



Managing reverse logistics to enhance sustainability of industrial marketing

C.K.M. Lee ^{a,*}, Jasmine Siu Lee Lam ^{b,1}

^a Department of Industrial and Systems Engineering, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong

^b Division of Infrastructure Systems and Maritime Studies, School of Civil and Environmental Engineering, Nanyang Technological University, Block N1, 50 Nanyang Avenue, 639798, Singapore

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ABSTRACT

In this paper, a sustainable industrial marketing framework of latest requirement of green and sustainable operation is proposed. When literatures in strategy, marketing and operation have provided insight about the efficiency of reverse logistics and business value for the customer, the interrelationship is still under explored. This raises the question whether manufacturers could determine ecological friendly strategies to address their customer's environmental conscious needs and design the suitable solution to strike the balance between ecology and economics. Based on the case study of a medical product manufacturer, this study addresses this question by investigating how manufacturers identify the problem of reverse logistics; design and develop of sustainable product and service by enhancing the efficiency of operations, and market competencies that add value to their customers' business processes. Within the strategy for designing for effective reverse logistics, these findings contribute to understand the use of information system and technology for reverse logistics to enhance the customer's business process and provide value-added process for customer retention.

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1. Introduction

The increasing concern about environmental and energy conservation leads enterprises to rethink about their market position; reformulate the strategy and reengineer the business process. A recent survey showed that around 82% of respondents are willing to increase spending on green marketing (Environmental Leader LLC & Media-BuyerPlanner LLC, 2009) because the enterprises realize the opportunity to sell the product at a higher price due to the green image and social responsibility. In the past decade, most enterprises found that it is not economic to remanufacture, recycle or refurbish and enterprises struggle and strike for the balance between economic and ecology. As there is a high price related to climate change or global warming, legislation has been enforced to request manufacturers to take back the sold product and reduce carbon footprint. Enterprises realize the need of developing green competence to have effective and efficient reverse logistics. As remanufacturing can reduce the waste and landfill space and save energy, in certain cases, it may be more cost effective for remanufacturing rather than producing the product from raw material. Sharma, Iyer, Mehrotra, and Krishnan (2010) devised the strategy of reducing surplus supply and reducing reverse supply to achieve sustainable environment. From an operational point of view, to manage the value of reverse logistics system, plant manager may base on volume

and use plant managed and process control approach for managing ferrous scrap reverse networks. The barrier for enterprises to implement green movement is due to the complexity in interrelated issues in ecology, incomplete information, lack of expertise and commitment, and lack of disparities between regions and industry (Peattie & Ratnayaka, 1992). Enterprises mainly concern about the marketing and promotion before sales and they may usually ignore the roles and responsibility of green marketing after sales which can further improve a company's reputation and the loyalty of green customers. From the strategic point of view, it is important to explore the value proposition of customers and operational benefit of companies. However, the top management usually faces the dilemma of advocating green movement as the cost and benefit is difficult to be evaluated and correlation among various factors for sustainable industrial marketing is unclear.

The objective of this research includes strategic and operational aspects. For strategic aspect, the objective is to analyze the main contributors for sustainability of industrial operational management. The operational goals of this study are to identify the daily problem faced by industry and analyze the cause of the problems. Through comprehensive literature review and case study, a sustainable industrial marketing framework is proposed and eight propositions are derived from the discussion. In order to solve the problem, corresponding solution is suggested to enhance the performance and efficiency of reverse logistics. The managerial implications are discussed and a direction for future research is listed in the Conclusion.

The significance of the paper is to develop a framework that explores how green marketing affects sustainable operations management which mainly focuses on the domain of business-to-business

* Corresponding author. Tel.: +852 27664982; fax: +852 2362 5267.

E-mail addresses: carman.lee@gmail.com (C.K.M. Lee), slam@ntu.edu.sg (J.S.L. Lam).

¹ Tel.: +65 6790 5276; fax: +65 6791 0676.

marketing. Based on the comprehensive study of recent work of researchers in sustainability development, several propositions are derived. The propositions developed in the framework can be used as a guide for further empirical research. The case study can also provide potential contribution to the body of knowledge in sustainable supply chain operations. The study about how company detects the problem by identifying symptoms to formulate the strategy and develop solutions to the problems and finally to measure the effectiveness of the implemented solution can provide insight for industrial practitioners and researchers for the financial, policy and operational aspects in reverse logistics programs. The managerial implications are discussed and the future work is listed for researcher's further study.

2. Literature review

2.1. Sustainability strategy

One of the earliest ideas on sustainability spun off from the World Commission on Environment and Development (WCED) Report (1987), also known as the Brundtland Report. The report attempted to articulate how sustainability needs to be regarded as the combination of environmental, economic and social factors. *Elkington (1997)* provided a comprehensive definition of the concept by defining it in terms of the triple bottom line (3BL): economic prosperity, environmental quality and social justice. In relation to corporate performance, *Savitz and Weber (2006)* noted that sustainability means operating a business in a way that causes minimal harm to living creatures. Sustainability is regarded as the integration of environmental, social and economic criteria and keeping an equitable balance among the three aspects that supports an organization for long-term competitiveness (*Carter & Rogers, 2008; Goncz, Skirke, Kleizen, & Barber, 2007; Sikdar, 2003*). The holistic view of sustainable development is seen as becoming increasingly strategic because it affects the core business of the firm and its growth, profitability and even survival (*Corbett & Klassen, 2006; Kolk & Pinkse, 2008*).

