



# Human and Technology in the 21st Century

<sup>1</sup>John Ibanga Isaac\*

Corresponding Author: \*[isaacjohn@mau.edu.ng](mailto:isaacjohn@mau.edu.ng)

<sup>1</sup> Modibbo Adama University, Yola, Adamawa State, Nigeria.

## Abstract

The 21st century witnesses an unprecedented surge in technological breakthroughs, profoundly reshaping human engagement with the world. Technology, from smartphones to artificial intelligence, permeates daily life, altering interactions and perceptions. This paper examines the multifaceted relationship between humanity and technology, exploring its implications, opportunities, and challenges. Technology enhances efficiency, communication, and access to information, catalyzing productivity and global connectivity. Key technological trends, including AI, IoT, blockchain, and renewable energy, reshape industries and societal dynamics. While technology offers benefits, it also poses challenges such as job displacement, privacy breaches, and health issues. To navigate the future, a balanced approach is essential, with initiatives promoting digital literacy and equitable access. Government regulations must safeguard privacy rights and foster ethical technology development. By embracing a human-centered approach, we can harness technology's promise while mitigating risks, steering toward an inclusive, equitable, and sustainable future.

**Keywords:** Artificial Intelligence; Augmented Reality; Blockchain; Internet of Things; Renewable Energy; Virtual Reality

## Introduction

The unprecedented technological breakthroughs in the 21st century have changed how people engage with the outside world. With the widespread use of smartphones and the development of artificial intelligence, technology has permeated every aspect of daily life. Technology is constantly improving and doing more impressive and perplexing things. Technology has changed the way we as humans live; it changes our understanding of the way things work and changes the way we interact with one another. Technology was once opposed but is now somewhat welcomed into our homes [1]. The development of 21st-century technology has had a huge impact in the areas of healthcare, education, agriculture, the banking sector, business, and the service industry required for human beings to live a comfortable life with full dignity and divinity. The power of technology enables us to connect with the world sharing ideas, innovations, and resources to make lives easier and comfortable for humans [2]. Technology doesn't change only human behaviors but also changes our daily routines. These phenomena show the dependency on technology which is evolving day by day.

Technology is the ever-evolving application of scientific knowledge for practical purposes, aimed at solving problems, improving efficiency, and enhancing human lives. It encompasses a wide range of tools, systems, methods, and processes that enable us to accomplish tasks more effectively and efficiently than we could through manual means alone [3]. Many young and elderly people now carry gadgets around. People are seen walking around with cell phones and carrying around laptop cases, others just listening to music but then the companies that build these types of technology will always

want to make them better and more efficient. So these companies keep releasing new devices that are smaller, faster, and more efficient irrespective of the cost. Technology now is a concept that we cannot survive without; an average person needs technology to move from one place to another, communicate, entertain, cook, be well, and do many other daily functions.

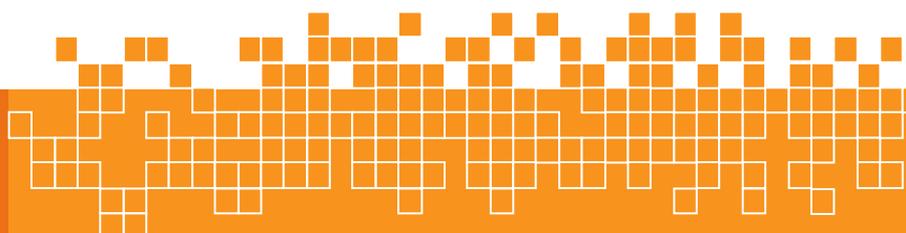
### Technologies in the 21st Century

One of the most remarkable aspects of technology is its ability to constantly innovate and evolve. From the invention of the wheel to the development of artificial intelligence, technology has transformed every aspect of human existence, from communication and transportation to healthcare and entertainment. Numerous significant technology trends have surfaced in the 21st century, influencing our way of life, employment, and interactions with the outside world [4]-[7]. Among them are:

