Chapter 1
The Dissemination of Industry 4.0 Across Global Value Chains: An International Business Perspective

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ABSTRACT

Although the concept of Industry 4.0 is still in its infancy, the ramifications of this emerging technology are beginning to be felt across various industries. This chapter deals with the application of new technology, such as the internet of things (IoT), big data and analytics, robotic systems, and additive manufacturing, in global value chains (GVCs). Secondary sources about Industry 4.0 are explored in order to compare new technologies and understand how they could impact manufacturers, companies, and consumers. The effects of digital technologies on location and coordination of work, as well as the capture of value in global value chains, are also discussed in this chapter. In particular, the chapter highlights the risks of cyberattacks and their consequences for individuals' privacy, calling for regulation in international and remote work contexts.

INTRODUCTION

In the world today, digital disruption has become the norm. The proliferation of information systems has permeated every aspect of human endeavour, including the manufacturing sector. The term "Industry 4.0" refers to cyber-physical systems (CPS) and complex data processes that use large amounts of data to control smart machines (Zhong et al., 2017; Vaidya et al., 2018; Villalba-Diez et al., 2019). As can be seen from Figure 1, after mechanisation (the first revolution), widespread use of electrical energy for mass production (the second revolution), and widespread digitalisation (the third revolution), Industry 4.0 is regarded as the fourth industrial revolution (Lasi et al., 2014).

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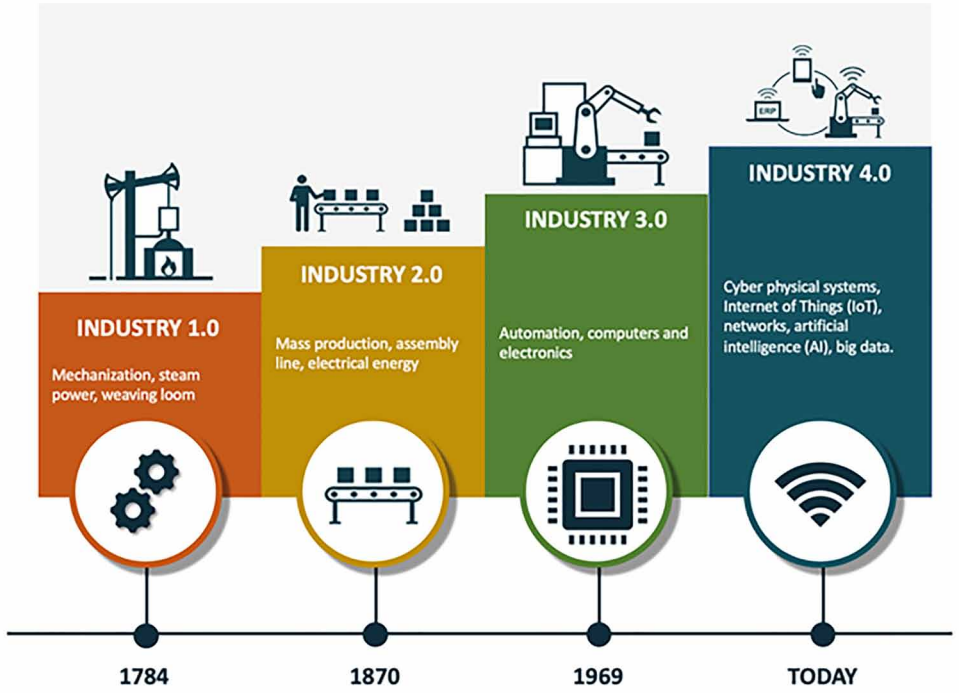
Figure 1. Industry 4.0 evolution



Industry 4.0 is a combination of emerging digital industrial technologies as well as the proliferation of the Internet of Things (IoT), intelligent products and devices (Ivanov et al., 2020; Matt et al., 2020; Olsen & Tomlin, 2020). Data collection and real-time evaluation help to reduce costs and improve quality because data collection and real-time evaluation help to reduce costs and improve quality (big data and analytics). The literature identifies nine foundational technologies that are referred to as "building blocks of Industry 4.0". These are: big data and analytics, autonomous robots, simulation, horizontal and vertical system integration, IoT, cybersecurity, the cloud, and augmented reality (Ali et al., 2017; Ali, 2018; Ali M et al., 2018; Ali, 2019a; Ali, 2019b, 2019c; Ali, 2020; Ali et al., 2020; Ali & Abdel-Haq, 2021) (Vaidya et al., 2018).

Since cost and reliability improvements have made digital technologies more viable for industrial applications, it is likely that the deployment of such technologies will not be realised until 2025 or later than 2030 (Vogels et al., 2020). Industry 4.0 has the potential to catalyse a global shift away from isolated production operations and toward integrated, automated, and optimised production and data flows on the supply chains of companies worldwide (Agrawal et al., 2020). First, the chapter provides a general overview of the key digital technologies that are currently transforming the global marketplace and analyses the potential effects of their implementation. After discussing the advantages of ownership, location, and internalisation for multinational corporations (MNCs), the effects of international business (IB) theory innovations, specifically the concept of ownership, location, and internalisation advantages are examined in the context of remote work and sustainability. The chapter concludes with a discussion of a few policy issues and suggestions for future research. The ultimate goal of this chapter is to discover and describe the most recent and advanced emerging technologies, as well as their impact on global value chain (GVC) design and international business and remote work practises.