



# Role of Artificial Intelligence in Achieving Sustainable Development Goals

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## **ABSTRACT**

*The Sustainable Development Goals (SDGs) are intended to transform our world – for the better, and in a sustainable manner. Artificial Intelligence (AI) as one of the most emerging technologies can become a powerful weapon towards achieving sustainability and meeting the UN Sustainable Development Goals (SDGs). There are 17 Global Goals where one goal is interrelated to another. Artificial Intelligence can contribute to sustainable development by helping to predict errors and plan Sustainable Development Goals more effectively. Artificial Intelligence (AI) has a wide range of potential positive and negative impacts on the various Sustainable Development Goals (SDGs). Every country has been tramping to achieve all goals by conscripting all national resources as well as all capabilities and masteries of the technology such as Artificial Intelligence (AI). AI is believed can deliver solutions to most of Global Goals such as food security including life below water, water security, and energy security, increase the quality of health service, support the establishment of smart nation, and the most of them is AI has become a leveraging factor of a country's economy.*

**KEYWORDS:** Artificial Intelligence, Technology, Achieving, Education, Environment and Sustainable Development Goals



## Introduction

Artificial intelligence (AI) is being heralded as being a vital tool to the global community achieving the targets of the United Nation's Sustainable Development Goals (SDGs). AI has the potential to bring about large scale improvements and transformation in areas such as health, agriculture and education by accelerating innovation and enterprise creation, delivering government services to citizens and reducing the cost of public service and the operation of critical infrastructure. In agriculture, increasing climate change risks, desertification, droughts and floods are leading to lower yields and productivity, creating opportunities for AI solutions to encourage crop and land use optimization and precision farming. AI innovation has also begun to reinvent manufacturing and supply chain operations with advances in automation leading to shorter production timelines and demand driven production [1].

## What Are Sustainable Development Goals (SDGs?)

SDGs are a collection of 17 interlinked global goals designed as a “blueprint to achieve a better and more sustainable future for all”. The SDGs were formalized in 2015 by the United Nations and are supposed to be achieved by 2030. As they all are interconnected, it is likely that the rise in poverty will lead to a decline in sanitation habits and an increase in health issues. Furthermore, with poverty, access to schooling is more difficult and it will be easier for violence to occur. Comparably, climate change is affecting biodiversity and would worsen current inequality between individuals. It implies, any commitment to improving one of these goals may have a positive impact on another, or even several others.

Just like the human body, the parts of sustainability are connected and can't function one without the other. The economy impacts the state of society, which affects the way we take care of our planet. The point of the goals is to prove that the economy can't advance without impacting society, which strongly depends on the environment [2].

