Chapter 1
An Analytical Framework for Smart Supply Chains 5.0

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ABSTRACT

Supply Chain 5.0 is the latest change in the continuous management system of procurement and supply chain in the new era. This concept describes the use of transformative technologies such as artificial intelligence (AI), blockchain, the internet of things, and big data analytics to create a continuous network of self-managing supply chain nodes. This system is an ecosystem that combines different technologies simultaneously to create an integrated network and to create a sustainable, resilient, and human-centered process-oriented system. This research has tried to identify the main actors and provide an analytical framework by examining the dimensions and components of this intelligent system. Understanding this framework is always an effective guide for the powerful implementation of this smart system.

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1. INTRODUCTION

Also, due to the volume of transactions in the business world, this chain is now much more complicated than in the past and faces more costs. Therefore, today's businesses in many industries are looking for ways to improve their supply chain situation. These new changes have forced industries to act smarter than before.

The supply chain is one of the areas affected by the fourth and fifth industrial revolutions and digital technologies such as the Internet of Things, advanced robotics, and big data analysis. Smart supply chain is the process of supply, warehousing, inventory control, production, and supply of products using smart technology. This method actually replaces the traditional and conventional methods of supply chain management based on the re-engineering of various processes. The main effort is to make a fundamental change in supply chain management by focusing on the possibilities of new technologies (Ivanov, 2023).

Although each of these technologies is capable of creating significant opportunities for businesses, the combination of these technologies together seems to lead to a major transformation in the supply chain. On the one hand, technology such as the Internet of Things, with the help of devices and sensors, leads to an increase in the speed of receiving information in real-time, from the state of the supply chain. On the other hand, big data analysis by processing this large volume of generated data brings identification of patterns and prediction of trends. In addition, artificial intelligence adds high analytical power to this collection. Blockchain is also a valuable solution for data security. Provides transparent and decentralized management. All these factors together provide a supply chain that, in addition to being smart, is sustainable and resilient and cares about people's lives. This intelligent hybrid process based on technology and integrated into the supply chain can lead to the supply chain system, which is called Supply Chain 5.0. Businesses that are able to use the combination of these technologies together will become an information-based business that is able to make decisions based on real and timely data and generally increase business productivity (Kamble, 2023).

Supply Chain 5.0 represents a critical departure from past eras by presenting intelligence, mechanization, and more noteworthy permeability into the whole supply chain organization. In addition, it is a biological system that combines different advances such as artificial intelligence, IoT, mechanical autonomy, blockchain, and big data analytics to make a bond together (Nozari et al., 2021). The utilization of AI is especially pivotal in Supply Chain 5.0. AI calculations can offer assistance in foreseeing requests and optimizing stock levels, progressing operational effectiveness, and diminishing squandering. AI-powered robots can moreover robotize monotonous assignments, such as picking and pressing, and decrease the hazard of human mistakes.