


# Chapter 1


## An Integrated Supply Chain and Marketing Analytical Framework for Improving 3PL Delivery Performance

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### **ABSTRACT**

*In this chapter we present a supply chain and marketing-based analytics framework for analyzing the delivery performance of third-party logistics providers charged with completing product deliveries to the end customer in a business to consumer supply chain. A novel feature of the framework is the use of market segmentation as the basis to isolate facets of the delivery process for improvement using statistical analysis. The framework, which advocates measuring and reducing delivery variability and uncertainty, easily integrates with existing cost-based delivery improvement models found in the literature. The framework is demonstrated using a real-world delivery data set.*

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## INTRODUCTION

Improving the operational and financial performance of their supply chains is a key objective for firms in today's competitive marketplace. Increasing raw material costs, enhanced levels of global and domestic competition, and rising expectations by consumers for wider product lines and shorter delivery times present challenges to firms across both traditional and omnichannel supply chains. As a result, many organizations have adopted and integrated supply chain analytics (SCA) into their business strategy. The benefits of SCA are widespread and have been shown to reduce supply chain costs, strengthen buyer-supplier relationships, mitigate risk, and improve supply chain efficiency and performance. Comprehensive reviews of SCA are found in Maheshwari, Gautam & Jaggi, (2021); Nguyen, Li, Spiegler, Ieromonachou & Lin, (2018); and Wang, Gunasekaran, Ngai & Papadopoulos, (2016).

Evolving from the broader field of business analytics where data-driven analyses are used to guide decision making and strengthen resiliency across the functional areas of marketing, finance and operations (Sarkar, Gunasekaran & Patil, 2025), SCA focuses descriptive, predictive, and prescriptive components of business analytics on specific processes in supply chains. The widely accepted Supply Chain Operations Reference (SCOR) model is a framework for benchmarking and identifying areas of improvement in supply chain operations and serves as a gateway for integrating SCA into supply chains (Nguyen, 2024; Delipinar & Kocaoglu, 2016; Huan, Sheoran & Wang, 2004). The SCOR model focuses on five core supply chain processes: Plan, Source, Make, Deliver, and Return. The application and contribution of SCA in each core process of the SCOR model has been addressed in the literature. Souza (2014) outlines how the descriptive, predictive, and prescriptive components of SCA can be used to improve supply chain performance in each of the five core processes. Within the SCOR model, each core process is broken down into a hierarchy of subprocesses that defines the strategic, tactical and operational components of the process. Hasan, Kamal, Daowd, Eldabi, Koliouisis & Papadopoulos (2024) provide a detailed breakdown of the five core SCOR processes and outline sixteen distinct decision areas where SCA can be implemented across subprocesses in the supply chain to support performance improvement.

Effectively managing the interface between supply chain management and marketing is a critical factor for the long-term success of firms (Madhani, 2012). The supply chain defines the process of transforming raw materials into finished products, maintaining product quality and delivering products to the end consumer; marketing focuses on identifying consumer wants and needs, developing products, and building customer relationships and trust. Lamberti & Pero (2019) examine both the supply chain and marketing perspectives of this interface and identify that collaboration between supply chain management and marketing is vital to satisfying

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