Int. J. Production Economics 147 (2014) 284–293

Contents lists available at ScienceDirect

Int. J. Production Economics

journal homepage: www.elsevier.com/locate/ijpe

The role of customer integration in extended producer responsibility: A study of Chinese export manufacturers

Kee-hung Lai [a,*], Christina W.Y. Wong [b,1], Y.H. Venus Lun [a,2]

[a] Department of Logistics and Maritime Studies, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong
[b] Business Division, Institute of Textiles and Clothing, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong

ARTICLE INFO

Article history:
Received 22 May 2012
Accepted 13 June 2013
Available online 5 September 2013

Keywords:
Environmental Management
Manufacturing
China
Empirical
Export

ABSTRACT

Extended producer responsibility (EPR) is increasingly emphasized by manufacturing enterprises to improve eco-efficiency and to satisfy the growing environmental requirements expected in the market. This trend is salient for export-oriented manufacturers mandated to comply with environmental regulatory requirements before entry is granted for their products in the requisite overseas countries. Drawing on the contingency theory, we examine the EPR practices undertaken by export-oriented manufacturers and the market and financial performance outcomes when such practices are characterized with low and high levels of customer integration in their implementation. Survey data collected from 134 manufacturing exporters in China show positive association of EPR practices with the performance outcomes. Using split group analysis, we found performance differences between the high and low manufacturer groups in customer integration for their EPR practices implementation. Particularly, the high customer integration group achieves better market performance whereas the low group weak in customer integration reap greater financial benefits. Managers need to understand the role of customer integration and the financial and market performance implications of implementing EPR practices to align with their performance goals and to build their supply chain system capabilities in the age of global complexity.

© 2013 Elsevier B.V. All rights reserved.

1. Introduction

Extended producer responsibility (EPR) originated from Europe as a policy concept aimed at extending producers' responsibility for their products to the post-consumption stage of their product life with the presumption that manufacturers have the capability to reduce environmental impacts (OECD, 2001). The policy objective is to shift the burden of the waste management costs resultant from products at the end of their lifecycle from local tax payers back to those original manufacturers offering products in the market. There are two major impetuses for governments to promote EPR for environmental protection. The first motivation relates to the relief of financial burdens by local governments on waste management. Second, by providing incentives to reduce consumption of primary resources, manufacturers are encouraged to utilize more secondary materials and undertake product design changes for reducing disposal and waste in production activities (Link and Naveh, 2006). This EPR concept emphasizes the principle of waste prevention by manufacturers with supporting practices such as recycling, reprocessing, and reusing the components and materials with residual values. An important goal of EPR is to reduce disposal, waste, and consumption of resources by encouraging manufacturers to use sustainable materials and design products for recycling. This policy-oriented environmental initiative has led to the response by many industries such as automobile (Milanez and Buhrs, 2009; Wang and Ming, 2011) and electronics (Khetriwal et al., 2009a) to establish industry standards as reference for manufacturers to develop corresponding solutions for mitigating disposal and waste of reusable materials or components caused by their industrial activities. This policy trend for extending the environmental responsibility to upstream producers suggests that EPR practices can be a feasible way for manufacturing enterprises to seek more sustainable forms of development by improving their overall eco-efficiency.

In recent years, we have seen growing concern on environmental degradation in emerging countries (e.g., China) due to their rapid industrialization and fast growing consumption pattern. As a popular policy instrument, EPR mandates manufacturers to treat or dispose their products at the end-of-life with the potential to protect the environment and reduce costs incurred from developing landfill. The aim is to reduce waste generation at the source, encourage environmentally-friendly product design, and support

* Corresponding author. Tel.: +852 2766 7920; fax: +852 2330 2704.
E-mail addresses: mike.lai@polyu.edu.hk, khunglai@gmail.com (K.-h. Lai), tcchris@polyu.edu.hk (C.W.Y. Wong), lgtvlun@polyu.edu.hk (Y.H. Venus Lun).
[1] Tel.: +852 2766 6415.
[2] Tel.: +852 2766 7415.

0925-5273/$ - see front matter © 2013 Elsevier B.V. All rights reserved.
http://dx.doi.org/10.1016/j.ijpe.2013.06.028

achievement of the public goal on 3Rs pertaining to reduction, recycling, and reuse in materials management. On the managerial side, manufacturers remain unsure how EPR can be applied as an organizational practice to improve their financial and market performance. The literature on EPR tends to focus on anecdote from governmental views with a confine to policy implications (Khetriwal et al., 2009a) as well as the effect on manufacturers' businesses and consumer prices (Atasu et al., 2009; Webster and Mitra, 2007). The importance of EPR for managing wastes in consumption based society is recognized, yet its pursuit as key management practices by manufacturers to achieve financial and market performance goals remains an inchoate field of study. This paper adds knowledge to this important topic by investigating various EPR practices including recycle, reprocess, reuse, inspection and separation of parts, adoption of modular design, and cannibalization as well as their links with performance outcomes. Specifically, we empirically test the EPR practices–performance relationship to ascertain the business value of EPR, providing managerial insights into the contributions of EPR practices to manufacturers' performance goals.

