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Integrating Innovation and Responsibility in Sustainable Farming Practices

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Abstract

The agri-food sector is facing unprecedented challenges in the 21st century, characterised by interlinked geopolitical, demographic, environmental and technological factors that require innovative solutions with sustainability principles in mind. Climate change, deteriorating natural resources and the need to ensure food security for a growing world population are forcing managers to reflect on these challenges. Responsible innovative approaches can significantly reduce the negative impact on the environment while maintaining or improving the level of productivity that is essential for future development. These innovative approaches to business management must be based on quality management, learning and the transfer of new knowledge and skills into practice. Digital technologies, precision farming and smart management systems are key innovations in addressing the challenges of climate change and food security concerns. The primary objective of the scientific paper is to identify current global challenges and trends in the sustainability of the agricultural sector and to evaluate the effectiveness of innovative technological solutions in transforming sustainable farm management practices, with particular focus on comparing the Slovak and EU agricultural sectors' adoption rates. Through a comprehensive analysis of longitudinal data (2018-2024), this research investigates the relation between technological integration and environmental sustainability metrics in the Slovak agricultural sector, compared with broader European Union benchmarks. The findings demonstrate a significant positive relation between innovation adoption rates and agricultural sustainability metrics. The research question of the article is whether the integration of innovative technological solutions in Slovak agricultural enterprises has a positive relationship with improved sustainability performance metrics.

Keywords: Climate Change, Environmental Impact, Food Security, Sustainability, Technological Integration