

**"PROMOTING CIRCULAR ECONOMY: DRIVERS AND BARRIERS TO DIGITAL
PRODUCT PASSPORT ADOPTION IN THE EU"**

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Introdução

This article examines factors promoting or hindering the Digital Product Passport adoption in the EU, proposing strategic recommendations to leverage drivers, and address barriers for successful integration of it into organizational and regulatory frameworks. A mixed-methods approach was used, combining the Delphi method with Total Interpretive Structural Modelling. Key findings revealed regulatory pressures, digitalization, and circular economy support as drivers, while high costs, lack of skills, and data standardization issues pose significant barriers to the Digital Product Passport.

Problema de Pesquisa e Objetivo

Currently, an estimated two billion tons of waste is produced every year, with most products thrown away and likely to end up in a landfill or burnt, thus the need to consider how best to design, consume, and dispose of products. Some companies have developed a circular economy approach however, without detailed information on the life cycle of each product and the supply lines. Digital Product Passports (DPP) are an important instrument in the worldwide fight against waste and shift to circular economy. This article aims to investigate the drivers and barriers to the adoption of the DPP.

Fundamentação Teórica

Ghisellini et al. (2016) presents a broad review of the circular economy, identifying the importance of transparency in aligning environmental and economic systems. Azevedo et al. (2013) introduce the ecosilient index for supply chains while Honic et al. (2019) explore Material Passports in building recycling, offering transferable insights into product-level traceability. Digital Product Passports (DPPs) provide detailed information about a product's journey, composition, and environmental impact.

Metodologia

This study adopts a mixed-methods approach to investigate the drivers and barriers of Digital Product Passport (DPP) implementation, acknowledging its multifaceted and systemic nature. The qualitative phase involved semi-structured interviews with selected experts to capture in-depth insights on transparency, traceability, and regulatory challenges. These expert interviews informed the design of a structured quantitative questionnaire, which included Likert scale questions to assess the relevance of each identified factor and a set of TISM-based items to map interdependencies.

Análise dos Resultados

This research identified a mix of drivers and barriers that influence Digital Product Passport (DPP) adoption. Key drivers include regulatory pressure for sustainability, digitalization of business processes, and the DPP's role in enabling circular economy practices. Key obstacles include the lack of data standardization, high digitalization costs, and insufficient technical and managerial skills, issues particularly affecting small and medium-sized enterprises. Moreover, successful implementation requires coordination among key stakeholders, including regulators, businesses, and consumers.

Conclusão

In conclusion, the DPP is more than a compliance tool, it is a catalyst for sustainability, innovation, and supply chain transformation. Despite its complexity, its adoption provides businesses with opportunities to differentiate themselves, optimize resource use, and align with global environmental goals. With coordinated efforts from businesses, institutions, and consumers, the DPP can become a pillar of the circular economy, driving sustainable change across industries.

Contribuição / Impacto

This article contributes to the literature as it uses for the first time the Delphi method and the Total Interpretive Structural Modelling (TISM) to help identify the main drivers and barriers and to map the relationship among drivers and barriers for DPP implementation. It supports sustainability and circular economy goals by promoting transparency, traceability, and material reuse, and provides policy guidance to help integrate Digital Product Passport (DPP) into organizational and regulatory frameworks.

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