Chapter 6

Opportunities and Challenges of Smart Supply Chain in Industry 5.0

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ABSTRACT

The smart supply chain (SSC) attempts to improve the general concept of the supply chain. The existential philosophy of Industry 5.0 is to develop the previous generation of the industry. Smart supply chain in the Industry 5.0 can be introduced as the Supply Chain 5.0 which includes three essential features. This study aims to review the smart supply chain. For this objective, smart supply chain opportunities (SSCO) and smart supply chain challenges (SSCC) are analyzed based on Industry 5.0. This study explains the industrial revolutions from the first one to the fifth one. In this chapter, SSC and Industry 5.0 are identified and defined briefly. Thus, SSC and Industry 5.0 are connected meticulously. For precise investigation, the opportunities and challenges of SSC are explained. As a result, the conceptual framework has been achieved. Using the Delphi method to reach a consensus of a group of experts to validate the extracted indicators is necessary for this chapter. Finally, the conceptual framework demonstrates a smart supply chain based on Industry 5.0.

1. INTRODUCTION

The main purpose of this section is to identify and analyze the most important opportunities and challenges of smart supply chains in Industry 5.0. A supply chain is defined as an intricate logistics system (Schiffling et al., 2022) that consists of facilities. Another definition of the supply chain is a network between an enterprise and its suppliers to provide and spread a specific product from the step of origin to the step of consumption (Li, 2020) involving the smart technologies in the supply chain (Zhang et al., 2022) leads to smart supply chains (SSCs) in the whole chain. Nowadays, the fast expansion of technologies such as the Internet of Things (IoT), Big data (BD), artificial intelligence (AI), and Blockchain has led to the emergence of SSCs (Li, 2020). The quick and efficient growth of smart technologies such as AI, Blockchain, cloud computing, and IoT has contributed to the innovation of supply chains, which appear so-called smart supply chains (Liu & Zhou 2021). Thus, setting up a smart supply chain includes the adoption of new technologies. Implementing SSCs is difficult for small industries. Since they have insufficient financial resources to invest (AlMulhim, 2021); they may have difficult tasks. SSC has a complicated vision. Precisely, understanding the smart supply chain vision takes time (Wang et al., 2022) because the concept of SSC is almost new to people. For this reason, companies use new technologies to understand SSC (He & Xiang, 2021).

Industry 5.0 widely transforms global industries all around the world. It aims to place the health of humans at the core of manufacturing systems (Leng et al., 2022). The execution of partial automation within the industry context and production context marked the beginning of what is usually referred to as Industry 3.0 (Mohamed et al., 2023). Industry 4.0 is the foundation of Industry 5.0 (Mourtzis et al., 2022). Surely, this question pops into the reader's mind what is the difference between Industry 4.0 and Industry 5.0? The center of industry 4.0 is technology, while the center of industry 5.0 is value (Xu et al., 2021). Despite this, there are some technologies in Industry 5.0 such as IoT, Cyber-Physical Systems, Big Data Analytics (BDA), Additive Manufacturing, Digital Twins, and Industrial Robotics (Mohamed et al., 2023). Furthermore, Fig. 1 explains the improvement journey of industry generations from 1760 to 2021 which explains the start of industrial revolutions and the subjects of that. The development trend of industry generations leads to the last generation which is called the fifth generation of industry.

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