

The Role of Green Supplier Selection in Promoting Sustainable Development in Bangladesh: An Application of Fuzzy AHP and DEMATEL

Saika Farah Sadia and Dr. Ferdous Sarwar

Department of Industrial and Production Engineering
Bangladesh University of Engineering and Technology (BUET)
Dhaka, Bangladesh
1908013@ipe.buet.ac.bd, ferdoussarwar@ipe.buet.ac.bd

Abstract

Nowadays, sustainability within the chain of supply management has already become an issue of the current world economic realities, far more than in the context of Bangladesh's garments industry. This paper develops a holistic approach to sustainable supplier selection, with a strong emphasis on a dimension that usually does not get the required attention — social responsibility. Intermingling Fuzzy AHP and DEMATEL into a hybrid approach for the same has rendered research on the selection of such a supplier, who balances economic performance with environmental and social considerations, complicated. The framework is structured; containment of expert judgments and multi-criteria decision analysis classify and evaluate suppliers with respect to environmental issues, social responsibility, operational factors, compliance, and economic factors. These results will give actionable insights to the practitioners in the garments sector to improve sustainable practices. This hybrid approach increases not only the robustness of supplier evaluation but also meets the growing demand that is growing globally for ethical supply chain standards.

Keywords

Sustainable Supplier Selection, Fuzzy AHP, DEMATEL, Social Responsibility, Garments Industry.

Acknowledgments

This research has been done under the full cooperation and resources of the Department of Industrial and Production Engineering, Bangladesh University of Engineering and Technology (BUET). The authors express gratitude for all the efforts and cooperation to complete the research.

I would like to express my deepest gratitude to my supervisor, Professor Ferdous Sarwar, from the Department of Industrial and Production Engineering at Bangladesh University of Engineering and Technology (BUET). His guidance, encouragement, and expertise have been instrumental in shaping the direction and quality of this research. His dedication to academic excellence has inspired me to strive for the best, and I am honored for the opportunity to work under his supervision.

Biographies

Professor Ferdous Sarwar is a highly qualified academic professional in the field of Industrial and Production Engineering. He earned his B.Sc. & M.Sc. from Bangladesh University of Engineering and Technology, BUET in Industrial & Production Engineering. He completed his Ph.D. in Industrial & Manufacturing Engineering from North Dakota State University, USA. Presently, he has been working as a Professor in the Department of Industrial and Production Engineering, BUET. His current research interests include Optimization, Advanced Manufacturing and Materials Engineering, Operations Management, Operations Research and Decision Analysis, Artificial Intelligence, Supply Chain Management, and Sustainable Manufacturing and Machine Learning. He has published more than 30 articles in several journals and conferences. He is a member of several esteemed professional organizations, such as

the International Microelectronics and Packaging Society (IMAPS), the Surface Mount Technology Association (SMTA), and the Institute of Industrial Engineers (IIE). With a commitment to academic excellence, He has guided numerous students in their research endeavors and has collaborated on projects that advance the field of industrial engineering. His expertise and dedication to fostering innovative solutions make him a respected figure in the academic and professional community.

Saika Farah Sadia is a beginning researcher, currently an undergraduate student in the Department of Industrial and Production Engineering at Bangladesh University of Engineering and Technology (BUET). She is an active member of the IEOM Society, contributing as a researcher and promoter of industrial engineering development. Her long-term research interests focus on combining Operations Research, Supply Chain Management, Sustainability, Manufacturing, Logistics, MCDM to improve decision making for real-world problems.