

**INTERRELATIONSHIPS BETWEEN SUSTAINABLE  
PROCUREMENT METRICS IN MANUFACTURING INDUSTRY:  
A DECISION-MAKING TRIAL AND EVALUATION  
LABORATORY (DEMATEL) ANALYSIS**

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August 2024

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## ABSTRACT

As global sustainability challenges intensify, the manufacturing sector faces growing pressure to integrate sustainable procurement practices. These practices, which balance economic, environmental, and social criteria, are essential for achieving long-term business viability and sustainability. This study examines the interrelationships between sustainable procurement metrics within the manufacturing industry using the Decision-Making Trial and Evaluation Laboratory (DEMATEL) method. The research systematically identifies and categorizes key sustainable procurement metrics within a theoretical framework, providing a structured basis for analysis. Data were collected through surveys and interviews with industry experts, ensuring a robust understanding of relevant metrics. The DEMATEL method was then employed to elucidate and quantify the causal relationships among these metrics, revealing critical interdependencies and the impact of changes within one dimension on others. The study's results were used to develop a decision support system (DSS) designed to enhance decision-making processes in procurement. This DSS integrates the identified interdependencies, offering actionable insights and guidance for implementing sustainable procurement practices. By clarifying the relationships between various metrics and their collective influence on procurement strategies, the DSS aids manufacturers in making informed decisions aligned with sustainability objectives. This research contributes to the academic literature by providing a comprehensive analysis of sustainable procurement metrics and their interactions, highlighting their significance in improving environmental and economic outcomes in the manufacturing industry.

### **Keywords:**

*Purchasing and supply management, Sustainable procurement, Economic sustainability, Environmental sustainability, social sustainability, Manufacturing industry, Procurement metrics, Interrelationships and interdependencies.*

## ACKNOWLEDGEMENT

Without the immense support and guidance of many resource persons, this study would have been impossible to conclude. I express my sincere appreciation to everyone who supported me in making this success. My completion of this research study could not have been accomplished without the guidance and encouragement of my supervisor, Prof. H. Niles Perera, Professor in Supply Chain Management, Department of Transport Management & Logistics Engineering, Faculty of Engineering, University of Moratuwa. I offer my sincere gratitude to my supervisor for all his constructive advice, invaluable encouragement, and the learning opportunities he provided throughout the entire study.

I would like to express my profound gratitude to all the examiners in the Progress Review for sharing their insightful knowledge, which helped me complete my research study successfully. My special thanks go to Prof. Amila Thibbotuwawa, Dr. Ranil Sugathadasas. I am immensely grateful to Senior Prof. Amal S. Kumarage, former Head and Founder of the Department of Transport and Logistics Management at the University of Moratuwa, and Prof. A.A.D.A.J. Perera, the current Head of the Department, for providing me with the opportunity to pursue the degree program. My special thanks extend to the research group of the Center for Supply Chain Operations and Logistics Optimization (SCOLO) for their constant support and to the academic and non-academic staff members at the Department of Transport Management and Logistics Engineering.

I am thankful for the grant from the Norwegian Program for Capacity Development in Higher Education and Research for Development (NORHED II – Project number 68085), which enabled this thesis and is mentioned with immense gratitude.

Finally, I acknowledge and pay my gratitude to my family, who has always supported me, especially during challenging times, and for their constant encouragement, without which this research study may not have become a reality.

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## List of Abbreviations

IoT	Internet of Things
DEMATEL	Decision-Making Trial and Evaluation Laboratory
TBL	Triple Bottom Line
SDGs	Sustainable Development Goals
CSR	Corporate Social Responsibility
SSCM	Sustainable Supply Chain Management
BCT	Blockchain Technology
PROMETHEE	Preference Ranking Organization Method for Enrichment Evaluation
RPA	Robotic Process Automation
ANP	Analytic Network Process
MNFs	Multinational Firms
AHP	Analytic Hierarchy Process
HP	Hewlett-Packard
LCA	Life Cycle Assessment
TQM	Total Quality Management
SRM	Supplier Relationship Management
ISM	Interpretive Structural Modelling
SDPs	Supplier Development Programs
SEM	Structural Equation Modeling