

# Chapter 1

## A Big Data Framework for Decision Making in Supply Chain

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### ABSTRACT

*The advent of information and communication technologies (ICT) ushers a cost-effective prospect to take care of large volumes of complex data, commonly known as “big data” in the supply chain operational environment. Big data is being generated today by web applications, social media, intelligent machines, sensors, mobile phones, and other smart handheld devices. Big data is characterized in terms of the velocity, volume, and variety with which it produces along the supply chain. This is due to recent advances in telecommunication networks along with centralized and decentralized data storage systems, which are processed thanks to modern digital computational capabilities. There is a growing interest in the use of this large volume of data and advanced analytics for diverse types of business problems in supply chain management (SCM). Such decision-support software applications employ pure mathematical techniques, artificial intelligence techniques, and sometimes uses both techniques to perform analytical operations that undercover relationships and patterns within supply chain generated big data. This chapter proposes a framework for the utilization of big data in SCM decision making. The framework is based on the SCOR (supply chain operations reference) model, which is endorsed by Supply Chain Council (SCC). The proposed framework is influenced by the enterprise potential of augmented reality and virtual reality in supply chain applications, and it identifies key categories of big data analytics applications for the key businesses of SCOR model. Finally, the chapter highlights research issues to extract insight from big data sources for enterprise decision making.*

### INTRODUCTION

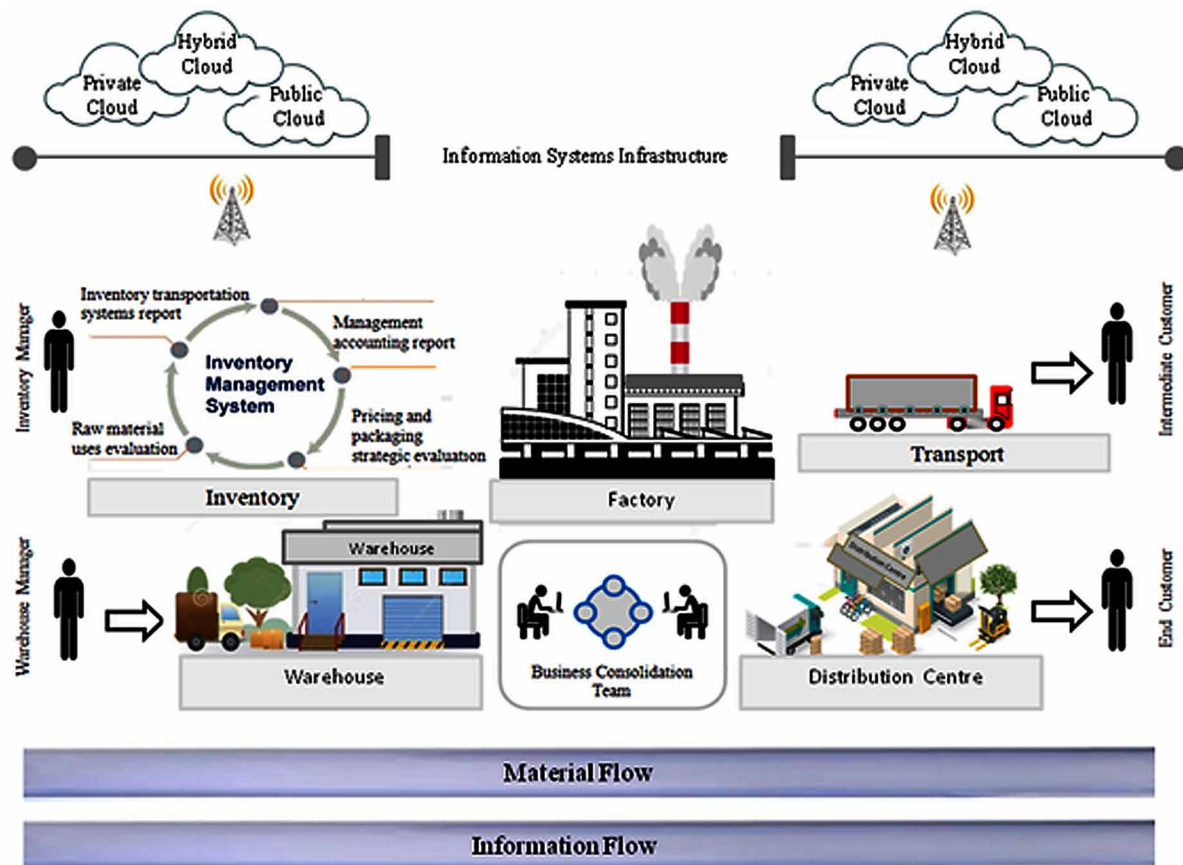
In today's global economy, retail enterprises are increasingly using distributed information systems to carry out day-to-day business operations. Such systems should result in the seamless integration of retail business applications and exchange of information between applications within and across enterprise boundaries. The extraordinary growth of information and communication technologies (ICT) driven by

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technology companies, computer hardware and software systems has empowered all aspects of computing applications across retail enterprises. At the same time the business environment is becoming more and more complex with functional units needing increasingly inter-functional data flow for decision-making, timely and efficient procurement of manufacturing parts, management of inventory, corporate accounting, human resources, and distribution of goods and services. In this circumstance, the retail business management team requires effective information systems to enhance competitiveness by cost reduction and improved logistics. It is universally recognized by large and small-to-medium-size retail enterprises (SME) that the ability of providing the right information at the right time brings huge rewards to retail supply chain management practices.

In a typical retail supply chain, raw materials are purchased from suppliers and products are manufactured at one or more production plants. Then they are transported to intermediate storage facilities (e.g. warehouses, distribution centers) for packing and shipping to retailers or customers. The path from supplier to customer can include a few intermediaries such as wholesalers, warehouses, and retailers, depending on the products and markets. In this way, SCM relates to business activities such as inbound and outbound transportation, warehousing, and inventory control. Importantly, it also embodies the information systems necessary to monitor these business activities. Figure 1 shows a simple diagrammatic representation of a retail supply chain, which highlights some of the primary business activities.

*Figure 1. Diagrammatic representation of a retail supply chain*



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