Another study objective is to investigate the role of customer integration in the performance outcomes of EPR implementation. While EPR emphasizes managing the post-use products, it implicitly assumes that customers would fulfill their responsibility voluntarily by returning the end-of-life products to the product manufacturers where participation by the former is presumably beneficial to the latter (Forslind, 2005). Although end consumer participation has been acknowledged as a critical success factor of EPR implementation (e.g., Nicol, 2007), there is no empirical evidence regarding whether the integration of customer participation by manufacturer determines the performance results of organizational EPR efforts. In particular, there is a knowledge gap on the role of customer integration in the EPR-performance link. *Customer integration* is concerned with participation of customers in the product return process and their attention and efforts made to facilitate the manufacturers' EPR practices. Integrating with customers is an important part of EPR for manufacturers to meet the performance objectives. This is particularly salient for export-oriented manufacturers mandated to comply with environmental regulatory requirements before their products are allowed for distribution and sales in the requisite overseas countries. In this study, producer is sampled in scope as product manufacturers with overseas customers targeted as the primary market for their output items. Undertaking EPR may incur costs because organizational efforts are needed to coordinate with customers, fulfill customer expectations to carry out environmental audits, and manage the retrieval of usable products. Prior analytical studies have found that such customer integration may lead to excess or shortage of returned products, which makes inventory management difficult for manufacturers (Guide et al., 2000). In a similar vein, the economic and social costs of disposal for excessively returned products, particularly those classified as unsuitable for remanufacturing, can be high. Based on the contingency theory with empirical evidence, we examine the market and financial impact of EPR practices implementation under different levels of customer integration with managerial insights on the business value of EPR practices and implementation. While the importance of EPR for manufacturing operations and its performance benefits are recognized in view of the escalating public quest for environment protection, the literature pays scant attention to the EPR practices–performance link and the role of customer integration in the process. To address this research void, this study seeks to answer the following research questions:

Question 1: Do EPR practices bring performance benefits to manufacturing enterprises?

Question 2: What is the role of customer integration on the implementation of EPR practices by manufacturers? In what ways does customer integration affect the EPR practices–performance relationship?

Answering these two research questions make two important contributions to the literature. This study is one of the first studies to empirically examine the EPR-performance link. The results shed light on the value of EPR practices for manufacturers to undertake their environmental responsibility and seek performance gains. Considering the customer role for manufacturing enterprises to build their supply chain system capability, this study advances knowledge on how integrating customers in the implementation of EPR practices differentiate their market and financial performance outcomes.

2. Research background and hypothesis development

2.1. Conceptualization of EPR

In this study, we define EPR as management practices including take-back, recycling, and final disposal of products that are helpful for manufacturing enterprises to relieve the environmental burdens bought by their products. While EPR focuses on utilizing reusable materials and components by incorporating modular design and capturing residual values from returned products, EPR is different from the notion of green supply chain management, green purchasing, and corporate environmental management. Green supply chain management focuses on inter-organizational efforts in managing the supply chain processes to reduce adverse environmental impact from purchasing of materials, production, to distribution of finished products (Sarkis et al., 2011). Green purchasing can be considered as one of the major processes of green supply chain management. As EPR manages residual values of returned products, green purchasing takes account of organizational sourcing decision with a focus on reducing use of environmentally unsustainable materials by developing purchasing policy, defining environmental objectives, and monitoring performance of suppliers (Chen, 2005; Wu et al., 2008). Lastly, EPR is different from the concept of organizational environmental management that is confined to organizational efforts and practices to reduce their adverse environmental impact through product and process stewardship with an emphasis on reducing liability and costs (Nicol, 2007). In comparison to the environmental management standard on ISO 14000 which is about process control with environmental consideration, EPR is concerned with the management practices by manufacturing enterprises on product take-back, recycling, and final disposal to reduce harms caused by their products to the environment.

One major goal of EPR is to mitigate the environmental damages by reducing disposal to landfill at the end of a product life. There are also economic values of EPR practices for manufacturers to collect and process the returned products through which to capture the residual values by remanufacturing, reprocessing, recycling, and reusing the reusable components. The return product streams cover packaging, electrical appliances and electronics, batteries, used oil, tires, and end-of-life vehicles. A major element of any EPR policy is the take-back requirement mandating individual manufacturers to collect and treat the resultant waste. Alternatively, product manufacturers are charged with financial obligations for these take-back activities. It is highly desirable that manufacturers incorporate environmental consideration at the product design stage to facilitate their subsequent take-back activities. This product stewardship emphasis improves and expedites the treatment of returned products (Subramanian

دریافت فوری ← متن کامل مقاله

ISIArticles
مرجع مقالات تخصصی ایران

✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
✓ امکان دانلود نسخه ترجمه شده مقالات
✓ پذیرش سفارش ترجمه تخصصی
✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
✓ دانلود فوری مقاله پس از پرداخت آنلاین
✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات