

# Chapter 11

## Industry 4.0 and Supply Chain Management: A Methodological Review

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### ABSTRACT

*The association of Industry 4.0 and supply chain management assures tremendous growth and developmental opportunities towards manufacturing organizations. The two aspects (Industry 4.0 and supply chain management) are one of the most opted choices for research among academicians and researchers. The study in question accommodates 884 papers from past 10 years, which contributes towards Industry 4.0, supply chain management, cyber-physical systems, digitization, Internet of Things, and Big Data predictive analytics. The statistical tools include BibExcel and Gephi for bibliometric and network analysis. The results are presented in the form of top contributing authors, keywords, and citations. The article also shares a conceptual model based on the review of studies. The findings will help managers or officials to understand the importance of Industry 4.0 and its association with supply chain management. The formed clusters and their associations are providing new areas that require managerial attention. The article ends while discussing the current and future scope of research.*

## **1. INTRODUCTION**

Industry 4.0 came into notice in the year 2011 at the Hannover Fair (Germany), and received a lot of concentration from academicians and officials (Dezi et al., 2018). The term fourth industrial revolution is a commonly used twin term for Industry 4.0 (I4). Kagermann (2015) explains it as a contemporary move enabling automation to exchange data in manufacturing organizations. The continuous developments in the area of science and technology are supporting the virtual growth and enhancements across manufacturing set-ups (Belvedere and Grando, 2017). The involvement of few other aspects not limited to internet of things (IoT), big data predictive analytics (BDPA), cloud computing (CC), and cyber physical systems (CPS) makes I4 a complete concept, also known as smart factory (Bag, 2017; Gunasekaran et al., 2017; Papadopoulos et al., 2017; Wamba et al., 2017). In addition, it is realised that I4 and CC, when put together, deliver the most beneficial outcomes with respect to information technology in manufacturing organizations (Fu et al., 2018). The role of CPS is to monitor all physical operations and produce a soft copy of every performed operation (Brettel et al., 2014; Gunasekaran et al., 2018), so that, organizations are able to make rational decisions. The IoT linked with CPS interact and coordinate amongst themselves and with humans in real time zone through online facilities (Wang et al., 2016). This process further smoothenes the internal organizational activities carried out through virtual methods (Hermann et al., 2016). The ongoing researches reflects that I4 it is the next level in manufacturing industry with digitization (DGT) as its key driver (Shrouf et al., 2014), followed by certain interruptions; (a) an incredible rise in data, (b) the power of computation, (c) network connectivity, (d) involvement of business analytics and business intelligence, and (e) human robotics (Lee et al., 2015).

The implementation of I4 in manufacturing set-ups impacts the overall supply chain management (SCM) (Stock and Seliger, 2016) (refer to Figure 1). The collaborative activities of manufacturers, retailers, customers, and suppliers require transparency. The process of DGT and automation of different processes in SCM has changed the work patterns for record maintenance and delivery of services (Fu et al., 2018). In order to gauge the possible opportunities and expected threats, it is highly essential to understand the existing stage of association between I4 and SCM. Given the above background, the present paper is a modest attempt to review and assess the current situation of I4 and SCM while considering major constituents i.e. DGT, IoT, CPS, BDPA. This study focuses to address the following research questions:

RQ1: What is the relationship between I4 and SCM?

RQ2: Is there any contribution towards I4 and SCM, when and where?

RQ3: What are the existing trends and future directions towards I4 and SCM?

The present study uses bibliometric analysis to assess a sum of 884 selected papers. The following sections will present the review of literature, analysis, discussion, limitations, and future directions.

## **2. REVIEW OF LITERATURE**

This section discusses the review of literature in two sub-sections i.e. Industry 4.0 and Supply Chain Management.

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