The importance of sustainable development has been recognized over the years. Accordingly, the number of studies in terms of the strategies and practices leading to sustainable outcomes has increased. From a macro perspective, the first rubric of thoughts in sustainability strategy is managerial orientation. *Elkington (1997)* examined sustainability in relation to corporate governance and argued that the key to establishing the triple bottom line is stakeholder consultation. At the firm level, there is evidence that linking sustainability goals and measures to corporate strategy helps to integrate sustainability into what the organization does (*Azzone & Noci, 1998*). Corporate proactive stance and tangible commitment, often in the form of a written environmental policy is a significant contributor to sustainability (*Ramus & Steger, 2000*). There are a large number of papers in the domain of logistics, supply chain and operations management, and more attention has been paid on the environmental dimension. One group of literature focuses on remanufacturing as an effective way to maintain products in a closed-loop, reducing both environmental impacts and costs of the manufacturing processes. *Guide, Jayaraman, Srivastava, and Benton (2000)* discussed the complicating characteristics including uncertainty in the timing and volume of returned products. The main recommendation is to adopt planning and control techniques. *Guide and Wassenhove (2001)* demonstrated a framework for analyzing the profitability of used product activities. *Souza, Ketzenberg, and Guide (2002)* made a further effort to model the firm's decision to remanufacture an optimal product mix enabling profit maximization in the long run. *Ketzenberg, Souza, and Guide (2003)* focused specifically on the configurations of a mixed assembly-disassembly line for remanufacturing. They suggested having advanced yield information for the remanufacturing parts can generally improve flow times. *Ijomah, McMahon, Hammond, and Newman (2007)* devised remanufacturing guidelines with the focus on practicing design for environment, i.e.

ecodesign. Also examining ecodesign, *Pigosso, Zanette, Filho, Ometto, and Rozenfeld (2010)* presented some 'end-of-life' remanufacturing methods, including using environmental design, industrial template and support tool. As a whole, the literature shows that sustainability strategies in remanufacturing require proper planning, efficiency and effectiveness in the process.

Recycling is another strategy for sustainable development. The main theme in this aspect is on product recovery management. *Thierry, Salomon, Van Nunen, and Van Wassenhove (1995)* considered investment recovery usually occurred at the back end of a closed-loop supply chain as a key strategic issue in product recovery management. *Linton, Yeomans, and Yoogalingam (2002)* focused on the uncertainty in the availability of waste as raw material for manufacturing. The modeling of the waste flow of durable goods was developed to tackle the challenges and requirements for forecasting. *Andel (2004)* discussed that repair and refurbish, rekitting and repackaging as well as parts retrieval and replacement are some of the returns models that can maximize the return on investment in reverse logistics with proper data management. Taking another perspective, *Anderson and Brodin (2005)* highlighted the importance of effective customer participation in recycling business. *Jayaraman (2006)* developed a mathematical programming model called Remanufacturing Aggregate Production Planning for aggregate production planning and control in product recovery and reuse. Purchasing and supply management has also received some interest with regards to sustainability. The so-called environmental purchasing stresses the collaboration with suppliers and customers. *Min and Galle (1997)* examined the role of green purchasing in reducing and eliminating wastes. They suggested proactive environmental audit programs and including environmental goals within the long-term corporate policy. *Carter and Carter (1998)* focused on inter-organizational factors and found that environmental purchasing activities will be facilitated through increased coordination with suppliers as well as downstream members of the supply chain, including retailers. Increased coordination within the firm would be important also. *Carter and Jennings (2004)* analyzed the role of purchasing in corporate social responsibility and claimed that external pressures from customers must be taken into account. To be sustainable in business, remanufacturing, recycling, environmental purchasing and other green supply chain management measures have to contribute to the commercial aspect in improving economic performance and competitiveness (*Rao & Holt, 2005*). Green marketing is another strategy which will be discussed in the sub-section below.

Though seemingly well researched, the approaches taken by these studies are largely driven by the individual technical streams and are not well connected to the sustainability literature. Also, the triple bottom line model shows that there are three aspects to be addressed simultaneously and the lack of any one of the three tenets would not be a total success in this area. While much interest has been generated on sustainability research, relatively scant literature can be found in terms of a holistic framework or model encompassing sustainable strategies and practices. *Zhu and Sarkis (2004)* presented a model consisting of the components of green Supply Chain Management (SCM), empirically validated by a survey on Chinese manufacturing firms. However, social responsibility has not been included in the study. *Carter and Rogers (2008)* developed a framework of sustainable SCM based on literature survey and conceptual theory building. They demonstrated the relationships among environmental, social and economic performance in the supply chain context. At the intersection of the three aspects, there are activities that organizations can engage in which not only positively affect the natural environment and society, but which also contribute to the long-term economic benefits of the firm. Also building on literature review, *Seuring and Muller (2008)* presented a conceptual framework addressing more on supplier management and product development. *Pagell and Wu (2009)* performed case studies of ten exemplar firms from various industry sectors for building a testable model of the elements necessary

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