Chapter 18
Innovative Practices for Eco-Friendly Suppliers in the Automotive Industry:
Strategies for Sustainable Supply Chains Using DEA Model

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ABSTRACT

Achieving sustainable supply chain management in the automotive sector requires careful consideration of green suppliers. This study offers a thorough method for applying the data envelopment analysis (DEA) model to assess and choose environmentally friendly providers in the automotive industry. The DEA model's application is illustrated by case studies from the automotive sector, which also emphasize the model's efficacy in identifying suppliers who meet strict operational requirements and excel in sustainability. The results highlight how crucial it is to include environmental factors in supplier selection procedures and provide useful advice for automakers looking to improve their green procurement practices. This

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study advances the field of sustainable supply chain management by offering a framework for selecting environmentally friendly suppliers that is applicable to a range of business sectors.

1. INTRODUCTION

The growing emphasis on environmental sustainability has led to the emergence of Green Supply Chain Management (GSCM) as a critical area of study in both academic research and industry practice (Tronnebati and Jawab, 2020). Every stage of the supply chain management process, including product design, procurement of materials, manufacturing, distribution, and end-of-life disposal, is integrated with environmental considerations through the use of GSCM (Srivastava, 2007). Regulatory pressures, consumer desire for environmentally friendly products, corporate social responsibility, and the possibility of financial gains from increased resource efficiency and waste reduction are some of the factors driving the implementation of GSCM (Carter and Rogers, 2008; Qin et al., 2017). Reverse logistics, eco-design, green manufacturing, green purchasing, and eco-design are some of the key strategies within GSCM that are used to reduce the environmental impact of supply chain operations (Min and Galle, 2001; Sarkis, 2003).

Enhanced customer satisfaction, financial savings, improved business reputation, and environmental improvements are just a few of the many advantages of GSCM (Hervani et al., 2005). But there are drawbacks to GSCM adoption as well, including high upfront expenditures, resistance from suppliers, insufficient experience, and difficulty with performance measurement By increasing supply chain efficiency and transparency(Moufad and Jawab, 2017), recent technological developments like blockchain and IoT present possible solutions to these problems. All things considered, GSCM is a calculated strategy that strikes a balance between environmental stewardship and economic performance in order to achieve sustainable development goals (Tronnebati et al., 2022a, 2022b).

Suppliers are essential to supply chains, and an organization's sustainability and general performance depend on choosing environmentally friendly suppliers. By strengthening their environmental credentials, cutting waste, and increasing resource efficiency, green suppliers can have a big impact on an organization's performance and help it achieve its sustainability goals (el Mokaddem and Jawab, 2019; Y. Frichi et al., 2019; Imane et al., 2020b; Moufad and Jawab, 2017). Therefore, On the other hand, choosing suppliers who have unsatisfactory environmental standards can have detrimental effects on your business, including fines from the authorities, harm to your reputation, and higher operating costs as a result of inefficiencies and waste management problems. For this reason, choosing green suppliers carefully is not