Chapter 18
Prospects of Artificial Intelligence (AI) Towards the Circular Economy

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ABSTRACT

Artificial intelligence has become a large part of everyday life. The world is heading towards new heights of adaption of various decision support technologies. In the present era, the rate at which we are consuming natural finite resources and depleting them, through producing chemicals, soil pollution, water pollution, air pollution, etc., is destroying our ecosystem. We have tried several recycling methods to minimize wastage, but it is insignificant. Now there is a need to think about state-of-the-art technological support like artificial intelligence (AI). This chapter explores the prospects of artificial intelligence in the circular economy.

1.BASICS OF ECONOMY

Circular economy (CE), popularly known as circularity aims at eliminations waste and continual utilization of scarce resources. It follows a life cycle of make, use, reuse, remake, recycle and again use. It creates a closed loop system, minimizing the wastage of residual amount of resources. It basically follows the principle of "utilizing the maximum of a resource" (Ellen MacArthur Foundation, 2012). Let us take a basic example of food cycle, we as vegetarians depends on plants to eat, so we cook the food, eat, and throw off the residual amount of food. But instead of throwing it off, if we put it in soil, it becomes compost and supplies maximum nutrients to plants. We again use plants to eat. This is a regenerative process which is totally in contrast to traditional linear economy. Thus, CE also support the idea of sustainability (Heshmati A. 2017).

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Scope

CE has a broad scope. The circular economy includes products, infrastructure, equipment and services, and applies to every industry sector. It includes 'technical' resources (metals, minerals, fossil resources) and 'biological' resources (food, fibres, timber, etc.). A shift from fossil fuels towards renewable sources of energy is such an example of moving towards CE.

Background

In 1960s, Kenneth Boulding raised idea of "open economy" shifting from "closed economy". Open economy supports an idea of unlimited input resources and output sinks. Closed economy, on the contrast, supports idea of limited input resources and output sinks.

CE basically defines the idea of non-linear economy, which enhances the concept of closed loop systems. Some of the relevant theoretical influences are cradle to cradle, laws of ecology (e.g., Barry Commoner's The Closing Circle), looped and performance economy (Stahel,W. 2016), regenerative design, industrial ecology, biomimicry and blue economy.

British renowned economists David W. Pearce and R. Kerry Turner in 1989, further developed the meaning of CE. As per their opinion, traditional open-ended economy has no tendency to recycle, it follows make-use-throw concept.

In 1990s, Tim Jackson began to enrich the concept of this circular economy. Going years by, this idea of CE began to be adopted by the people at large. In 2006, China started working towards implementing CE in its governmental policy.

Linear Economy and Circular Economy

Evolution changed the economy to a big extent. It helped evolve us from stones to metals, electrical vehicles to ICE. Thus, moving from traditional economy to new economy is a must. The concept of circular economy was devised by David Pearce and Kerry Turner, two British environmental economists. They said, "Human lifestyle based on a linear model is unsustainable due to high rates of consumption and disposal, far exceeding the regenerative capacity of natural ecosystems to sustain human lifestyles."(Pearce, D.et.al. 1989). Of course, we, as a world, need to rethink the use of traditional economy and think of stepping in into a new and much more effective economy, i.e., circular economy, that is regenerative, resourceful and recyclable.

Basics of CE

As agreed, a simple equation created is Circularity = Competitiveness.

This clearly indicates that circularity is directly proportional to competitiveness. Whereas, competitiveness mainly depends upon economics of resources or capital. It can further be glorified in four areas such as, costs, material security, innovation and design and reduced externalities.

Costs includes true costs, having materials and regulatory compliance

Material security includes foreseen and unforeseen shortages Innovation and design includes materials, products and business models. Reduced externalities include true costs of products.