Topic Overview: The Role of Technological Advancements in Achieving the Sustainable Development Goals (SDGs)

In 2015, the United Nations created the 17 Sustainable Development Goals (SDGs) as a worldwide call to end poverty, protect the planet, and ensure prosperity for everyone by 2030. About a decade later, in 2025, the current picture is one of mixed results. While technology has allowed for remarkable progress in many areas, its benefits remain uneven, and its downsides significantly more noticeable. This overview will explore both the technological breakthroughs helping us achieve a prospering world, and the downsides of such innovations.

Technological Advancements Helping Achieve the SDGs:

- **Digital networks and cloud technology**

  Fast internet, cloud services, and digital platforms now support education, healthcare, banking, and climate action around the world. One example is the EDISON Alliance's *1 Billion Lives Challenge*, which has already helped over a billion people in about 130 countries by providing telehealth services, online learning, and access to financial tools.

- **Artificial intelligence (AI)**

  AI and new tools like generative AI are being used to make energy grids more efficient, help farmers grow more food with fewer resources, detect diseases earlier, and create personalized learning for students. The UN has praised AI's potential to make societies greener and more inclusive, but it also warns of risks like misinformation, bias, and privacy violations.

  Clean energy innovations

  Advances like hybrid solar-and-wind systems and floating wind turbines are producing cleaner power, even in places where traditional renewable systems were hard to install.

- **Smart farming and robotics**

  Farming is getting smarter through sensors, drones, and data-driven planning that save water and boost crop yields. Soft robots—made with flexible, eco-friendly materials—are also being developed to help with farming, healthcare, and disaster relief.

- **Inclusive AI governance**

  Reports from the UN and World Economic Forum stress that AI should be designed for everyone's benefit, not just the wealthy or powerful. Fair rules, global cooperation, and equal access are seen as key to ensuring that technology helps close, not widen, the development gap.

The Concerns and Costs Behind These Advancements:

- **The digital divide**

  About one in three people in the world still has no internet access, and many more have slow or unreliable connections. In poorer countries, women are often much less likely than men to own a phone or go online. This means large groups are left out of the benefits technology can bring.

- **Environmental costs**

  Running huge data centers and AI systems takes massive amounts of electricity and water. The internet alone produces nearly 4% of global greenhouse gas emissions—similar to the entire aviation industry. Tech giants like Google and Microsoft now use more electricity each year than some countries, and their operations create large amounts of e-waste.

- **Hidden resource use in AI**

  Training one advanced AI model can emit hundreds of tons of carbon dioxide. If AI keeps expanding at its current rate, its global electricity use could more than double in just a few years, and its water use for cooling could reach billions of cubic meters.

- **E-waste and raw materials**

  Technology products have short lifespans. The world produced 62 million tonnes of e-waste in 2022, and AI-related devices could add millions more tonnes by 2030. Many devices contain valuable metals, but recycling is still far from adequate.

- **Data control and “data colonialism”**

  Much of the world’s environmental and social data is collected and stored by a handful of big companies. This gives them huge influence over what information is available, raising questions about fairness, privacy, and national control over data.

- **Dependence and Addiction:**

  Of course, with the development of technology, and how it can help make people’s lives easier, people continue to spend more and more time behind screens and have grown quite a significant dependence on these technological breakthroughs. This can lead to various negative effects such as isolation, less face-to-face interaction, and worse social skills. This can also lead to job displacement as machine automation and artificial intelligence take over tasks that were previously done by humans.

Overall, technology has significantly helped in achieving the SDG's when it comes to clean energy, enhancing access to the required tools, education, and even agriculture. However, there are many concerns when it comes to such developments, such as e-waste, energy consumption, digital divide, and the concentration of data power (creating a sort of "Monopoly").

Topic 1 relevant parties

1. United States: The United States leads in artificial intelligence, biotechnology, renewable energy, and space research. It funds numerous global projects, supports large research networks, and has considerable influence over how emerging technologies are introduced and regulated worldwide.

