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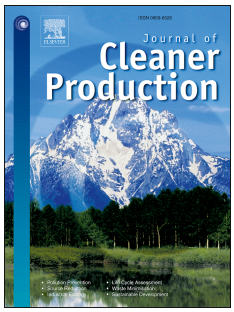

Cartelization or Cost-sharing? Comparison of cooperation modes in a green supply chain

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Cartelization or Cost-sharing? Comparison of cooperation modes in a green supply chain

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Abstract

In order to achieve superior energy-saving performance of products, both the upstream and downstream firms in a green supply chain intend to form R&D (Research and Development) collaborations. This paper analyzes via a game-theoretical approach two typical cooperative behaviors, Cartelization and Cost-sharing contract, of the two chain members. Comparisons are carried out between cases of Cartelization, Cost-sharing contract and a benchmark of non-cooperation. Results rely on both the comparative efficiency which captures the technology difference between the members and the effectiveness factor which measures the consumer green awareness and government subsidy. Specifically, for moderate comparative efficiency and effectiveness factors, the upstream firm mostly favors a Cartelization, the downstream firm generally prefers a non-cooperative scheme while the chain-wide profit mostly peaks under a Cost-sharing contract. However, low comparative efficiency and large effectiveness factor lead to different preferences such that Cartelization becomes least beneficial for the upstream firm but most favored by the downstream firm and the chain. A Cost-sharing contract brings more profit to both members and the chain than a non-cooperative mode does, and a Cartelization is Pareto-improving among the three under certain conditions. Chain-wide collaboration always benefits the consumers and the environment rather than a non-cooperative case does. In addition, the implication from the modelling results can be verified by an empirical example.

Keywords: Supply chain management, Green supply chain, Cartelization, Cost-sharing contract, Pareto-improving

1. Introduction

Environmental concerns have become increasingly essential for manufacturers who encounter scissor-style pressures. The top blade comes from government and authorities, urging companies to go green by enforcing policies; the bottom one reflects strong willingness of consumers to abate emission, protect the environment and purchase greener products. From another standpoint, these pressures act as driving forces of environmental innovation, which mainly include demand-pull and regulatory push/pull factors (De

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