Chapter 11
Adoption of Industry 4.0: Analysis and Action of Mexican Case

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ABSTRACT

Industry 4.0 integrates enterprises through continuous data flow, which can represent a competitive advantage. This chapter presents an analysis of the public policies for higher education as well as the initiatives that are being developed in Mexico to promote the adoption of Industry 4.0 technologies. It analyzed government and business initiatives that promote and strengthen labor sector skills to prepare the country's different productive sectors to take advantage of the opportunities offered by digital technologies. As a result, a set of best practices was identified, consisting of a bottom-up orchestrated process, matching Industry 4.0 initiatives with business needs, and strong involvement of private and public stakeholders. However, it was not possible to identify a strategic map that establishes the lines of action for the effective adoption of Industry 4.0 digital technologies. The formation of human capital to strengthen and increase strategies is an open topic.

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INTRODUCTION

The Fourth Industrial Revolution (4IR), also called Industry 4.0, has a substantial impact on greater efficiency and production performance and therefore on sustainability, due to its technological capabilities (Delera et al., 2022; Jayashree et al., 2022), that, when integrated, enhance productivity, efficiency, and innovation by optimizing production processes, create value with increased product functionality and respond to market needs (Zabidin et al., 2020).

Industry 4.0 integrates manufacturing through continuous data flow, which fosters monitoring, interoperability, and transparency, and represents a competitive advantage for companies. In this regard, 4IR is occurring through ubiquitous computing, Artificial Intelligence (AI), the Internet of Things (IoT), Big data, Blockchain, and other technological advances are evidence of dramatic change at exponential speed. However, there is little empirical evidence on its adoption and the existing evidence corresponds mostly to developed countries (Shreyanshu et al., 2022).

The Global Competitiveness Report of the World Economic Forum (WEF, 2018a) says that the adaptation of countries to the 4IR is a relevant factor for their prosperity or stagnation (CEPAL, 2018). Therefore, the Industry 4.0 initiative consists of a high-tech strategic project by governments aimed at stimulating the digitalization of manufacturing processes, as well as supporting small and medium-sized enterprises (SMEs). Specifically, this evolution promotes and strengthens standardization, safety, legal frameworks, research, and transformation of labor and production processes.

The Industry 4.0 paradigm promotes that companies develop their capabilities to manage and use the data generated in their production chains through analytical processes based on AI techniques that enable data-driven management that promises to develop a hyper-automated company with high productivity.

To achieve this, it proposes the digitization and vertical and horizontal integration of value chains in the different business sectors; the digitization of product and services offered to the market the digitization of business models, and processes to ensure customer satisfaction (Geissbauer et al., 2016; Kim et al., 2021).

Nine technological pillars are being integrated around the Industry 4.0 vision: big data, autonomous robots, computer simulation, horizontal and vertical integration, internet of things, cloud computing, additive manufacturing, augmented reality, and cybersecurity (Rübmann et al., 2015). These and additional digital technologies shown in Figure 1 provide companies with the opportunity to design and deploy new business models based on innovative strategies and data-driven enterprises to strengthen their competitiveness and sustainability (Müller, 2019).