2. China: China is a central player in renewable energy manufacturing and AI development. Through initiatives such as the Belt and Road, it builds infrastructure in developing regions and exports affordable technology, from solar panels to telecom equipment, helping nations modernise faster.

3. India: With a rapidly expanding technology industry, India focuses on IT services and nationwide systems like Aadhaar and UPI. These have been adopted in several developing countries due to their cost-effectiveness and reliability.

4. Japan: Known for advancements in robotics, disaster response systems, and renewable energy, Japan works closely with other nations to improve infrastructure and build resilience to natural disasters.

5. South Korea: Strong in electronics, 5G networks, and smart manufacturing, South Korea invests heavily in research and forms technology partnerships abroad. Its expertise is often shared through manufacturing hubs and joint ventures.

6. Germany: Germany leads the EU in renewable energy, sustainable industry, and smart city projects. It funds technology transfer programmes and runs specialised training that supports countries working towards the Sustainable Development Goals.

7. United Kingdom: The UK's strengths include AI ethics, medical technology, and research from its universities. It also contributes to international frameworks designed to keep innovation safe and widely accessible.

8. France: France invests in climate technology, health innovation, and digital access, with a particular focus on francophone Africa. It blends technical solutions with long-term development planning.

9. Netherlands: Recognised for water management, farming technology, and open-data systems, the Netherlands shares expertise that is valuable for countries facing environmental risks.

10. Singapore: Singapore has become a global model for e-governance and cybersecurity. Its "Smart Nation" strategy is frequently adapted by smaller states upgrading public services.

11. United Arab Emirates: The UAE channels major investments into AI research, space exploration, and sustainable smart cities designed to serve as examples internationally.

12. Brazil: Brazil works in agricultural innovation, biofuels, and climate monitoring. These projects balance environmental needs with economic development.

13. Rwanda: Rwanda uses drones for medical supply delivery and operates advanced e-governance systems, making it a leader in African digital reform.

14. Kenya: Mobile banking platforms such as M-Pesa, developed in Kenya, have expanded financial access across rural areas and boosted local businesses.

15. South Africa: South Africa has established strong science and tech facilities alongside advanced public health systems that benefit the wider region.

16. Nigeria: Nigeria's fast-growing fintech and edtech sectors are spreading across Africa, supported by one of the continent's largest tech markets.

17. Indonesia: By applying technology in health, education, and environmental management on a national scale, Indonesia offers models other island nations can adapt.

18. Estonia: Estonia's nationwide digital ID and online public service system is often replicated by countries modernising their governance.

19. United Nations Agencies (UNDP, WHO, ITU, UNESCO): These agencies provide funding, technical advice, and policy guidance to ensure technological advancements are shared fairly and support the Sustainable Development Goals.

Topic 1 Keywords

1. Artificial Intelligence (AI): Computer systems designed to perform tasks that normally require human intelligence, such as decision-making or language processing.

2. Renewable Energy: Energy from naturally replenishing sources like solar, wind, and hydropower.

3. Digital Divide: The gap between those who have access to modern technology and the internet, and those who do not.

4. E-governance: The use of digital tools and internet-based systems to deliver government services and information to citizens.

5. Aadhaar: India's national digital ID system, giving each registered resident a unique 12-digit number linked to biometric and demographic data.

6. UPI (Unified Payments Interface): India's real-time mobile payment system enabling instant transfers between bank accounts via phone numbers or QR codes.

7. Economic Growth: The increase in goods and services produced in a country, often tied to innovation and productivity improvements.

8. Belt and Road Initiative (BRI): China's global infrastructure and investment project, building roads, railways, ports, and digital networks in partner countries.