1. **Artificial Intelligence (AI):** AI has advanced to the point where machines can now carry out activities like speech recognition, picture processing, and decision-making that previously required human intelligence.
2. **Internet of Things (IoT):** The Internet of Things (IoT) is the network of physical objects that are connected and have sensors, software, and various additional technologies integrated into them that enable data collection and exchange. Industries including manufacturing, agriculture, and healthcare have all been transformed by this technology.
3. **Blockchain:** Without the need for middlemen, blockchain technology offers a transparent and safe means to record transactions involving numerous parties. Applications for it can be found in voting systems, supply chain management, and finance.
4. **Augmented Reality (AR) and Virtual Reality (VR):** These technologies produce virtual worlds that can be fully explored in VR or they can overlay virtual features over the actual world (AR) to create immersive digital experiences. They can be used in marketing, training, education, and gaming.
5. **Renewable Energy:** Developing technology to capture renewable energy sources like solar, wind, and hydroelectric power has received a lot of attention as concerns about climate change and environmental sustainability grow.
6. **Biotechnology:** Developments in biotechnology have opened up new avenues for illness treatment and improving human health, including gene editing, personalized medicine, and synthetic biology.
7. **Cybersecurity:** We must safeguard digital systems from online attacks as our reliance on them grows. Cybersecurity solutions are always evolving to protect sensitive data and vital infrastructure from intrusions.

### Advantages and Disadvantages of Technology to Human Life

Although there are many potential advantages to technology, there are drawbacks as well as moral dilemmas. The following table presents the advantages and disadvantages of Technology [6],[8]. These are just some of the many advantages and disadvantages associated with technology, and they can vary depending on factors such as individual circumstances, societal norms, and technological advancements.



**Table 1.** Advantages and Disadvantages

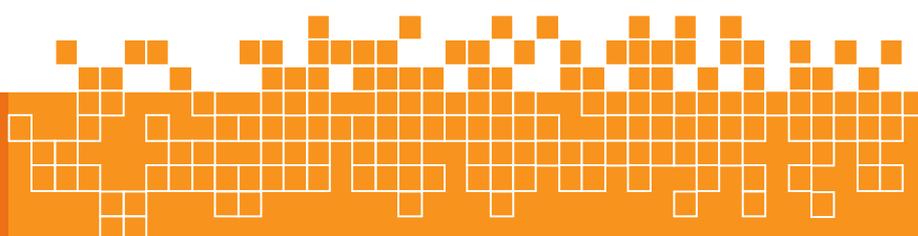
S/N	Advantages of Technology	Disadvantages of Technology
1.	Enhanced Efficiency: Time and effort can be saved by using technology to automate activities	Job Displacement: AI and automation may result in the loss of jobs in several industries
2.	Better Communication: Instantaneous communication over great distances is made possible by technology	Dependency: Reliance on technology too much might result in a decline in critical thinking and self-reliance
3.	Information Access: Learning and research are made easier by the internet's abundance of information	Privacy Concerns: Personal information may be misused or accessed without authorization thanks to technology
4.	Increased Productivity: Software and tools make it possible for people and organizations to work more productively	Health Problems: Extended usage of electronic devices, such as PCs and cell phones, can result in both mental and physical health issues
5.	Medical Advancements: Technological advancements have improved diagnosis and treatment in the field of medicine	The Digital Divide: Inequalities in access to technology have the potential to exacerbate social inequality by expanding the wealth and poverty gaps
6.	Creativity and Innovation: Technology fosters creativity and makes it possible to create new goods and services	Security Risks: Cyberthreats including malware, viruses, and hackers can affect technology
7.	Convenience: Online shopping, banking, and entertainment are just a few of the elements that make technology convenient	Addiction: Compulsive technology use can result in social isolation and addiction
8.	Medical Advancements: Technological advancements have improved diagnosis and treatment in the field of medicine	Addiction: Excessive use of technology can lead to addiction and social isolation.

### Navigating the Future

In navigating the complexities of the 21st-century technological landscape, a multifaceted approach is essential to harness the benefits of technology while mitigating its risks. Initiatives focusing on upskilling the workforce and enhancing digital literacy are crucial for individuals to adapt to the evolving job market and make informed decisions about technology use [9]. Moreover, governmental regulations play a pivotal role in safeguarding privacy rights and ensuring equitable access to technology resources [10]. Integrating ethical considerations into the design and deployment of technological solutions is paramount to ensure they serve the common good and uphold human values [10].

Fostering a culture of responsible technology use, characterized by mindfulness, empathy, and digital wellness, is key to mitigating the adverse effects of technology on mental health and social relationships. Research has highlighted the importance of considering ethics and risk management in the integration of mobile apps into psychiatric treatments, emphasizing the need for ethical standards in digital mental health applications [11]. Additionally, the use of privacy-enhancing technologies, such as Privacy Enhancing Technologies (PETs), can offer solutions to protect individuals' data privacy [12].

