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Abstract.

The aim of this study is to explore the economic efficiency of innovative development in production enterprises through the implementation of energy resource-saving systems, particularly in the context of digitization. This research employs a mixed-methods approach, utilizing quantitative data analysis through software tools such as SPSS and qualitative interviews with industry experts. Surveys were conducted among production enterprises to gather insights on energy-saving practices and their economic impacts. The study found that enterprises implementing energy resource-saving systems experienced a significant reduction in operational costs, improved productivity, and enhanced sustainability metrics. The data indicated an average cost savings of 15% and a productivity increase of 20% post-implementation. To further analyze these findings, the study incorporates Applied Nonlinear Analysis to model the complex relationships between energy resource-saving systems, operational efficiency, and productivity outcomes. This analytical framework allows for a deeper understanding of how nonlinear interactions among various factors influence economic performance in production settings. The findings suggest that the integration of energy resource-saving systems not only contributes to economic efficiency but also aligns with broader sustainability goals. The study concludes that digitization plays a crucial role in optimizing these systems. This research is beneficial for stakeholders in the fields of industrial engineering, environmental management, and corporate sustainability. This study introduces a comprehensive framework for assessing the economic impacts of energy resource-saving systems in production enterprises, contributing new insights into the intersection of digitization, sustainability, and nonlinear analytical methods.

Keywords: economic efficiency, innovative development, energy resource-saving systems, applied nonlinear analysis, digitization, production enterprises.