

ABSTRACT

Leather tanning is an industry that produces tanned leather from animal skins such as cow, goat, and sheep for various leather products and wearables (e.g. Shoes and Jackets); which specification varies in accordance to the texture, size, thickness, quality, etc. Because of this variation, most of leather tannery businesses are Make-to-Order. Despite the organic nature of the material being processed, leather tanning industry actually poses harmful environmental impacts due to the essential usage of chemical mixtures in the manufacturing process, thus exists strict laws & regulations in the industry both internally and globally. Voluntary or involuntary violation of the regulations will result in notice, financial sanctions, loss of permit, or even detention.

In Indonesia, the leather industry product is an export commodity that is consistently growing with each passing year. With the increase of organic leather-based product demands in the global market, the number of potential market opportunity for companies in the leather industry sector also increases. Among the fundamental requirements in order to be able to enter the market is to possess an internationally recognized certification concerning Environmental Management System (EMS). Aside of being a prerequisite, the implementation of an EMS points towards the long term objective of company & supply chain sustainability development. In the sustainability endeavor, environmental friendliness performance and continuous monitoring evaluation must be fulfilled. Risk managements also need to be conducted in order for a system to be able to continuously develop & improve. The scope of a robust EMS should include Asset Recovery (AR) element process that helps company achieve optimal environmental performance and efficient resource usage.

This research used ISO 14001:2015 EMS standardization as basis of reference in developing AR process to achieve company sustainability. The development integrated risk management aspect with a sustainable supply chain (SSC) framework to determine the risk criteria, categorization of risks in SSC which are identified based on literature study. In the context of this study, the identified risk criteria are: Information Technology risks, Financial risks, Supply risks, Process risks, Control & Plan risks, Environmental risks, Product recovery risks, and Organizational risks. The SCOR (Supply Chain Operation Reference) model is utilized in the AR business process activities mapping & risk sub-criteria identification. Risk criteria & sub-criteria are then validated by the company, from 40 identified risks of AR process, 37 of them correspond to the actual condition of the company. The risks are then processed using the Criteria Importance Through Inter-criteria Correlation (CRITIC) method.

Mitigation action alternatives are formulated from the identified risks in order to prevent the ensuing disruptions. The basis of the mitigation actions formulation are obtained from discussion in reference to the ISO 14001:2015 clauses. 11 mitigation actions are identified and then processed using the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method.

The data processed through the TOPSIS-CRITIC method are refined in the form of Neutrosophic Set to be able to represent real-world condition. The results show the priority of each risks and the ranking of mitigation action alternatives in accordance with the relative closeness value.

To ensure the progress of risk mitigation, tracing back to the importance of a continuous evaluation and monitoring in sustainability, it is necessary to design and implement a monitoring system that is able to fulfill those factors in order for the company to be able to achieve sustainability in the near future. The input data of this system are obtained from the results of TOPSIS-CRITIC method calculation, utilizing Microsoft Excel as the platform of design. The system is designed to be able to display: graph and statistics data of risks and mitigation actions; and the risk mitigation progress metric of risk control status and mitigation actions initiation status.

The results of this study are expected to be able to help the company fulfill and oversee the actual progress of risk mitigation in AR process, thus providing the company access in developing other EMS aspects as stated in ISO 14001.

Key Words — Sustainability, ISO 14001, Asset Recovery, neutrosophic TOPSIS-CRITIC, Monitoring System.