A Conceptual Model for Sustainable Supply Chain in Industrial Systems using Multi-Objective Programming

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Industrial firms in developing countries have recently started to adopt sustainable supply chain management (SSCM) to manage their environmental responsibility. Though, achieving sustainable production within a SSCM context has been one of the most pressing challenges in emerging markets, as it may not involve securing financial benefits. Costumers and governments are compelling companies to become more sustainable. However, the lack of research on how to incorporate these issues makes this a challenging task. The case is more demanding for supply chain (SC) with several elements such as supplier, producer, customer and etc. To fill this gap a generic conceptual model is proposed focusing on sustainability dimensions of economic, social an environmental using multi-objective programming model for the design and planning of supply chains. The economic pillar of sustainability is addressed in this work considering the costs of the supply chain in an industrial system based on the indices collected from the literature. Given scarcity of empirical evidence, this study raises the proposition that SSCM practices can be both environmentally necessary and good business in the context of emerging economies. Finally economic, social and environmental indicators appropriate to assess strategic decisions are proposed in the context of a conceptual model.

This paper aims to balance between these three pillars that offers a challenge, from the strategic to the operational level. The social pillar in particular has been left unaccounted for and we are still far from achieving the so called suatainable supply chain.In this paper, developed a model for measuring firms contribution to sustainability by providing a framework for evaluation sustainability and distinguish the importance of indicators in different countries and context and also provide possibility of applying reward and punishment systems by regulatory bodies through using dynamic coefficient. In the following, developed a mathmatical programming model, in order to maximizing sustainable value. This model maximized the sustainable value by determining production quantity and number of human resources and considering production capacity and labor costs constraints

Content analysis:

Index collection:the index to be collected and the unit of analysis are defined and delimited

Descriptive analysis: formal aspects of the index are assessed

Category selection: structural dimensions including the major topics of analysis and related analytic categories with detailed classifications of each structural dimension are selected to be applied to the colect index

Economic:

net sales,The efficiency,Employee benefits,Financial Flow Index(Wage, pension,….),The responsibility for the product and the community,The return on investment

Environmental

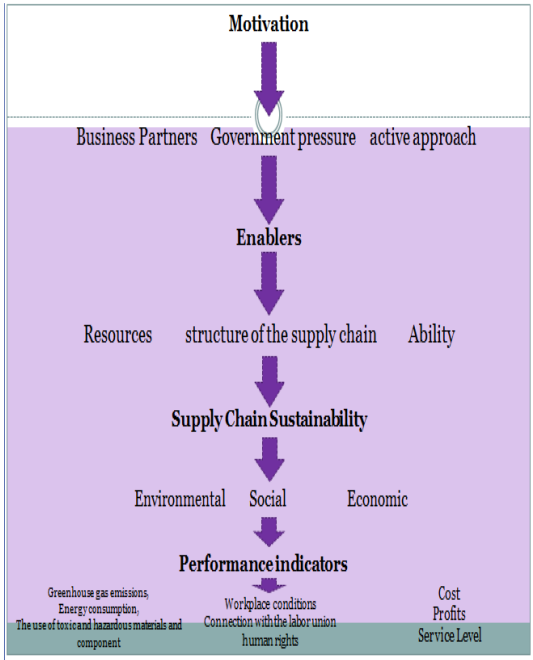
Use of renewable energy,Life Cycle Management,Waste for disposal per unit of production,Water resources and ecosystems,Performance of suppliers,Changes in the nature by effect of the activities and operations

Social

Diversity and opportunity,Health and safety,Education and training,Political contributions,Advertisement

This work contributes to answering the question: How to integrate sustainability into supply chain design and planning? It does so in the following ways:

It present a generic multi-objective mathmatical programming model for the design of planning of supply chains, incorporating the three dimensions of sustainability.



Social	Environmental	Economic
employment	Waste and energy management	Customer
human rights	Satisfying and fulfilling	Staff
Community and social laws	Changes in living standards	Backup capital
Product responsibility	Water Management	Indirect economic impact
	Products and Services	
	Transportation	