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Agent-Based Modeling of the Egg Supply Chain: Dynamics, Challenges, and Optimization Strategies

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This research leverages Agent-Based Modeling (ABM) using NetLogo to simulate the egg supply chain, focusing on the interactions and decision making processes of factories, distributors, retailers, and customers. The model incorporates dynamic pricing, demand variability, inventory management, spoilage rates, and import mechanisms to reflect real-world complexities in managing perishable goods. Simulation results demonstrate the model's capacity to stabilize supply chain dynamics, mitigate inefficiencies like overstocking and shortages, and ensure price stability across tiers. Building on prior studies that utilized ABM to analyze perishable goods supply chains under disruptions and optimize supply chain operations, this research validates ABM as a robust decision-support tool. The findings provide actionable insights into policy interventions and strategies for enhancing supply chain resilience and efficiency under dynamic and uncertain conditions.

Keywords: *Agent-Based Modeling (ABM), Egg Supply Chain, Dynamic Pricing, Supply Chain Resilience*

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