

## **Overcoming The Storm: Frugal Innovation in Brazilian Industries Resilience**

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## **Introdução**

Brazilian industries face urgent challenges due to climate change and resource scarcity, sparking academic debate on resilience and innovation. Recent studies suggest that adaptability and frugal innovation are crucial for companies' survival and growth. However, little is known about how organizational learning drives frugal innovation in Brazilian industrial firms exposed to climate risks.

## **Problema de Pesquisa e Objetivo**

The study aims to analyze the impact of organizational learning capabilities in frugal innovation in Brazilian industrial firms facing climate and resource constraints. Specifically, it investigates the moderating effects of firm size, capital origin, and manager gender, offering practical recommendations to strengthen sectoral resilience and adaptive capacity.

## **Fundamentação Teórica**

Frugal innovation creates efficient, affordable solutions for resource-scarce settings without compromising quality. Literature highlights experimentation, dialogue, and knowledge sharing as key enablers of frugal innovation and resilience. Organizational learning capability is identified as a fundamental driver for turning constraints into opportunities and sustainable value.

## **Metodologia**

The research is a quantitative, descriptive, and explanatory cross-sectional study. Data was collected from 448 Brazilian industrial firms through validated surveys. Structural equation modeling (PLS-SEM) was used for model testing, with additional cluster analysis in Python to investigate the moderating effects of size, gender, and capital origin on the relationships.

## **Análise dos Resultados**

Organizational learning capability significantly predicts frugal innovation ( $\beta = 0.54$ ,  $p < 0.001$ ,  $R^2 = 0.36$ ). The impact is strongest in medium/large firms and those led by women. Cluster analysis shows that context (firm size, leadership gender, capital origin) influences the strength of this relationship, supporting differentiated strategies for resilience.

## **Conclusão**

Organizational learning capabilities—especially experimentation, openness, risk propensity, dialogue, and participation—promote frugal innovation in Brazilian industry. Effects are more pronounced in resource-rich, female-led, and national-capital firms. Tailored policies and management strategies are needed to maximize resilience and adaptation to climate change.

## **Contribuição / Impacto**

This study advances empirical knowledge by integrating robust data and statistical models. It provides actionable recommendations for managers and policymakers by presenting the Practices for Frugal Innovation Resilience framework, highlighting organizational learning as a strategic lever for frugal innovation and resilience in the face of climate challenges in emerging markets like Brazil.

## **Referências Bibliográficas**

Alegre & Chiva (2008); Berndt et al. (2023, 2024); Bessant et al. (2014); Chiva et al. (2007); Díaz-García et al. (2013); Hossain (2018); Jiménez-Jiménez & Sanz-Valle (2011); Rossetto et al. (2023); UNFCCC (2019); Zeschky et al. (2011, 2014), and others.