

# Analysis of the impact of COVID-19 on the coupling of the material flow and capital flow in a closed-loop supply chain

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## ABSTRACT

The complex and changeable external social and economic environment has a significant impact on the sustainable development of the closed-loop supply chain. In particular, the occurrence of uncertain emergencies increases the risk of interruption of the closed-loop supply chain, making it insufficient to analyze its complex changes from the perspective of material flow alone. Based on this analysis, the paper constructs a closed-loop supply chain material flow and capital flow coupling system composed of manufacturers, sellers and recyclers to explore the impact of material flow sudden interruption on the closed-loop supply chain system when an uncertain emergency occurs. In this paper, based on the closed-loop supply chain system coupled with logistics and capital flow, a system dynamics simulation model was established by using Vensim simulation software to analyze the impact of COVID-19 epidemic on manufacturers, sellers and recyclers under five scenarios. The results show that when COVID-19 outbreaks occur, the material flow of each main enterprise in the closed-loop supply chain is more easily influenced than the capital flow. At the same time, it can be found that the recyclers in the main enterprises of the closed-loop supply chain are more easily influenced by the material flow. The model constructed in this paper has applicability and can be used for related studies of closed-loop supply chain under other emergencies, but the scene design should be carried out according to the characteristics of emergencies themselves.

## ARTICLE INFO

### Keywords:

COVID-19 epidemic;  
Supply chain;  
Closed-loop supply chain;  
Material flow;  
Capital flow;  
Material-capital flows coupling;  
System dynamics;  
Simulation;  
Vensim simulation software

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### Article history:

Received 25 January 2021

Revised 28 February 2021

Accepted 3 March 2021



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