

TECHNOLOGY AND GEOPOLITICS: A CHALLENGE IN THE DIGITAL AGE

Kunkunrat Kunkunrat
Pasundan University

ARTICLE INFO

Keywords:
Technology, Geopolitics, Digital Era,
Cyber Security.

ABSTRACT

Along with rapid advances in technology, shifts in geopolitical paradigms have occurred, giving rise to new challenges that need to be understood and overcome. ICT has shaped and influenced the dynamics of foreign policy, national security and international relations between countries. This research aims to investigate the impact of the integration of information and communication technology (ICT) on geopolitics in the digital era. The research methodology is descriptive qualitative which includes literature analysis, case studies, and interviews with geopolitical experts and related stakeholders. The results of this research highlight the complexity of the impact of technology in global geopolitics. The findings show that technological advances not only provide opportunities for economic progress and digital diplomacy, but also pose serious challenges, such as the threat of cyber attacks and the risk of proliferation of weapons of mass destruction. This research emphasizes the need for rapid response and international cooperation in developing effective regulatory frameworks to manage risks and ensure ethical use of technology. In conclusion, a deep understanding of the geopolitical impact of technology is key to designing relevant and proactive policies in maintaining global security and stability in this digital era.

E-mail:
kunkurat@unpas.ac.id

Copyright © 2022 Economic Journal. All rights reserved.
is Licensed under a Creative Commons Attribution-NonCommercial 4.0
International License (CC BY-NC 4.0)

1. INTRODUCTION

Technological advances have been a major catalyst in changing the landscape of manufacturing and industrial sectors across the world. In the manufacturing sector, automation, artificial intelligence, and the Internet of Things (IoT) enable unprecedented production efficiency (Arianto, 2018). Production processes become more precise, faster and adaptive, enabling companies to respond more quickly to market changes. Apart from that, technology also opens the door to innovation in product design, supply chain management, and marketing (Quaralia, 2022). Companies that can make good use of this technology can increase their competitiveness and create a significant market advantage (Rizki, 2022).

However, the impact of technology is not limited to the economic sector alone. In the realm of geopolitics and world security, technology also plays a key role (Djelantik, 2015). Cybersecurity is becoming a major concern, with cyber attacks and threats becoming increasingly complex and widespread throughout the world. Countries compete to dominate in the realm of information and communication technology, which can provide strategic advantages in military and economic aspects (Rahman, 2020). While technology opens the door to international cooperation in dealing with global challenges such as climate change and pandemics, it also raises tensions between countries in terms of control over digital resources and data (Yadav, 2022).

Technology has become a major player in redefining the way countries compete in the geopolitical arena. In the past, military and economic strength were the main elements in determining a country's influence in the world. However, with advances in information and communication technology, countries now have new ways to strengthen their position (Hendrianto, 2021). Success in mastering and integrating advanced technologies, such as artificial intelligence, big data analytics, and cybersecurity, can provide significant strategic advantages. Countries that are able to create innovation ecosystems and support technological development can achieve greater power in the realm of global economics and security (Satris, 2015).

Apart from that, technology is also changing the dynamics of diplomacy between countries. Digital diplomacy and the use of social media as a means of communication and influence are increasingly

Technology and Geopolitics: A Challenge in the Digital Age. Kunkunrat Kunkunrat

important. Countries can now utilize digital platforms to spread ideology, build positive perceptions, or even change global public opinion (Rachmat, 2014). This creates a new stage where countries compete for international support and influence global policy. Thus, technological advances not only create new ways to compete, but also shift the focus of geopolitical competition from conventional aspects towards dominance in an increasingly integrated digital world (Novianti et al, 2019).

The United States has long dominated the military technology scene, providing significant advantages in global conflicts with the development of systems such as drones, missile defense systems, and cyber security. However, China and Russia are now catching up with massive investments in research and development of new technologies, especially in the fields of artificial intelligence and quantum computing (Alsahrin 2018). They seek to create military technological independence with the development of automated weapons systems, artificial intelligence capabilities, hypersonic weapons and innovative air defense systems. As competition intensifies, geopolitical and global power dynamics are expected to undergo significant changes, challenging the United States' dominance in the military realm in the future (Roza, 2013).

Technology has become the main driver in changing the paradigm of cooperation between countries in the contemporary era. In the past, cooperation between countries was often realized through formal treaties and agreements, especially in economic and security contexts. However, with advances in information and communication technology, countries are now increasingly inclined to collaborate through informal networks and partnerships (Baskoro, 2017). The existence of digital platforms, virtual conferences and social media makes it easier to interact between countries without being constrained by geographical or time constraints. Countries can quickly communicate and collaborate, despite having different political systems or interests, creating new forums for information exchange and multilateral diplomacy (Wangke, 2021).

