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Big data analytics and application for logistics and supply chain management

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ABSTRACT

This special issue explores big data analytics and applications for logistics and supply chain management by examining novel methods, practices, and opportunities. The articles present and analyse a variety of opportunities to improve big data analytics and applications for logistics and supply chain management, such as those through exploring technology-driven tracking strategies, financial performance relations with data driven supply chains, and implementation issues and supply chain capability maturity with big data. This editorial note summarizes the discussions on the big data attributes, on effective practices for implementation, and on evaluation and implementation methods.

1. Introduction

The inception of Web 2.0, together with Industry 4.0, the Internet of Things (IoT), and other digital technologies has ushered in a good deal of attention to big data and its analysis. This research topic is gaining popularity globally both to drive performance improvements and to benefit from new insights. Massive amounts of data are now collated from several sources, including enterprise resource planning (ERP) systems, distributed manufacturing environments, orders and shipment logistics, social media feeds, customer buying patterns, product lifecycle operations, and technology-driven data sources such as global positioning systems (GPS), radio frequency based identification (RFID) tracking, mobile devices, surveillance videos, and others. As such, organisations are currently dealing with big datasets characterized by 4Vs: large volume, velocity, variety, and veracity. A recent International Data Corporation (IDC) forecast suggests that the Big Data technology will grow at a rate of 26.4% compound annual growth, reaching \$41.5 billion through 2018. The bigger the data, the more challenging it becomes to manage and analyse and to deliver useful business insights.

Recent studies in the field of big data analytics have come up with tools and techniques to make data-driven supply chain decisions. Analysing and interpreting results in real time can assist enterprises in making better and faster decisions to satisfy customer requirements. It will also help organisations to improve their supply chain design and management by reducing costs and mitigating risks. Recently, various research studies have indicated the benefits of using big data methods in logistics and supply chain management. [Tan et al. \(2015\)](#) proposed a big data analytics infrastructure based on deduction graph theory to enhance supply chain innovation capabilities. [Cakici et al. \(2011\)](#) used RFID data for redesigning an optimal inventory policy. [Mishra and Singh \(2016\)](#) proposed a big data analytics approach for waste minimization in food supply chains. [Zhong et al. \(2015\)](#) stated how big data information could be used in effective logistics planning, production planning, and scheduling. [Shukla and Kiridena \(2016\)](#) introduced a fuzzy rough sets-based multi-agent model for configuring supply chains in dynamic environments. [Dutta and Bose \(2015\)](#) presented the challenges of managing a big data project for a cement supply and logistics network. [Singh et al. \(2015\)](#) proposed a cloud computing framework for reducing the carbon footprint of a supply chain. [Waller and Fawcett \(2013a, 2013b\)](#) argued that use of data science, predictive analytics, and big data could help logistics managers to meet internal needs and adjust to changes in the supply chain environment. Along with these studies, there are many areas within supply chain management that could benefit from big data methods and technologies, including mitigation of bullwhip effect, multi-criteria decision making ([Govindan et al., 2013](#)), sustainable supply chain management ([Kannan, 2018](#); [Govindan et al., 2017](#)), sensor data-based predictive maintenance in manufacturing, efficient logistics ([Govindan et al., 2015](#)), forecasting and demand management ([Schoenherr and Speier-Pero, 2015](#)), and

