Journal of Cleaner Production 170 (2018) 183–192

Contents lists available at ScienceDirect

Journal of Cleaner Production

journal homepage: www.elsevier.com/locate/jclepro

Green supply chain game model and analysis under revenue-sharing contract

Huihui Song*, Xuexian Gao

[a] School of Economics & Management, China University of Petroleum (East China), Changjiang West Rd. 66, Economic & Technological Development Zone, Qingdao, Shandong, 266580, PR China

ARTICLE INFO

Article history:
Received 15 May 2017
Received in revised form
16 August 2017
Accepted 14 September 2017
Available online 15 September 2017

Keywords:
Green supply chain
Revenue-sharing contract
Game model
Green sensitive

ABSTRACT

A revenue-sharing contract can play an important role in coordinating the distribution of benefits among the upstream and downstream members of a green supply chain and improving its overall performance. However, there are few quantitative studies on revenue-sharing contracts in green supply chains. To this end, we first establish a green supply chain game model with two kinds of revenue-sharing contracts, and then compare the results with the common centralized control game model and the decentralized decision game model's results. By comparing the models' results, we can quantitatively analyze the impact of the contracts on the internal membership decision variables and the overall performance of the supply chain. Our study also takes consumer sensitivity towards green products into account to make a better sense of its impacts on the relative variables. Finally, we propose that a revenue-sharing contract can effectively improve the greening level of the products and the overall profitability of the supply chain. In particular, the retailer-led revenue-sharing contract leads to higher greening level compared with the decentralized control condition. In addition, under this case, both the manufacturer and the retailer get higher profits, which is of great significance to green supply chain's establishment and cooperation. In addition, the bargaining revenue sharing contract can make both product's greening level and supply chain's overall profit even higher than that under the retailer-led revenue sharing contract.

1. Introduction

The great development of economic globalization requires companies to establish a global supply chain instead of the traditional limited supply chain. The global supply chain aims to ensure the timely availability of material as well as minimizing the cost of manufacturing, service and performance (Almaktoom et al., 2016). However, with the expansion of the global supply chain, resource consumption and environmental pollution problems have aroused people's attention (Zhu and Sarkis, 2004). Therefore, improving the global supply chain's resource utilization efficiency and reducing the impact of manufacturing on the environment have become a hot topic (Seuring, 2013). Under this circumstance, the green supply chain concept came into being.

A green supply chain is a modern management idea with the goal of minimizing environmental impacts and maximizing resource efficiency from material acquisition, processing, packaging, storage, transportation, use, to final scrapping (Srivastava, 2007). Establishing green supply chains to raise the utilization efficiency of resources and reduce the impact of the manufacturing on the environment has attracted the attention of various countries and organizations. Hundreds of countries have put energy conservation and environmental protection into their development strategies, and continue to strengthen and improve relevant legislation (Mathiyazhagan et al., 2015). For example, the “Restrictions on the Use of Certain Hazardous Substances Directive in Electrical and Electronic Equipment” promulgated by the European Union in 2006 (EU-Directive, 2003) prompted manufacturers to attach great importance to toxic and hazardous substances in products. Since 2009, China has strengthened environmental protection legislation and supervision, and has begun to implement environmental protection and reduce energy consumption in the process of business management. Implementing green supply chain has become an important goal (Luo et al., 2015). To motivate the companies to participate in the green supply chain, the government has provided subsides for remanufacturers (Albared et al., 2008). Increasingly

* Corresponding author.
E-mail addresses: sdshuihui@163.com (H. Song), xiaoling1569@163.com (X. Gao).

https://doi.org/10.1016/j.jclepro.2017.09.138
0959-6526/