Within this framework, technology also plays an important role in forming cross-border alliances and partnerships. Countries can more flexibly form informal relationships based on shared interests or specific global challenges, without having to be bound by formal agreements which tend to be more complicated and slower (Patria et al, 2018). Apart from that, technology also allows countries to respond quickly to changes in global situations, such as health crises or climate change, by coordinating through digital platforms (Fonna, 2019). Thus, technology not only changes the way countries work together, but also opens up new space for diplomacy that is more dynamic and responsive to global challenges.

The aim of this research is to investigate the impact of current information and communications technologies on geopolitical dynamics, with a focus on changes in the way countries interact, cooperate and compete in the digital era. The benefits of this research include contributing to a deeper understanding of the complexity of the relationship between technology and geopolitics in the digital era. It is hoped that the research results will provide new insights regarding the challenges and opportunities faced by countries in facing this technological transformation. Another benefit is that it provides a foundation for the development of policies that are responsive to changing geopolitical dynamics and provides guidance for stakeholders, policy analysts and practitioners in the field of international security.

2. METHOD

This research is a type of qualitative research which aims to solve problems based on social reality using data, in accordance with the concept put forward by Moleong (2014). Moleong defines qualitative research as an effort to understand certain phenomena, such as behavior, perception, motivation for action, holistically, and by means of description using words and language, in a natural context and by utilizing various scientific methods. The focus of this research is to provide an in-depth understanding of Technology and Geopolitics as a Challenge in the Digital Era. The research methodology is descriptive, with the aim of describing situations or events, the nature of certain populations or areas by looking for factual information, providing justification for the situation, and carrying out evaluations to obtain a clear picture (Anggito & Setiawan, 2018). All data collected is analyzed and organized to draw conclusions which are then expressed in written form.

3. RESULTS AND DISCUSSION

Technology's biggest impact on geopolitics in 2021 will not come from the technology itself, but from the systems that surround it. The way we view the world, the way we create economic value, and the way we drive innovation – and the way we wield power is concentrated among a few “big tech” companies

in what is referred to as the attention economy or surveillance capitalism. Therefore, the battleground for gaining geopolitical influence will center on who owns the technology and which countries they influence (Iswadhana & Arisanto, 2022). And what is no less important is who regulates these sectors and how the supply chains will be integrated. The following are some of the roles of technological developments in global geopolitics.

First, the role of technology in cyber security has significant implications in global geopolitics. With countries' increasing dependence on information technology infrastructure, successfully protecting themselves from cyber threats has become a crucial aspect in maintaining national security. Technology enables geopolitical actors to launch cyberattacks that can include hacking computer systems, theft of sensitive data, and even disruption of critical infrastructure operations. Conversely, the ability to build strong cyber defenses is also a determining factor in mitigating security risks. Countries that are able to develop high levels of cybersecurity technology may gain strategic advantages, while those that cannot may be vulnerable to threats that could harm overall geopolitical stability. Therefore, cyber security is not only a technological challenge, but also an important element in calculating national security and geopolitical relations in this digital era.

Second, the role of technology in shaping global information order is very prominent in geopolitical dynamics. Social media and information technology have created a new paradigm in the dissemination and exchange of information throughout the world. Countries can now use digital platforms to influence international public opinion, shape narratives that support national interests, and even direct the world's outlook on certain issues. Digital diplomacy is becoming increasingly important, with countries competing for support and building a positive image. While technology provides wider access for the public to information, it also increases the risk of spreading disinformation. Thus, the role of technology in shaping global information order is not only an instrument of diplomacy, but also creates new challenges in understanding information reality and shaping public opinion at the international level.

Third, the role of technology in digital diplomacy is becoming increasingly important in the dynamics of international relations. Countries are now increasingly dependent on digital platforms and social media to communicate, interact and conduct their diplomacy. Digital diplomacy involves the use of information and communications technology to build and maintain bilateral and multilateral relationships. In addition, countries also utilize social media as a tool to promote foreign policy, build a positive image, and support international initiatives. This creates a diplomatic landscape that is more dynamic and responsive to changes in global geopolitics. However, while technology facilitates faster and more open interactions, it also raises challenges related to security, privacy and information management. Thus, the role of technology in digital diplomacy is not only as an efficient means of communication, but also creates new complexities and considerations in carrying out international relations.

Fourth, the role of military technology is a critical factor in understanding global security dynamics. Advances in technology, such as artificial intelligence, robotics, and cyber power, have changed the way countries view and participate in armed conflict. Countries that are able to master and implement advanced military technology have a significant strategic advantage. For example, artificial intelligence can be used to increase precision in military operations, robotics can be used for dangerous tasks without sacrificing human personnel, and cyber forces can be an effective weapon in dealing with cyber threats. On the other hand, competition for control of this technology creates security inequalities and the potential for escalation in global conflict. Thus, the role of military technology not only influences a country's defense strategy, but also becomes a central point in determining the country's position and influence on the international security stage.