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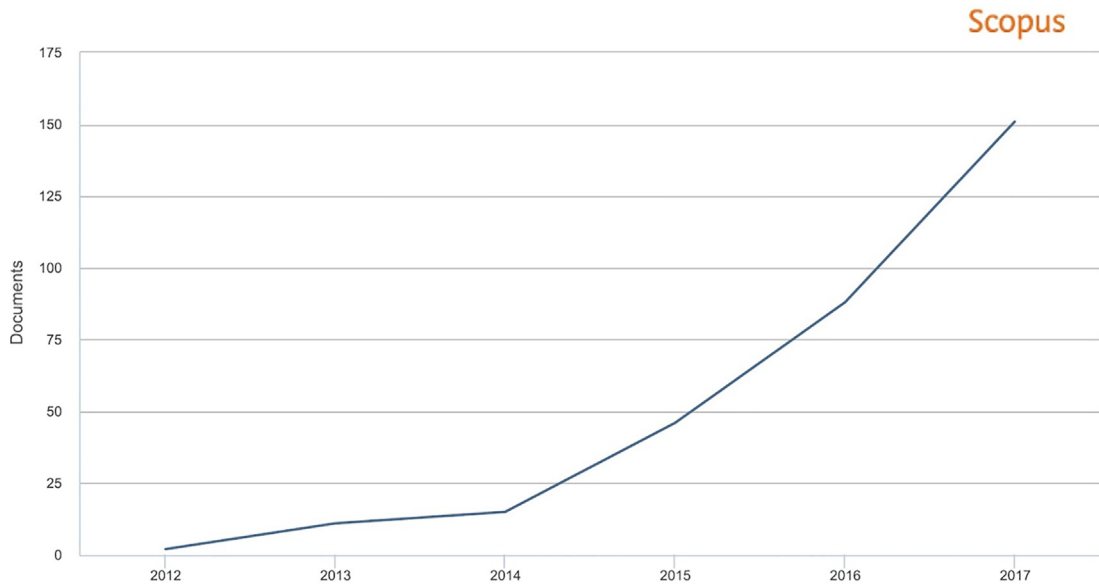


Fig. 1. Number of big data analytics papers published in various time periods (2012–14 March 2018) as revealed in (Scopus).

planning and scheduling (Chan et al., 2013). To improve operational efficiency, integrated production and distribution processes across different supply chain components, big data information and technologies need to be reassessed. Manufacturers, logistics, suppliers, and retailers should develop a holistic approach to add value to their customers and services.

2. Literature review on big data analytics

To provide the overview of this SI, initially a broad search was conducted to document the number of papers published in the area of ‘Big data analytics’ the search period used was from 2012 to 14 March 2018. An overview of the number of articles is presented in Fig. 1. After looking into the journal’s specific search, Fig. 2 clearly demonstrates that the *Annals of Operations Research* was the leading journal in terms of the numbers of papers from Scopus.

In order to refine the search to identify the document type, the Scopus databases were investigated further. In this search, conference papers, notebook chapters, books, and short surveys were excluded. After excluding these items, a total of 313 were considered. The document types considered in this section included articles, articles in press, and reviews. The overview of document

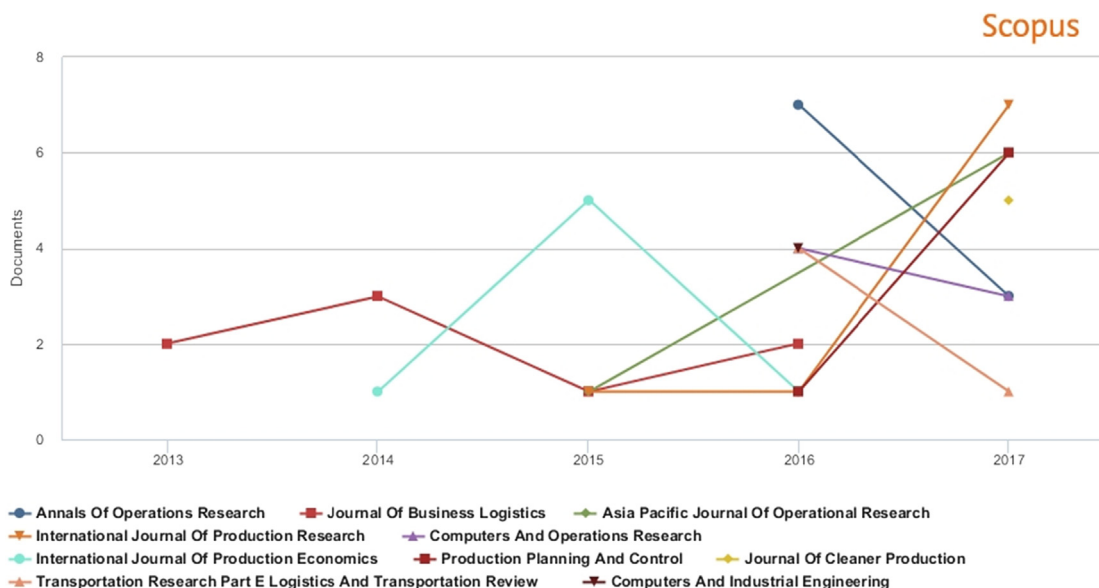


Fig. 2. Share of top international journals with highest contributions in publishing big data analytics topics as revealed in (Scopus).

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