

IT Applications Enhancing Green Supply Chain Efficiency in Industries

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Abstract - IT can transform high-technology companies into green enterprises by enhancing the economic and ecological impact of operations. Green IT can accelerate product innovation, minimize costs and mitigate risks, while reducing the carbon footprint. In present economic scenario, organizations are trying to achieve sustainable competitiveness in global markets. Sustainability incorporates the concepts of economic, social, and environmental performance. Green supply chain management (GSCM) practices comprise green design, reducing energy consumption, reusing/recycling material and packaging, reverse logistics and environmental collaboration in the supply chain. This paper highlights latest developments in implementing IT applications in supply chain management practices towards making green supply chain management more effective and environmental friendly in various industries.

Index terms - Regulatory laws of product recycling, ecological damage, collaborative integration of environmental, logistics optimization, operational performance

I. INTRODUCTION

Environmental management has become a topic of mutual concern for businesses, governments and consumers due to increasing high levels of industrialization. The growing concern in the global market for green issues and the scarcity of natural resources have forced executives to view supply chain strategies from an environmental perspective. The European Union passed the Restriction of Hazardous Substance and the Waste Electrical and Electronic Equipment Regulations demanding compliance with the relevant regulatory laws of product recycling and prohibiting the use of hazardous substances in products for sale in the market. In this development, the supply chain manager plays an important role of selecting and developing appropriate green strategies with the objective of improving environmental, economic, and social

performance as well as gaining a competitive advantage. The term green is now widely used interchangeably on the more established sustainability concept, which points to a more holistic view of environmental, social and economic impact.

Eco-efficiency, which seeks to minimize ecological damage while maximizing production efficiency, and remanufacturing, have become key assets to achieve best practices. Customer demands and governmental pressures continue to push businesses to be more and more sustainable

II. AREAS OF GREEN SCM

**** Packaging engineering and redesign.** A range of retailers, consumer packaged goods (CPG) and food manufacturers have actively engaged partners to redesign packaging to reduce the use of materials and, in some cases, logistics costs. These companies use sourcing optimization tools and product lifecycle management (PLM) applications to aid in the process.

**** Materials substitution.** Both manufacturers and end consumers such as telecom providers are working with suppliers to identify substitute materials like recycled plastics that are environmentally friendly and durable. For example, a titanium fastener may cost more initially, but provides significantly longer durability than steel while delivering the same performance characteristics at a lighter weight. Sourcing optimization tools, supply management suites, product lifecycle management tools and supplier collaboration applications all play a part in materials substitution.

**** Certification.** Companies -- especially those selling into the EU -- are required to certify that their products meet specific environmental criteria (e.g., are lead-free or not a hazardous substance). Supplier information management (SIM) solutions help companies survey and manage the

certification process in their supply chains by documenting that both tier one and sub-tier suppliers avoid the use of banned materials or production processes.

**** Logistics optimization.** By strategically locating distribution facilities and warehouses and reducing LTL (less than truckload) small parcel and air freight shipments, manufacturers can reduce their environmental footprint and also prop up the bottom line.

III. VARIOUS ROLES OF LOGISTICS AND TRANSPORT SECTOR IN REDUCING EMISSIONS

For green supply chain various roles that the logistics and transport sector plays in reducing emissions are:-

**** Effects of ISO 14001 certification on the promotion of green supply chain management (GSCM)**

**** Research on interest and implementation of green supply chain initiatives**

**** A quantitative picture of current sustainable supply chain practices and plans**

**** A measurement and quantification of how companies are managing the complexities of supply chain demands, distribution costs and environmental concerns**

**** Key drivers of sustainable supply chains**

**** A new integrated supply chain model that takes into account sustainability parameters such as CO2 emissions reduction, reduced energy consumption**

**** Better traceability and reduced traffic congestion**

**** Best practices for companies looking to green their supply chains**

**** An outline of the supply chain green initiatives currently implemented or planned in manufacturing, warehousing and distribution**

