

Supply chain management for green and low-carbon products—a case study of  
TFT-LCD industry  
李欣怡, 王佳蓁, 林俊宇  
Technology Management  
Management  
amylee@chu.edu.tw

## Abstract

Some advanced companies have already adapted to the trend of green supply chain before environmental policy was in practice. In a conventional supply chain, companies usually focused on cost, delivery, and quality, because they are the most important criteria for success. However, due to the change of environment, the rise of environmental consensus, and the concept of green supply chain, the traditional supply chain must be extended into a green supply chain. In addition to the traditional players, including manufacturers, suppliers, distributors, retailers, and customers, in the supply chain recyclers and wastes processors must be included in the green supply chain. Therefore, the environmental issue has to be examined from product design to the end of lifecycle in a whole supply chain. Environmental protection and sustainable development have become more and more important factors of business operation. Enterprises must focus on environmental protection and social responsibility to extend product lifecycle and business development. Generally speaking, being a green supplier is every manufacturer's social responsibility. Companies should understand that there are different techniques and capabilities between traditional and green suppliers. Carbon footprint is a good measure of the impact that a product has on the environment, especially in climate change, in the entire lifetime of the product. Carbon footprint is directly linked to CO<sub>2</sub> emission. Thus, the reduction of CO<sub>2</sub> emission must be considered in the product life cycle. While more and more researchers are working on the green supply chain management in the past few years, very few have incorporated CO<sub>2</sub> emission or carbon footprint into the green supply chain system. The research aims to propose an integrated model for facilitating the supply chain management for green and low-carbon products, and a case

study will be carried out on a TFT-LCD industry. To reduce the failure rate of a new product, a firm needs to select the right suppliers that not only can satisfy the basic requirements, such as cost and quality, but also can provide green and low-carbon materials. The goal is to construct a green and low-carbon supplier evaluation model. The attributes that a green and low-carbon supplier should have will be analyzed first. Fuzzy analytic network process (FANP) model will be incorporated with the benefits, opportunities, costs and risks (BOCR) concept next to evaluate various aspects of suppliers. By applying the model, the manufacturer can find the most suitable supplier for cooperation and can provide recommendations to other suppliers that need improvements.

Keyword : TFT-LCD; fuzzy analytic network process (FANP); fuzzy set; green supply chain; benefits, opportunities, costs and risks (BOCR).