Chapter 16
Imagining the Sustainable Future With Industry 6.0:
A Smarter Pathway for Modern Society and Manufacturing Industries

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ABSTRACT

Industry is defined as the production of goods and services through the transformation of raw materials and resources into valuable products. It involves the creation of finished products or services through various stages of production that may include manufacturing, processing, assembly, packaging, and distribution. Industries have played a significant role in the economic growth and development of nations throughout history. They have contributed to the creation of employment opportunities, the development of new technologies, and the improvement of living standards. Over the years, the industrial sector has gone through numerous changes, and each of these changes has been termed as an "Industry Revolution."

1. INTRODUCTION

Modern, cutting-edge digital technologies are proliferating at the speed of light. Businesses and industries, however, have a difficult time accepting new technologies to adapt to their shifting behaviour. For industries to gain momentum and succeed with these cutting-edge high-speed technologies, they must

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work at the speed of light. By modifying or adopting an agile mentality, industries can quickly absorb these changes. Technology's digitalization is a journey, not a destination; it supports business models, the healthcare system, industrial industries, etc. for their expansion, shapes businesses, and benefits consumers. The transition from mechanisation to electrification to electronification to computation to mass customization to mass personalisation to virtualization to digitization to intelligence has reached its pivot point. Researchers are already beginning to consider industry 6.0, a futuristic concept, as a step beyond industry 5.0. The concept of Industry 6.0 changes depending on the demands of various sectors. It can also be omnipresent, customer-driven, human-centred, anti-fragile manufacturing, virtualized, human co-robot centric, and homogeneous assets, among other things. According to future predictions for industry 6.0, there will be a hyper-connection between industries, a high degree of mass customization and mass personalization of services and goods, as well as a dynamic supply chain management concept and a high degree of class one lot size thinking, which will allow information to travel freely between nations (Business Finland, 2015).

About every ten years, wireless communication networks undergo an iterative process of evolution. Many nations and standardisation bodies throughout the world have stated their ambitions for 6G research currently, which is still in the early stages of study. The first significant 6G research initiative in the world was started by the Finnish government in 2018. In March 2019, the Federal Communications Commission (FCC) in the US recommended building 6G based on "mmWave + THz + satellite" and opened the terahertz (THz) spectrum for 6G research. The NextG Alliance, a trade association with a focus on the administration of 6G development in North America, was established in October 2020 under the leadership of the Alliance for Telecommunications Industry Solutions (ATIS) (Iscan & No, 2021).

The Japan 6G Strategic Plan was published in April 2020 by Japan's Ministry of Internal Affairs and Communications. The 6G timetable was made public in South Korea in January 2020, and its commercial launch was projected for 2028. Germany announced an investment in 6G research in April 2021, including a 6G Platform and a 6G Research Hub. For next-generation networks and services, the 6G Smart Networks and Services Industry Association (6G-IA) has been established in Europe. The International Telecommunications Union (ITU), a global organisation for standardisation, published the inaugural 6G research timetable in February 2020. By 2023, it's anticipated that research on the 6G vision and related technical ideas would be finished (Martynov et al., 2019).

In contemporary civilizations, consumerism is becoming increasingly significant. A consumption model that considers consumers' growing importance is required to inform consumer-oriented policy. The dominant consumption model in market economy theory and consumer policy has typically been founded on the idea of consumer sovereignty. This paradigm serves as the market economy's explanation and moral framework (Hansen & Schrader, 1997). To establish regulated, controlled functionality within the confines of legality, current technical advancements must work hand in hand with the administrative sector. Enterprise architecture should be created to make sure that the human input component is never cut off from a completely automated process chain. The new framework might provide flexible work hours, which, as appealing as they may sound to the workers, might turn out to be a blessing with two curses. The average salary of the workers will undoubtedly be negatively impacted by a flexible schedule. Second, the revenue might not be consistent, resulting in unanticipated hiccups along the route that could financially upset modern society.

The paper is organized as the next section discusses about Industry 6.0 and its Key features and technologies. The next section discusses about the Sustainability Challenges in Manufacturing followed