



# Chapter 9

## Industry 5.0 and the Collaborative Approach of Internet of Things With Artificial Intelligence

**Sunil Gupta**

 <https://orcid.org/0000-0003-3862-1980>  
UPES University, Dehradun, India

**Monit Kapoor**

 <https://orcid.org/0000-0002-9036-6115>  
Chitkara University Institute of Engineering and Technology, Chitkara University, Rajpura, India

**Hitesh Kumar Sharma**

UPES University, Dehradun, India

### ABSTRACT

*Industry 5.0 with the internet of things (IoT) gives a human touch to Industry 4.0 for the development to provide efficiency with automation using robots and machines. The advancement in artificial intelligence makes robots with attached brains like human minds. This brain-machine interface introduces the concept of Industry 5.0, where robots with IoT features tangle with humans and try to work as an agent instead of participants. This digital transformation provides opportunities and challenges. This chapter provides development by various IoT and artificial intelligence-based industries and researchers for the use of Industry 5.0 with their application. In addition, the chapter describes how IoT robots and human values collaborate to give input to Industry 5.0. Finally, the impact of Industrial 5.0 is deliberated based on the economy and manufacturing process with increased productivity.*

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## **INTRODUCTION: DENOTATION OF INDUSTRY 5.0**

Industry 5.0 deals with personalization that allows consumers to customize their products. The Industrial Revolution 4.0 focused on digitalization, which introduced the concept of interconnected devices using the Internet of Things (IoT), artificial intelligence, and data analytics for future automation. The history of the revolution is shown in Table 1. The First Industrial Revolution was based on mechanization, which was based on mechanical production with the help of water and steam power. This steam engine replaces animals and human power. The First Industrial Revolution mainly happened in Europe and North America (Paschek et al., 2019).

The Second Industrial Revolution provides electrification through the production of electricity and engines. It enhances production by enabling electricity into the manufacturing process. The third industrial revolution occurred during the 1980s and was famous for globalization and automation; it gave birth to the Internet and computers. This automation provides a new concept in the field of information technology with the mass production of electronic equipment. The fourth industrial revolution is the complete digitalization of the 21<sup>st</sup> century and gives the concept of artificial intelligence (AI), the Internet of things (IoT), and cryptosystems with data analytics.

The fifth industrial revolution is based on the personalization and cooperation of people and machinery to customize people's things based on their needs. This revolution puts humans back into industrial production by collaborating with artificial intelligence machines like robots (Bernick, 2017). This helps increase production, customization, and personalization for existing customers. Industry 5.0 will create high-value jobs for humans. Humans will be responsible for designing and customizing the product depending on their customer's needs. The machines help in the manufacturing and production of the same. With Industry 5.0, we can automate the manufacturing process of the industry. Data analytics may help provide real-time data from machines in any field. Analytics helps to make a design better and remove the failure of any product; it improves the quality of the process and product outcome. Industry 5.0 increased the human role in designing a product with more automation and providing better information. Industry 5.0 focuses on delivering customer satisfaction with the help of hyper customization. Technologies like Blockchain, IoT, Drones, Exoskeleton, and 5G enable the sector to access Industry 5.0 in a new era of experience (Schwab, 2017). Having all of these technologies implemented per the Sustainable Development Goals (SDG) will lead our societies to evolve into society 5.0.

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