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**Evaluating sustainability in supply chain by  
Multicriteria Analysis: A Systematic Review of the  
Literature**

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**Abstract**

The importance of the evaluation of sustainability in supply chains gradually augments during recent years. Sustainability, which is considered as a multidimensional concept, is the ability to satisfy current human needs without endangering future generations' resources (Ferrarini et al., 2001, Kates et al., 2001). Multi-criteria analysis (MCA) constitutes of various methods that combine criteria in order to evaluate alternatives and provide coherent assessment (Martinez-Alier et al., 1999; Romero and Rehman, 2003; Ehrgott et al., 2010) in multiple disciplines. Sustainability assessment requires the proper handling of uncertainty and different types of information (Cinelli et al., 2014). Thus, MCA, through its efforts to enhance communication between assessment participants and its flexibility, becomes a suitable method for sustainability (Cinelli et al., 2014). The main objective of this preliminary paper is to identify and analyze the relevant literature until October 2015 on the application of Multi-criteria methods for sustainability and performance assessment in supply chains.

The research approach we attempt was inspired by Tranfield et al. (2003) and Denyer and Tranfield (2009) and incorporates steps from data collection in relevant papers recognition to the final review of the literature. A research protocol established by Anthony et al. (2014) was followed for the extraction of necessary material for the conducted research study. Web of Science and Scopus were the two main utilized databases for the extraction of relevant papers. The search terms included a combination of Multicriteria analysis, sustainability and supply chains. Further subject specification was applied through keywords such as food, agriculture and policy. The identified papers were deselected depending on their semantic relevance to the research project by their abstract and keyword findings examination.

The queries conducted according to the aforementioned research protocol identified a high volume of articles relevant to the research topic. A new selection was established according to the domains provided by Anthony et al. (2014), including also additional keywords consistent to the research topic. This new selection enhanced the coherence of our database in order to be able to conclude later in sensible results. We explored the conceptual content

of chosen articles by following the Social Network Analysis proposed by Belotti and Mora (2014). We then categorised the articles regarding characteristics drawn by Anthony et al. (2014) and Pilbeam and Alvarez (2012). These characteristics include the unit of analysis, the decision/evaluation problem, the primary actors of the analysis, the model purpose and type and the functional area as well. In order to reach the root of the research topic we examined key articles as well as articles that can be identified as excellent in the research field.

The first categorization of the selected material illustrates a general content analysis of the MCA methods in supply chains. The in depth examination of specific articles provides key implementation examples of MCA methods in supply chain stages. Through this process we also demonstrate the use of MCA methods in particular situations.

**Keywords** : sustainability, multicriteria analysis, supply chain

## References

- Bellotti, E., and Mora, C., (2014), Networks of practices in critical consumption." *Journal of Consumer Culture*, 26, 1469-5405
- Cinelli, M., Coles, S. R., & Kirwan, K. (2014). Analysis of the potentials of multi criteria decision analysis methods to conduct sustainability assessment. *Ecological Indicators*, 46, 138-148.
- Denyer, D., Tranfield, D. (2009), Producing a systematic review, in Buchanan, David A. (Ed); Bryman, Alan (Ed), (2009). *The Sage handbook of organizational research methods*. , (pp. 671-689). Thousand Oaks, CA: Sage Publications Ltd, xxxvi, 738 pp.
- Ehrgott M., RUI FIGUERA J., GRECO S. (2010), *Trends in Multiple Criteria Decision Analysis*, New York, Springer
- Ferrarini, A., Bodini, A., & Becchi, M. (2001). Environmental quality and sustainability in the province of Reggio Emilia (Italy): using multi-criteria analysis to assess and compare municipal performance. *Journal of Environmental Management*, 63(2), 117-131.
- Kates, R. W., Clark, W. C., Corell, R., Hall, J. M., Jaeger, C. C., Lowe, I., ... & Faucheux, S. (2001). Sustainability science. *Science*, 292(5517), 641-642.
- Romero, C., & Rehman, T. (2003). *Multiple criteria analysis for agricultural decisions*, Elsevier
- Tranfield, D. R., Denyer, D., & Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British journal of management*, 14, 207-222.