Chapter 16
AI and Big Data Analytics Revolutionizing Industry 5.0:
Unlocking the Power of Smart Manufacturing and Beyond

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ABSTRACT

This study intends to investigate the application of artificial intelligence (AI) technologies in Industry 5.0, concentrating on the joint component that promotes interaction and collaboration between humans and machines. The artificial intelligence may improve human capacities, increase productivity, and make it easier to establish new business models. In addition, the study examines the ethical concerns and societal repercussions related to the use of AI in Industry 5.0. The research outlines critical success factors, difficulties, and best practices for effectively collaboratively leveraging AI within the framework of Industry 5.0. The results of this research provide organizations and policymakers with insights and recommendations that can help them use the synergy of AI and Industry 5.0 to generate collaborative innovation and achieve sustainable growth. Human-centricity, socio-environmental sustainability, and resilience are some of the aims that Industry 5.0 has the potential to support.

1. INTRODUCTION

The combination of AI with Industry 5.0 has the potential to completely transform businesses by igniting widespread, cross-organizational creativity and promoting long-term success. Harnessing the potential of AI becomes vital for opening up new prospects and gaining a competitive edge as we reach the era of

Figure 1. Industrial revolution and outcomes
(Source: Author compilation)
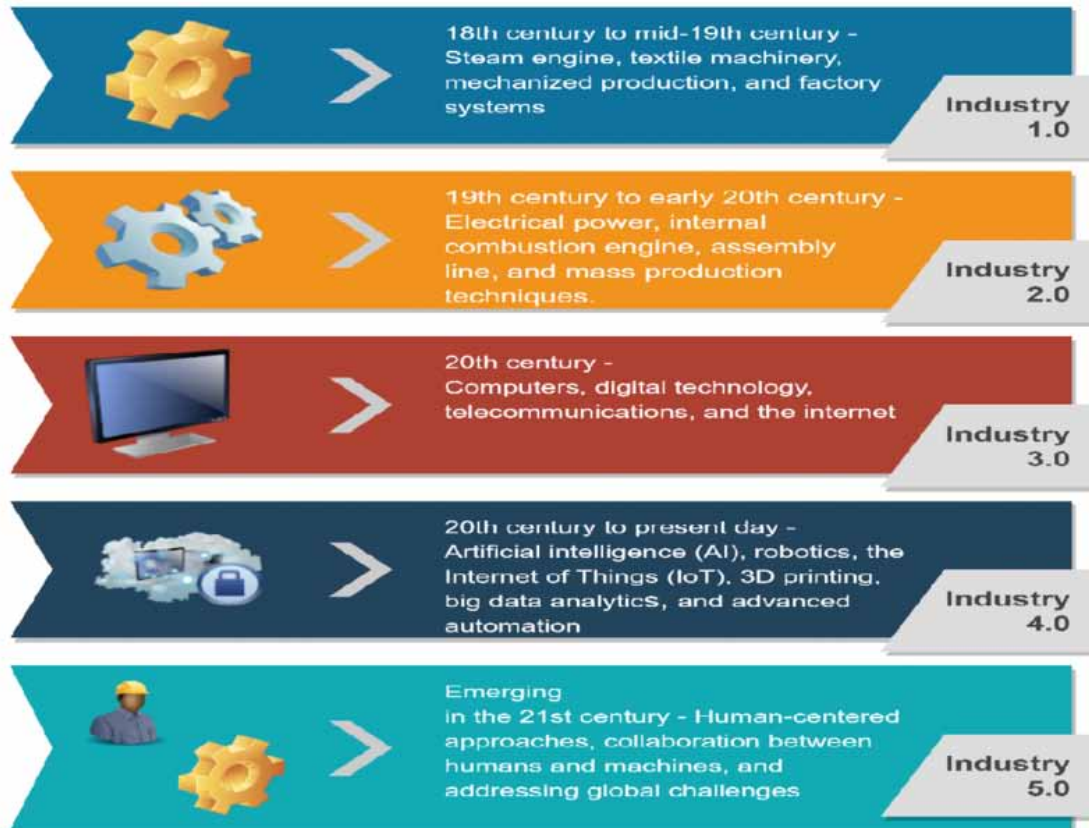
Industry 5.0, which emphasizes the harmonious cohabitation of humans and machines. Human creativity, problem-solving skills, and emotional intelligence are valued in Industry 5.0, marking a significant departure from the entirely automated operations of Industry 4.0. That humans have specific abilities and points of view that machines can't imitate is recognized. Nonetheless, artificial intelligence (AI) technologies have great potential in Industry 5.0 for enhancing human capabilities, automating repetitive jobs, and facilitating data-driven decision-making (Adel, 2022).

In Figure 1 it is mentioned that from industry 0.1 to industry 0.5 major changes seen in the field of technologies. Industry 0.1 started in 18th century that time steam engines, textiles machinery and factory system was used and slowly it change to industry 0.2 which seen up gradation in electric power. More changes seen in industry 3.0 to 5.0 where human develop advance technologies and machine leaning. Many sectors have significantly benefited from AI's ability to learn, reason, and handle large volumes of data. It has boosted production, saved money, and inspired new goods and services by increasing efficiency, precision, and automation. However, AI's actual value comes in its partnership with human workers, whom it may enhance, allowing them to take on greater complexity and driving collaborative innovation (Xian et al., 2023).This article will explore the many facets of AI's incorporation into Industry 5.0, including its design implications, ethical considerations, and societal impact. Case studies

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