

STUDY OF SELECT ISSUES OF SUSTAINABLE SUPPLY CHAIN MANAGEMENT IN INDIAN ELECTRONICS INDUSTRY

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by

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ABSTRACT

World over organizations are focusing on sustainable goals, where along with economic success their role in protecting the planet and people are becoming important. Sustainability has gained a lot of interest from industry and academia in recent years. An increasing number of organizations are now committing to the cause of sustainability in their supply chains. The research was conducted to address some of the critical problems in the field of sustainable supply chain management. The issues related to sustainable supply chain management were considered in context of Indian electronic industry by choosing representative case studies. *Five* problems were addressed in this research by applying suitable methodologies. The *first* problem of the research was to identify and analyze the enablers of sustainable supply chain. The enablers that assist in implementation of sustainability in supply chain are identified and categorized. A combined methodology of Grey theory and DEMATEL is employed to address this research problem. Sensitivity analysis is performed to check the robustness of the results. The findings along with managerial and academic implications are discussed.

The *second* research problem identifies barriers to implementing a sustainable supply chain. There is an apparent need to remove these barriers for effective implementation of a sustainable supply chain. The interdependence of these barriers and their prioritization at various levels are addressed. Mutual influences among the barriers are also studied. The barriers are categorized to understand the functional aspects and classified as independent, dependent and linkage. The contextual relationships and hierarchical structure of the barriers are found using Interpretive Structural Modeling and MICMAC analysis. The *third* problem is complementary to the second and investigates the causal factors, effect factors and degree of prominence of barriers to implementing SSCM using the combined methodology of Grey DEMATEL. The overall relationship among barriers is established by a diagraph. The research studies the relationship among barriers so that organizations can comprehend the hurdles while shifting to a sustainable supply chain. The results and managerial implications of the research are elaborated.

The *fourth* research problem prioritizes the customer requirements and design requirements for eco-efficiency in an electronic supply chain. It studies the improvisation of the eco-efficiency problem by identifying and analyzing the customer

and design requirements. An integrated Analytical Network Process and Quality Function Deployment methodology is applied to find out the interrelationship among the customer requirements and design requirements. The House of Quality developed translates the customer requirements to prioritize the design requirements in improving eco-efficiency levels of supply chain. The research will help decision-makers to arrive at crucial decisions on attaining eco-efficiency measures.

The *fifth* problem addressed in the thesis is to develop a model and methodology in selection of suppliers for a sustainable supply chain. Sustainability is an important factor that needs to be incorporated in selection of suppliers as well. A combined Analytic Hierarchy Process and TOPSIS approach is applied to solve this problem considering the uncertainty involved and to evaluate the quantitative and qualitative data. The model is demonstrated by its application to select a sustainable supplier in a real world electronics case company. The sustainability dimensions and criteria have been considered in the selection framework. The model elucidates the evaluation of tangible and intangible sustainability criteria in selecting suppliers. The proposed model can be used for ranking the suppliers in order of preference based on the pre-decided sustainability criterion identified by an organization. The framework gives managers insight into evaluating and selecting sustainable suppliers based on a comprehensive criterion. The robustness of the result is tested with sensitivity analysis.