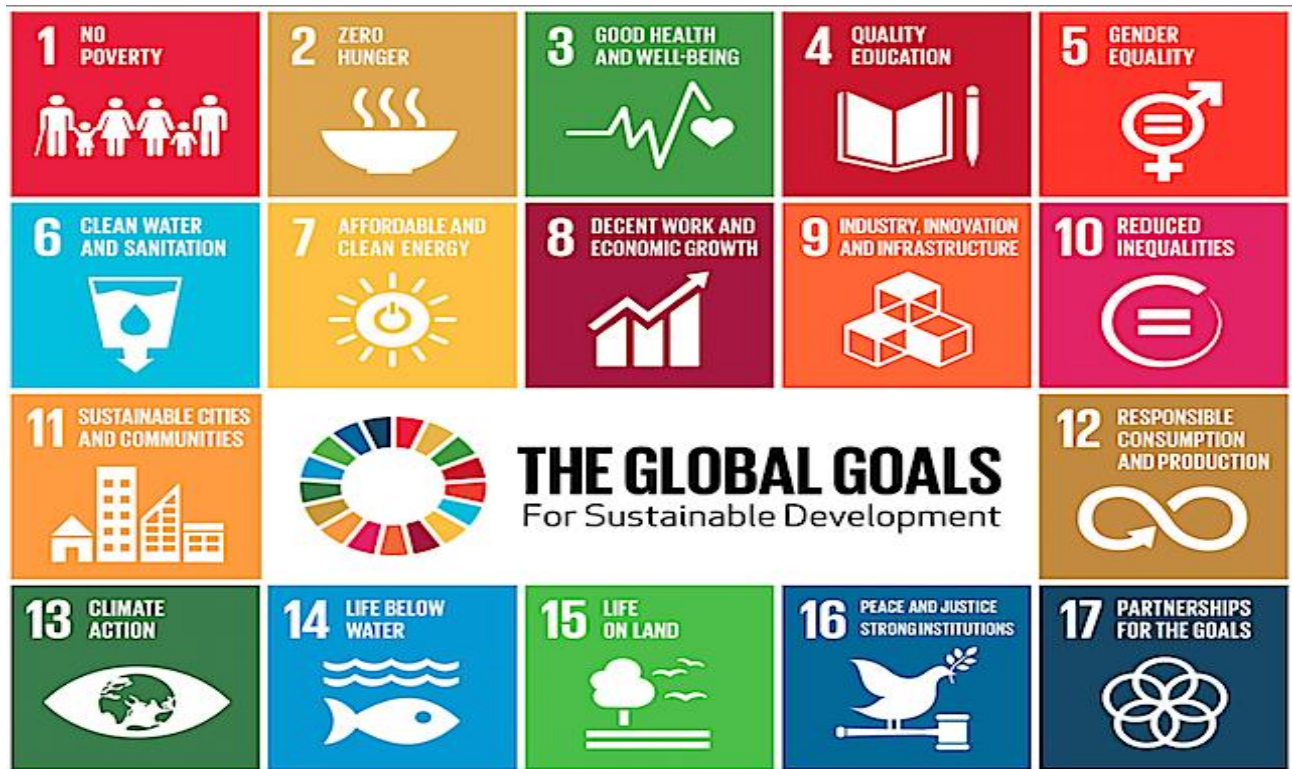


Figure 1: Sustainable Development Goals (SDGs)

## The Need for Technology

Technology has always been an essential element for these industries, but artificial intelligence (AI) has brought technology to the center of organizations. For instance, from self-driving vehicles to crucial life-saving medical gear, AI is being infused virtually into every apparatus and program. The global artificial intelligence market size was valued at USD 136.55 billion in 2022 and is projected to expand at a compound annual growth rate (CAGR) of 37.3% from 2023 to 2030.

The continuous research and innovation directed by tech giants are driving the adoption of advanced technologies in industry verticals, such as automotive, healthcare, retail, finance, and manufacturing. AI is proven to be a significant revolutionary element of the upcoming digital era. The essential fact accelerating the rate of innovation in AI is accessibility to historical datasets. Since data storage and recovery have become more economical, healthcare institutions and government agencies build unstructured data accessible to the research domain [4].



## **Role of Artificial Intelligence Innovation to Achieve The Sustainable Development Goals SDGs**

In areas such as healthcare, agriculture, schooling, and transport, AI innovation will enable humans to leverage vast quantities of data and make groundbreaking advances. AI and climate change has been an area that has been gaining a lot of traction in recent years. For example, AI can be used to manage environmental changes and impacts in many different economic fields and conditions. Renewable distributed electricity grids integrated with AI, safer supply chains, environmental control and regulation, and weather condition forecasting, are only some of the possible applications.

According to research by PwC UK and Microsoft, by 2030, the use of AI for environmental technologies could add up to USD \$5.2 trillion to the world economy. In addition, the use of AI technology solutions could decrease global greenhouse gas (GHG) emissions by 4% in 2030, an amount equal to 2.4 Gt CO<sub>2</sub> equivalent to Australia, Canada and Japan's total annual emissions in 2030. As part of this change, while improving competitiveness, AI could generate 38.2 million new jobs across the global economy, creating more openings for skilled professionals [2].

AI can also help enhance the efficiency of renewable energies. Companies are already using this technology to find out the daily availability of energy-generating facilities (wind turbines, hydraulic plants, biomass plants etc.), in order to predict the energy production required to be produced in the coming days and, ultimately, to prevent and diagnose breakdowns.

In agriculture, it is used to make irrigation and fertilization more efficient. With the use of humidity, temperature and fertilization sensors, Artificial Intelligence is able to predict crops' needs. The most innovative solutions within agricultural sustainability are drones that help farmers with surveillance, in addition to hyper spectral image analysis for comprehensive pest control [5].

