

# Green supplier evaluation using fuzzy axiomatic design based decision analysis \*

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## Abstract

Purchasing is one of the vital functions within a company and supplier performance evaluation is one of the most important business processes of the purchasing function. Traditionally, companies have considered factors such as price, quality, flexibility, etc. while evaluating suppliers. However, environmental pressures urge them to consider green issues. This study proposes a decision model for supplier performance evaluation by considering various environmental performance criteria. An axiomatic design based fuzzy group decision making approach is adopted to evaluate green supplier alternatives. Finally, a case study is given to demonstrate the potential of the methodology.

*Key words:* Green supplier evaluation, Fuzzy axiomatic design, Group decision making.

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## 1 Introduction

Competitive advantages associated with supply chain management philosophy can be achieved by strategic collaboration with suppliers and service providers. The success of a supply chain is highly dependent on its suppliers and thus, supplier selection problem has been a major research area. In recent years, an additional strategic dimension of suppliers is taken into account, which is their contribution to sustainable development, particularly to the environment [1], [2].

Pressure from governments, institutions and consumers has forced many companies to improve their environmental performance [3], [4], [5]. Over the last few years, organizations have responded to this challenge by implementing a number of programs [6]. First, managers introduced end-of-pipe initiatives aimed at reducing emissions, waste and energy consumption [7]. At the end of the 1980s, clean technologies were introduced along with programs for reducing the environmental impact of key steps in the production process [8]. At the beginning of the 1990s, enterprises changed their operating procedures and introduced eco-auditing frameworks for modifying products and services [9]. Organizations are facing a fourth phase; in which environmentally conscious firms, mainly large companies, are developing environmental programs aimed at organizing their supply chains [10], [11]. Greater collaboration among the members of a supply chain might foster the development of improved environmental practices [12]. For this reason, many companies have begun to pay

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