGENHARIA INDUSTRIAL - MAEI

PROGRAMA DE PÓS-GRADUAÇÃO EM ENGENHARIA INDUSTRIAL - PEI

LUCAS MENEZES PEREIRA

✉ pei@ufba.br

🌐 www.pei.ufba.br

📷 @peiufba

f @peiufba

▶ PEI TV

Orientador:

- Prof. Dr. Francisco Gaudêncio Mendonça Freires (PEI-UFBA)

Banca Examinadora:

- Prof. Dr. Francisco Gaudêncio Mendonça Freires (PEI-UFBA);

- Prof. Dr. Vasco Sanchez Rodrigues (Cardiff University - Reino Unido);

- Prof. Dr. Minelle Enéas da Silva (University of Manitoba - Canadá);

- Prof. Dr. Adauto Farias Bueno (Universidade do Estado de Mato Grosso).

Suplente:

- Prof. Eduardo Oliveira Teles (IFBA);
- Prof. Marcus Vinícius Carvalho Fagundes (UESB).

Título: HYBRID MODELLING APPLIED IN FAVOUR OF THE PERFORMANCE OF THE BRAZILIAN PLASTIC WASTE MANAGEMENT SYSTEM.

Data: 17 de janeiro de 2025   **Horário:** 13h:00
Local: https://conferenciaweb.rnp.br/webconf/pei_epufba

Resumo:

This empirical study aims to suggest improvements to the performance of plastic waste management (PWM) systems. It uses a hybrid modelling integrating Partial Least Squares Structural Equation Modelling (PLS-SEM), Interpretive Structural Modelling (ISM), and Matrix of Impact Cross-Multiplication Applied to Classification (MICMAC). The data for the modelling were collected through a structured questionnaire and a semi-structured questionnaire targeting the recycling stakeholders of this type of waste. The first asked about the importance of various indicators from the literature; on the other hand, the second asked about the relationships between constructs. Regarding the results, socioeconomic matters and organizational features correlate with the system effectiveness and are driving constructs influencing the dependent constructs: system efficiency, system effectiveness, and system performance. The results also say that efficiency correlates with performance, highlighting the importance of high productivity and cost-effective recycling processes. So, when deciding about PWM, the local public service should observe population density, per-capita income, and popular consciousness about sorting waste at the source; in turn, organizations should focus on personnel training, advertising, and incentive-based schemes to enhance the performance of PWM systems. Also considering the results, an application framework proposal for systems assessment was developed, merging them with ones from another framework evaluating PWM systems. This framework proposal is structured into the basic and subsequent application levels. The basic level includes socioeconomic matters, organizational features, policies, technological status, recovery value, and supply chain coordination. The subsequent comprises efficiency, effectiveness, and performance. As for theoretical implications, this study's versatile methodology, with statistical refinement, containing quantitative and qualitative data collection, can be repeated to suggest improvements to other waste management systems and in different geographical contexts. Regarding the practical implications, the framework proposal, whose application is theoretically demonstrated in the metropolitan city of Salvador, provides practitioners with a measurement and tracking tool to help interventions for improving PWM systems. Furthermore, this study can contribute to plans like Planares (the new national solid waste plan) in Brazil—the world's fourth-largest plastic waste generator—a country requiring a systematic improvement to reach, by 2040, the target of 48.1% Municipal Solid Waste (MSW) yearly recovered. Regarding the social implications, improved PWM systems foster economic opportunities through job creation, reducing environmental pollution, enhancing public health, and promoting community engagement in recycling efforts. This study goes towards the Sustainable Development Goals for sustainable cities (SDG 11), responsible consumption (SDG 12), ocean protection (SDG 14), and ecosystem restoration (SDG 15).

Palavras-chave: Plastic Waste Management. Circular Economy. Recycling. Sustainability. Partial Least Squares Structural Equation Modelling. Interpretative Structural Modelling. Matrix of Impact Cross-Multiplication Applied to Classification.