

Chapter 52

Recent Developments in Green Supply Chain Management: Sourcing and Logistics

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ABSTRACT

In today's supply chains, green and sustainable business practices have become an integral part of long-term strategy as well as the day-to-day operations, and sourcing and logistics play fundamental roles in ensuring the success of sustainable supply chains. In this chapter, we review recent research on three classes of decision models that are used in the logistics and sourcing functions of sustainable supply chains. Specifically, we examine and summarize recent developments in sustainable decision models for supplier selection, inventory lot-sizing, and last-mile delivery. Our review of the green and sustainable features found in these three models results in a single-source consolidation of models used in sustainable sourcing and logistics. This review may prove useful to researchers who focus on sustainable supply chain management and to practitioners who seek to expand their toolkit of models for the management and control of their supply chain.

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INTRODUCTION

Since the 1970s, there was an evolution of paradigms for improving the productivity and profitability of integrated manufacturing and distribution systems. These paradigms included the Just-In-Time (JIT) production philosophy, Lean and Agile Manufacturing, Six-Sigma, Mass Customization, and Supply Chain Management (SCM). Organizations embraced these paradigms as a means to improve their competitiveness in response to heightened levels of global competition and demands by customers for low-cost, customized products with short delivery lead times. In these paradigms, sourcing and logistics have always played an important role in ensuring that customer demands for products were met in a timely manner. As organizations recognized the strategic implications of partnering with suppliers, the traditionally functional roles of sourcing and logistics were elevated to a more strategic level. As a result, sourcing and logistics have become the cornerstones of today's widely adopted SCM philosophy. The SCM philosophy, which advocates integrating value-adding activities such as production planning and inventory control, sourcing, logistics, and customer relationship management, has been shown to improve financial performance and competitive advantage. For a detailed review of the literature on the financial impact of SCM on firm performance, the reader is directed to Shi & Yu (2013).

Today, there is heightened interest in how business practices make an impact on the environment. Concerns over resource usage, energy consumption, and waste have prompted organizations to consider green and sustainable practices in the operation of their supply chains. As a result of the adoption of green and sustainable practices into supply chain operations, the SCM philosophy has further evolved and, to reflect these adopted practices, is now commonly referred to as either the Green Supply Chain Management (GSCM) or Sustainable Supply Chain Management (SSCM). As noted by Ahi & Searcy (2013), there are numerous definitions for these terms (22 for GSCM and 12 for SSCM), and the literature suggests that SSCM is essentially an extension of GSCM. For the convenience of the reader, Table 1 contains a list of definitions of key terms that are used in this chapter.

The long-term benefits of adopting green and sustainable business practices have been investigated by several researchers. Ambec and Lanoie (2008) systematically reviewed the literature on how firms can benefit from better environmental performance and provided a summary of the relationship between environmental and economic performance. Wang and Sarkis (2013), Green, Zelbst, Meacham, and Bhadauria (2012), and Rao and Holt (2005) empirically examined how the adoption of green and sustainable practices in SCM leads to improved economic and operational performance. Recent case study-based analyses that detail the integration of GSCM in real-world supply chains were reported by Ubeda, Arcelus, & Faulin (2011) for Eroski, a Spanish food distributor, and by Lee (2011) for Hyundai, a Korean automobile manufacturer.

The contribution of this chapter to the literature on GSCM business practices is threefold and is summarized in our research objectives. In satisfying these research objectives, our chapter will be of interest to researchers who currently work in the field of green and sustainable supply chains, researchers who may be entering the field, and practitioners who are interested in learning about new research trends in the field.

First, we summarize quantitative modeling research on supplier selection models and examine the evolution of supplier selection models to include green and sustainable sourcing criteria. Sourcing plays a fundamental role in the operation of any supply chain. Concerns over the carbon footprint and related environmental costs associated with sourcing decisions in supply chains have generated considerable interest in the literature. In response to these concerns, researchers have contributed many empirical

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