### **Artificial Intelligence in Quality Education**



Education is at the heart of the 2030 Agenda for Sustainable Development: it is identified as a stand-alone goal (Sustainable Development Goal 4) and is also present as targets under other SDGs on health, growth and employment, sustainable consumption and production, and climate change. Sustainable Development Goal 4 ensures inclusive and equitable quality education and promotes lifelong learning opportunities for all [6]. Artificial Intelligence (AI) has the potential to address some of the biggest challenges in education today, innovates teaching and learning practices, and accelerates progress towards SDG 4.

### **Use of Artificial Intelligence For Life Below Water**

AI is helping to conserve oceans by fighting plastic pollution with machine learning. Machine learning tackles one of the biggest challenges of combating plastic pollution which is tracking and measuring how exactly it gets into bodies of water. Underwater autonomous robots can reach unforeseen depths that are unlocking the wonders of the deepest parts of our oceans. AI is helping to understand the complex interplay of climate impacts on our Earth system, and how climate change is impacting our oceans [7]. SDG 14 sets out a wide-ranging set of targets for better stewardship of ocean resources – including better management of fisheries, large and small; protection of key marine resources; and sustainable development for the Small Island Developing States (SIDS). Emerging technologies can help governments better manage their fisheries. Ocean-going drones can cruise the ocean for a year at a time, offering a cost-effective solution for assessing fish stocks and patrolling remote areas. Real-time reporting allows dynamic management of fishing to reduce by catch of protected species [8].

### **Artificial Intelligence and Environmental Outcomes**

There is a growing number of AI applications in the environmental sector, including those within the energy (eg. smart grids), agricultural, and monitoring sectors. This is made possible by the recent advances in IoT hardware and the accompanying AI algorithms in vision and sensor fusion. In a smart city context, for instance, the introduction and potential adoption of Electronic Vehicles (EVs) and smart appliances could improve the efficiency and reliability of electricity generations. In addition, AI could integrate renewable energy into smart grids by astutely managing its risk and



efficiently bridging the supply-demand gaps. It is estimated that the total electricity demand from Information and Communications Technology (ICT) alone could require up to 20% of global energy by 2030, from the current 1%. Green growth, therefore, is essential by building a more efficient and renewable-energy-based data center and by embedding human knowledge into existing models through priors. This is because the human brain consumes much less energy than the current AI models (and with greater efficiency, too), and innovating on this integration (eg. Physics-informed deep learning [2]) could be useful not just for the environment but also for the communities at large who are especially vulnerable to the excess AI-system-based pollution [3].



Figure 2: AI and Environment

### **Artificial Intelligent In Smart Cities And Communities**

In the digital era, the smart city can become an intelligent society by utilizing advances in emerging technologies. The convergence of Artificial Intelligence (AI) and block chain technology is revolutionizing the smart city network architecture to build sustainable ecosystems [9]. According to international organization reports, internationally more than fifty percent population is living in



urban areas, and by 2050, more than two-thirds of the population will be living in cities providing big investment opportunities for tech development companies. The role of AI in sustainable cities is going to play a big role in making urbanization smarter, aiming to accomplish sustainable growth by making the cities prepared with advanced features to live, shop, walk, and enjoy a safe and more convenient life in such environments. AI-enabled sensors and cameras can keep an eye on the surroundings for improving the security level in the city's neighborhoods. Such cameras are able to recognize people and their faces or can even track unusual activities done by them in restricted areas. A High-resolution AI security camera system helps in tracking the movement of all registered vehicles. It can also monitor the cleanliness of the public spaces and crowd density round-the-clock.

## Conclusion

The main conclusion of the work is that AI can positively contribute to the achievement of 134 targets across all the SDGs, whereas it can inhibit 59 targets. AI can help towards the achievement of all the SDGs, generally through a technological improvement that helps to overcome a certain existing barrier. For instance, AI can help to develop more accurate and robust methods to measure pollution levels in urban areas, thus allowing developing more comprehensive plans to improve their air quality. Also, satellite images can be analyzed through AI to track and identify areas of growing poverty, with the aim of developing coordinated actions to provide better help.

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