Sources use for topic 1

https://time.com/7024240/digital-technology-sustainable-development/

https://www.weforum.org/publications/edison-alliance-1-billion-lives-challenge/

https://time.com/7209794/edison-alliance-digital-technology/

https://www.itpro.com/technology/artificial-intelligence/mistrals-new-sustainability-tracker-tool-shows-the-impact-ai-has-on-the-environment-and-it-makes-for-sober-reading

https://www.reuters.com/sustainability/climate-energy/tech-giants-indirect-emissions-rose-150-three-years-ai-expands-un-agency-says-2025-06-05/

https://nationalcentreforai.jiscinvolve.org/wp/2025/05/02/artificial-intelligence-and-the-environment-putting-the-numbers-into-perspective/

https://www.gao.gov/products/gao-25-107172

https://www.libraryjournal.com/story/the-environmental-cost-of-ai-climate-crisis

https://www.techradar.com/pro/how-can-we-create-a-sustainable-ai-future

https://www.snopes.com/news/2025/01/16/ai-environment-carbon-footprint/

https://unitar.org/about/news-stories/press/global-e-waste-monitor-2024-electronic-waste-rising-five-times-faster-documented-e-waste-recycling

https://unitar.org/about/news-stories/press/global-e-waste-monitor-2024-electronic-waste-rising-five-times-faster-documented-e-waste-recycling

Citation

Vestberg, Hans. “How Digital Technology Can Help the U.N. Achieve Its 2030 Agenda.” Time, 25 Sept. 2024, time.com/7024240/digital-technology-sustainable-development/. Accessed 21 Aug. 2025.

“Edison Alliance: 1 Billion Lives Challenge.” World Economic Forum, www.weforum.org/publications/edison-alliance-1-billion-lives-challenge/. Accessed 21 Aug. 2025.

Vestberg, Hans, and Robert F. Smith. “How We Connected One Billion Lives through Digital Technology.” Time, 24 Jan. 2025, time.com/7209794/edison-alliance-digital-technology/. Accessed 21 Aug. 2025.

Bathgate, Rory. “Mistral’s New Sustainability Tracker Tool Shows the Impact AI Has on the Environment – and It Makes for Sober Reading.” IT Pro, 11 Aug. 2025, www.itpro.com/technology/artificial-intelligence/mistrals-new-sustainability-tracker-tool-shows-the-impact-ai-has-on-the-environment-and-it-makes-for-sober-reading. Accessed 21 Aug. 2025.

Tech Giants’ Indirect Emissions Rose 150% in Three Years as AI Expands, Un Agency Says | Reuters, www.reuters.com/sustainability/climate-energy/tech-giants-indirect-emissions-rose-150-three-years-ai-expands-un-agency-says-2025-06-05/. Accessed 21 Aug. 2025.

Barker, Catherine. “Artificial Intelligence and the Environment: Putting the Numbers into Perspective.” Artificial Intelligence, 2 May 2025, nationalcentreforai.jiscinvolve.org/wp/2025/05/02/artificial-intelligence-and-the-environment-putting-the-numbers-into-perspective/. Accessed 21 Aug. 2025.

Office, U.S. Government Accountability. “Artificial Intelligence: Generative AI’s Environmental and Human Effects.” Artificial Intelligence: Generative AI’s Environmental and Human Effects | U.S. GAO, www.gao.gov/products/gao-25-107172. Accessed 21 Aug. 2025.

Enis, Matt. “The Environmental Cost of AI: Climate Crisis.” Library Journal, www.libraryjournal.com/story/the-environmental-cost-of-ai-climate-crisis. Accessed 21 Aug. 2025.

Lebourg, Gregory. “How Can We Create a Sustainable AI Future?” TechRadar, 8 July 2025, www.techradar.com/pro/how-can-we-create-a-sustainable-ai-future. Accessed 21 Aug. 2025.

Deng, Rae. “Ai’s Impact on the Environment, Explained.” Snopes, Snopes.Com, 26 June 2025, www.snopes.com/news/2025/01/16/ai-environment-carbon-footprint/. Accessed 21 Aug. 2025.