As technology continues to advance, challenges in security and privacy, particularly in technologies like blockchain, necessitate a deeper understanding of the associated risks and the need for standardized protocols [13]. Furthermore, the integration of big data and predictive analytics in healthcare requires a collaborative effort among policymakers, regulators, clinicians, patients, and industry stakeholders to establish regulatory frameworks that balance innovation with privacy and security concerns. A balanced approach to technology adoption must encompass upskilling initiatives, regulatory frameworks, ethical considerations in design, and a culture of responsible technology use. By addressing these aspects comprehensively, society can leverage the benefits of technology while safeguarding individual rights and promoting ethical practices.



## Conclusion

The 21st century brings with it both promise and danger in the interaction between humans and technology. Technology has the power to transform entire industries, enhance people's quality of life, and solve urgent global issues, but if it is allowed to spread unchecked, it can worsen already-existing disparities and endanger people's autonomy and well-being. Through the adoption of a human-centered approach to technology development and application, we may effectively leverage its revolutionary potential to establish a future that is more egalitarian, inclusive, and sustainable for all.

## References

- [1] Floridi, L. (2014). *The fourth revolution: How the infosphere is reshaping human reality*. Oxford University Press.
- [2] Brynjolfsson, E., & McAfee, A. (2014). *The second Machine Age: Work, progress, and prosperity in a time of brilliant technologies*. W. W. Norton & Company.
- [3] Zuboff, S. (2019). *The age of surveillance capitalism: The fight for a human future at the new frontier of power*. PublicAffairs.
- [4] Turkle, S. (2017). *Alone together: Why we expect more from technology and less from each other*. Basic Books.
- [5] Sheng, J., Amankwah-Amoah, J., & Wang, X. (2019). Technology in the 21st century: New challenges and opportunities. *Technological Forecasting and Social Change*, 143, 321-335.
- [6] Popkova, E. G., & Gulzat, K. (2020). Technological revolution in the 21st-century: digital society vs. artificial intelligence. In *The 21st century from the positions of modern science: Intellectual, digital and innovative aspects* (pp. 339-345). Springer International Publishing.
- [7] Lewis, K. (2020). Technology in the workplace: Redefining skills for the 21st century. *The Midwest Quarterly*, 61(3), 348-356.
- [8] Moshinski, V., Pozniakovska, N., Mikluha, O., & Voitko, M. (2021). Modern education technologies: 21st century trends and challenges. In *SHS Web of Conferences* (Vol. 104, p. 03009). EDP Sciences.
- [9] Chan, S., Godwin, H., Gonzalez, A., Yellowlees, P. M., & Hilty, D. M. (2017). Review of use and integration of mobile apps into psychiatric treatments. *Current Psychiatry Reports*, 19(12), 1-9. <https://doi.org/10.1007/s11920-017-0848-9>
- [10] Hassan, S., Dhali, M., Zaman, F., & Tanveer, M. (2021). Big data and predictive analytics in healthcare in Bangladesh: regulatory challenges. *Heliyon*, 7(6), e07179. <https://doi.org/10.1016/j.heliyon.2021.e07179>
- [11] Ben-Zeev, D., Drake, R., & Marsch, L. (2015). Clinical technology specialists. *BMJ*, 350(Feb), 945. <https://doi.org/10.1136/bmj.h945>
- [12] Prinsloo, P., Slade, S., & Khalil, M. (2022). The answer is (not only) technological: considering student data privacy in learning analytics. *British Journal of Educational Technology*, 53(4), 876-893. <https://doi.org/10.1111/bjet.13216>
- [13] Tariq, T. (2022). Challenges in Security and Privacy posed by Blockchain Technology. *Journal of Independent Studies and Research Computing*, 20(2), 1-9. <https://doi.org/10.31645/jisrc.22.20.2.1>

## Authors



**Dr. Isaac John Ibanga** is an erudite scholar, dedicated researcher, and esteemed lecturer within the Sandwich Degree Programme of the Faculty of Education at the Modibbo Adama University of Technology, located in Yola, Adamawa State, Nigeria. With a specialized focus on electrical technology education, Dr. Ibanga has made significant contributions to the field through both his teaching and research efforts. He holds advanced degrees in electrical technology and education, which have equipped him with a unique blend of practical skills and theoretical knowledge. His academic journey and professional experiences have been marked by a commitment to advancing educational methodologies and improving technological applications in education. (email: [isaacjohn@mau.edu.ng](mailto:isaacjohn@mau.edu.ng)).