

## **A cross-functional collaborative model for supplier evaluation for the sustainability of a firm**

**\*Koshila Jayarathne, Annista Wijayanayake and Samantha Weerabahu**

*Department of Industrial Management,  
Faculty of Science, University of Kelaniya, Sri Lanka  
\*koshilajayarathne@gmail.com*

### **Abstract**

Business organizations have emphasized the importance of sustainability in their business processes. Sustainability of a firm can be measured on social, environmental and economic benefit indicators known as “triple bottom line”. Supplier selection process is one of the critical issues of sustainability activities faced by supply chain managers to maintain a strategically competitive position in the industry and supplier selection can significantly affect in achieving the triple bottom line. Given the current context, technological factors immensely affect the sustainability of a firm. Communication and web based systems related technology is a vital factor to build sustainable supply chain relationships. Thus, technological aspects can be taken into consideration under different sustainable criteria for supplier selection, though it has not been considered yet as a major factor. Analytical Network Process (ANP) has been incorporated to compute the supplier evaluated score that was computed by each department against each supplier. Then an Integer Linear Programming (ILP) model has been used to integrate the judgments of the multiple decision-makers. This research addresses the supplier selection decisions by groups of experts, which improves the quality and accuracy of the decisions made. In this model, both subjective and objective factors related to supplier selection are incorporated in order to optimize the procurement process aligning to the sustainability of the firm.

**Keywords:** Analytical Network Process (ANP), Group decision making, Integer linear programming, Supplier selection, Sustainability

### **Introduction**

Supply Chain Management (SCM) is a business term which has been emerging in the past few decades and it has been gaining popularity ever since. Supply chain is comprised of all those activities associated with the transformation and flow of goods and services, including their attendant information flows, from the sources of materials to end users (Bowersox and Closs, 1996). SCM includes supplier selection and in one of the areas where a strategically competitive position for the organization could be built. Selection of the best and/or the most suitable supplier is based on assessing the supplier capabilities, which is a complicated multi-dimensional problem, as it involves number of supplier selection criteria. Sustainability is simply the long term existence of the company. When a company is focusing on sustainability, it always tries to ensure a minimal negative impact on the global or local environment, society or economy. Sustainability has become a popular buzzword, both in today’s business world and within the broader facets of society. Sustainability can be incorporated into the supplier selection process, in order to improve the supplier selection process of a company. However, the idea of including sustainability as a criterion should be considered as a challenge, as traditionally, supplier selection is based on the criteria such as cost, quality, delivery etc. With increasing pressure arising from a contaminative environment and deficient energy and resources, decisions concerning supplier selection should be based not only on