Chapter 11
Industrial Revolution 4.0 and the Environment:
The Asian Perspective

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ABSTRACT

Mother Nature has suffered through many industrial revolutions. Ecology suffered after the first industrial revolution. Industrial revolutions quadrupled CO2. Industrial Revolution 4.0 follows the Stockholm Conference in 1972 and Brundtland's report "Our Common Future" (1983-1987) on sustainable development. The emerging and less developed countries are condemned for their carbon footprint and CO2 emissions from manufacturing and consumption. According to the environmental Kuznets curve hypothesis, developed countries advise developing nations to follow their development path to reduce carbon emissions. Industrial Revolution 4.0 replaced the Fordist style of production with information-based production. In this context, is digitization pro-environment? Regrettably, this has not been empirically studied. This chapter examines the environmental effects of digitalization and Industrial Revolution 4.0. The chapter will examine the link between the environment, digitalization, and Industrial Revolution 4.0 using empirical validation and descriptive analysis.

INTRODUCTION

The Emergence of Digital Eras the Prelude of Industry 4.0

The emergence of the digital world during the last decade of the last millennium has put an end to the Fordist mode of production and opened the sluice gate for an informative mode of production. The spread

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of the World Wide Web and then the mobile phones following the appearance of smartphones led to the conjugation of the internet and mobile phones over time, turning information from static to dynamic. Information remained no longer a slave of space and time; literally, it could be accessed at the tip of a finger at anytime and anywhere. Obviously, this particular incident created an ambiance of information symmetry that arguably improved social welfare. The surfacing of Industry 4.0, often called the fourth industrial revolution, emphasized a production process that was capital-intensive and, more aptly, information-intensive. Over time, automation of the production process through artificial intelligence has made digitalization even more important. This particular rise of information through digitalization gave rise to the famous or infamous digital divide (Banerjee & Gupta, 2022).

A Critical Consideration of the Pro-Environment Ambiance

During these heydays of pro-environment growth and development following the 1972 Stockholm Convention (Chen & McDonough, 2022), and more precisely the Brundtland Commission report that was the outcome of the Brundtland Commission established in 1983 and dissolved following their report 'Our Common Future' in 1987, a new term, sustainable development, has been coined. The essence of sustainable development rests on the pillar of benefiting the present without sacrificing the future. The report tries to identify and address the anthropocentric maladies that the environment is subject to following the industrial revolution, first in Great Britain and then in the United States of America. It is a well-known fact that the level of carbon dioxide (CO_2) in atmospheric air has increased three times from the pre- to post-industrial revolution, and the report is relevant in this context (Brundtland, 1987). Later on, the report has been criticised by experts as ordinal in nature (Butlin, 1989) and replication of Pigouvian externalities (Pigou, 1920). However, the most important shortcomings of the report remained behind the veil. The concerned report has a major lacuna: it considers sustainable development purely from an anthropocentric perspective and disregards the fact that environmental sustainability is much beyond anthropocentric sustainability and depends on all the living and non-living agents of mother nature. The experts who criticised the report never took into account this major shortcoming of the Brundtland Commission report 'Our Common Future'. The influence of 'Our Common Future' on the academic literature can be easily found in the fact that it popularised the discipline of environmental economics like no other factor (Banerjee et al., 2022).

Industry 4.0: Need for an Empirical Evaluation

However, the present chapter does not delve into such a descriptive debate. It rather investigates the fact of whether the so-called Industry 4.0 and its subset, digitalization, are as environmentally friendly as they are promoted. The green sector is perceived through the proliferation of the service sector. Are they really green? Whether Industry 4.0 and digitalization are essential to improve the quality of the environment and lead toward sustainable development (Javaid et al., 2022). These series of questions need both descriptive and empirical validation, as so far these claims are more theoretical in nature. In research, it has often been found that a strong theory lacks the necessary empirical validation and is thus only useful in papers but not in any particular problem scenario. Considering the extremely sensitive nature of the environmental status and problems, it cannot be left to a mere theory to stand as the vanguard of the problem. Without a doubt, such theories need to be empirically investigated and validated before acceptance (Banerjee et al., 2022).