

Abstract No: MR-20

Developing a methodology for evaluating the sustainability performance of logistics service providers using AHP

A. P. K. J. Prabodhika, D. H. H. Niwunhella and A. Wijayanayake*

Department of Industrial Management, University of Kelaniya, Sri Lanka
anni@kln.ac.lk*

Sustainability and sustainable development have become a buzzing topic in today's business world. Business organizations are now more towards making themselves more economically, socially, and environmentally sustainable. With the introduction of concepts like "Sustainable Supply Chain Management" organizations have determined not only to make themselves sustainable but also to make the whole supply chain sustainable as well. Many manufacturers and retailers often outsource their logistics functions to Logistics Service Providers (LSPs) to focus more on their core business process. Due to the competitiveness and the popularity of the sustainability concept, those organizations evaluate their prospective LSPs not only based on economic aspects like cost, service quality but also on social and environmental aspects as well. This paper proposes a methodology for evaluating the sustainability performance of LSPs using the Analytical Hierarchy Process (AHP). A Composite Sustainability Performance Index (CSPI) was developed using AHP since multiple dimensions and indicators need to be incorporated when measuring the sustainability performance and composites indices assist in aggregating all dimensions and indicators into a single measurement which will be easy to interpret, compare and benchmark. CSPI can be used by organizations when selecting the LSPs as their business partners based on the performance of three traditional dimensions of sustainability; Economic, Social, and Environmental, and a newly included technological aspect. The proposed methodology is flexible as it depends on the sustainability requirements of a particular organization when selecting LSPs as the relative importance of the dimensions and its indicators are up to the organization to decide. Analytic Hierarchy Process (AHP) has been used to create a model and give relative importance for each dimension/indicator and then the sub-dimensions or sub-indicators under each dimension are compared. Weighted and evaluated indicators are then aggregated using linear additive aggregation to construct the CSPI based on which the LSPs can be evaluated. This proposed model enables the selection of the best LSP according to the organization's preference or requirements. The proposed methodology was then used to compare and select the 3 prospective LSPs of an apparel manufacturing organization using the data obtained through interviews and questionnaires. According to the results, the highest importance of the organization was given to the economic dimension (0.5498), then to environmental (0.2748), then social (0.1202), and least to the technology dimension (0.0554) by the decision-makers. CSPI values are computed as 3.6863, 3.1644, 3.3044 for LSP 1, LSP 2, LSP 3, respectively. Among them, the highest values were obtained by LSP 1 which is 3.6863 and it is the best selection among the three alternatives. The reason LSP 1 got the highest CSPI is, it has performed best in the highly weighted sustainability performance indicators by the organization when compared to the other two LSPs.

Keywords: Analytic hierarchy process, Composite index, Logistics service providers, Sustainability, Sustainability indicators