**** Survey of sustainable packaging policies**

**** A look at the growing role of procurement organizations within sustainability efforts institutions of higher learning**

**** A categorization of research and practice in purchasing, manufacturing, outbound, and reverse logistics dimensions**

IV. DESIRABLE ESSENTIAL INFORMATION REQUIRED IN VARIOUS AREAS

Supplier Management and Purchasing Essentials:-

**** Must-know green purchasing policies**

**** Environmentally preferred purchasing**

**** Green inventory management and procurement plans**

**** Expert advice on vendor selection**

**** Purchasing green IT systems**

Transportation, Warehousing and Distribution:-

**** Green network analysis**

**** Key considerations for green transportation, network optimization, warehousing and distribution**

**** Expediting deliveries and conducting follow-up**

**** Green distribution and transportation with IT systems**

Direct Store Delivery, Returns and Recycling:-

**** Green Suppliers Network: cost-reduction opportunities & supplier sustainability scorecard**

**** Direct store delivery planning and processes**

**** Green continuous improvement process**

**** Green indirect purchasing**

**** Crucial end of lifecycle considerations**

Value Enhancement Strategies:-

**** Green supply chain risk management**

**** Pivotal supplier product and quality issues**

**** Important role of product origin and traceability**

**** Green business intelligence**

**** Financing and leveraging strategies for purchasing**

The Green Supply Chain: Essential Strategies and Foundations:-

**** Best practices in green supply chain management**

**** Green sustainability and carbon neutrality strategies**

**** Critical tools for ensuring quality**

**** Supplier assessments for environmental and social responsibility**

Carbon Accounting, Sustainability, Renewable Energy, Greenhouse Gases (GHG),

Water and Land Use:-

**** Sustainable development within the supply chain**

**** LEED: sustainable building and green factories**

**** Embracing corporate social responsibility**

**** Environmental and carbon accounting issues for the supply chain professional**

GHG and Climate Change Regulations, Impacts and Strategies:-

**** Regulatory considerations and sustainability strategies**

**** Imperative global warming perspectives**

**** Carbon credits, green power and renewable energy credits**

**** Consumer expectations of a green supply chain**

Manufacturing, Demand, Factory, Materials and Network Planning:-

**** Green manufacturing, forecasting and strategies**

**** Green product lifecycle management (PLM)**

**** Case study: corporate environmental footprint determination**

**** Outsourcing, building and leasing in a green world**

**** Green manufacturing systems**

V. EFFECTIVE COMMUNICATIONS ESSENTIALLY REQUIRED FOR EFFECTIVENESS

Supply Chain Solution Software is a streamlined system that provides logistics, global freight, financial services, mail services and consulting to enhance customer's business performance and improve their supply chains. Effective communications throughout the world had commanded virtual world of e-business, e-integration, e-making, ecommerce, e engineering, eprocurement, and e-services. General Electric, Wal Mart, Procter and Gamble use e-commerce to communicate directly with suppliers and retail stores. E-commerce requires effective operations management decisions and skills. The goal of operations management is to provide a best synthesis of technology, people and processes. Geographic Information Systems (GIS) and Global Positioning Systems (GPS) are used extensively in location, site selection, land use planning, environment science, transportation systems; trucking companies now track their tracks via GPS technology. In vehicle navigational system, vehicle location systems, emergency vehicle deployment and traffic management are using GIS and GPS for their value chains

VI. CONCLUSION

Supply chain value partners have to collaborate in establishing research and development (R&D) projects that carry out product life-cycle analysis aimed at introducing new product and process technology innovations to contribute to the overall value creation. As far as production processes are concerned, organizations do not only seek to gain green efficiency from an ecological perspective, but also to take advantage of the green strategy to gain a competitive position. New green products that can be remanufactured or recycled are expected. As a result, management should pay attention to developing relationships between supply chain operations. As far as logistics is concerned, recycling and product take back initiatives are a priority. Therefore, logistics operations should be redesigned to suit such integrative relationships between players.

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