SUPPLY CHAIN ENVIRONMENTAL MANAGEMENT MODEL INTEGRATED FROM FUZZY-AHP & FUZZY-QFD

Nicolás Clavijo Buriticá
Fundación Universitaria Agraria de Colombia.
Calle 170 N° 54ª-10. Bogotá, Colombia.
nicolasclbr@yahoo.es; clavijo.nicolas@uniagraria.edu.co

John Ricardo Sánchez Rodriguez
Fundación Universitaria Agraria de Colombia.
Calle 170 N° 54ª-10. Bogotá, Colombia.
ricardo.sanchezr@hotmail.com

Lina Margarita Correa López
Fundación Universitaria Agraria de Colombia.
Calle 170 N° 54ª-10. Bogotá, Colombia.
linacorreal@gmail.com

The supply chain management today should be directed to the attention of world´s critical problems to meet the high and changing market demands and needs of natural resource conservation. One of these problems is certainly environmental impact generated by industries, which as result of operational dynamism and complex relationship with the macro-system in which they relate, generate negative alteration in the environment.

According to the above is proposed an integrated model for supply chain management with a high level of productivity and environmental commitment, which refers to two groups of management systems: the first group refers to those models whose scope of management is the supply chain, (Lean Supply Chain (LSC) and Green Supply Chain (GSC)); the second group are the models of Cleaner Production (CP) and ISO 14001:2004, which have been addressed from the General System Theory (GST), which takes into account the interaction between supply chain actors as a complex system which is particularized in the Systemic organization (SO) concept.

The development of this research is based methodologically on the use of tools of Multiple Criteria Decision Making (MCDM), which are mathematically treated under the fuzzy logic precepts for the purpose of address the uncertainty and imprecision in the management models integration process. The data processing is carried out generally as part of a Fuzzy Inference system in which the Analysis Hierarchical Process (AHP) is extended by Fuzzy reasoning (Fuzzy-AHP) and feeds the inference motor, whose operation is done schematically in the House Of Quality (HOQ) like essential tool of the QFD Model (Quality Function Deployment) which also is addressed under Fuzzy Logic (called Fuzzy-QFD). The data operation to meet the four management models integration, in the whole fuzzy inference system is effected in a spreadsheet that envisage all possible combinations in the relationship between the relative ratings of the integrating models and the results are validated under Consistence Indicators that determine the data processing validity. The integration was developed as follows: LSC + GSC = integration 1; the second integration CP + ISO 14001 = integration 2; and finally integration as follow: Integration 1 + Integration 2= Final Integrated Model.

Keywords: Fuzzy logic, Quality Function Deployment, AHP.