Fifth, the role of technology in the global economy is a key element that shapes the dynamics of international relations. With the rapid advancement of information and communications technology, especially through electronic commerce and digital finance, countries can utilize technology to expand their economic influence at the global level. Dominance in the technology sector also gives countries a significant competitive advantage. For example, technology companies that dominate global markets can become key agents in determining the direction and policy of the world economy. Technology also facilitates innovation and the development of new economic sectors, creating economic growth opportunities that can have a major impact on a country's economic stability and strength. Therefore, the role of technology in the economy is not only a tool for achieving economic excellence, but also a major factor that shapes a country's position and influence in the global economic arena.

Sixth, technological changes have a significant impact on global environmental issues. On the one hand, technology plays an important role in addressing environmental challenges, especially through the development of renewable energy sources and climate change mitigation efforts. Innovations in renewable energy technologies, such as solar panels and wind turbines, provide potential solutions to reduce dependence on environmentally detrimental fossil fuels. On the other hand, this progress can also be a potential source of conflict or cooperation between countries. Countries may compete for control over innovative environmental technologies, while international cooperation in the development and implementation of technological solutions may provide a foundation for global environmental prosperity. Therefore, the role of technology in environmental issues is not only as a solution, but also as a factor that shapes the dynamics of international relations related to environmental resources and sustainability.

Seventh, the role of technology in producing inequality of access creates complex dynamics in global geopolitics. Countries that have access to and mastery of high technology can take a dominant role in the international arena, while countries with limited access or lagging behind in technology may face challenges competing effectively. These access gaps create power inequalities that can influence the dynamics of international relations, resulting in shifts in the balance of power and affecting diplomatic negotiations and global perceptions of a country. In addition, unequal access to technology also creates digital divisions between developed and developing countries, which can deepen economic and social disparities at the global level. Therefore, the role of technology in creating inequality of access is not only a challenge for lagging countries, but also a central issue in managing inequalities of power and resources in an increasingly connected world.

Apart from its constructive role, technology also provides new challenges and threats in the global geopolitical arena. A country's success in utilizing technology for strategic advantage can create power disparities that give rise to the potential for conflict. One of the challenges that can be said to be the most pressing is cyber warfare. Top of Form. Cyberattacks have emerged as a serious threat to countries around the world, posing potential risks to critical infrastructure, national security and global stability. First of all, cyber attacks can be planned with the aim of disrupting and damaging a country's critical infrastructure. Electrical systems, telecommunications networks, and transportation systems, which are all connected through information technology, are vulnerable to cyber attacks that can cause serious disruptions in the functioning of society. This potential damage requires serious efforts to protect critical infrastructure from cyber threats, highlighting the complexity of maintaining a country's resilience to attacks that could compromise its security and operational continuity.

In addition, cyber attacks can also be focused on stealing sensitive information, both military and economic, which can provide strategic advantages for the party carrying out the attack. Data theft involving government secrets, company information, or personal data can undermine the trust and integrity of a country. The long-term implications of such an attack could involve a decline in public confidence, economic loss, and potentially even fuel diplomatic tensions between countries. Furthermore, cyber attacks are not only limited to the digital realm, but also have the potential to launch physical attacks. For example, a successful cyberattack could provide access to manipulate control systems on critical infrastructure, such as nuclear facilities or weapons systems, opening the potential for a physical attack that could cause major damage and loss of life. This shows that cyberattacks not only threaten digital security, but can also produce serious physical impacts. Facing the complexity and seriousness of the threat of cyber attacks, countries need to increase their collaborative efforts in developing cyber security policies, exchanging information, and implementing effective preventive measures. Additionally, the need for a strong global regulatory framework and international cooperation can help address these increasingly serious challenges in the future.

The emerging challenges of technology, especially in the context of the proliferation of weapons of mass destruction, signal concerning developments in global security. New technologies, such as 3D printing, make it easier for countries to develop and produce weapons of mass destruction at lower costs and with more covert efforts. The ability to create these weapons in a more efficient and undetectable manner could give states with malicious intent more options in designing and deploying serious threats to international stability. The threat of proliferation of weapons of mass destruction not only creates uncertainty in global security, but also complicates efforts to control and prevent the spread of these weapons. The lack of effective control over these new technologies may result in an increased risk of attacks by non-state groups or individual actors who may have detrimental motives. Therefore, the need

for immediate response and collaborative action from the international community has become increasingly urgent.

In an era dominated by technological progress, crucial questions about the future of international security emerge as serious challenges. As technology advances rapidly, a key challenge for policymakers is uncertainty about how technology will be used in the geopolitical arena. Rapid changes in technology, such as artificial intelligence, quantum computing, and advanced military technology, create an environment that is difficult to predict. Not only are states competing to gain strategic advantage in technology, but there are also emerging threats from non-state groups and individuals who could exploit technology to the detriment of international security.

These challenges force policymakers to develop strategies that are responsive and adaptive to evolving threats. Greater effort is needed in designing security policies that are able to address these uncertainties. In addition, international cooperation is becoming increasingly important to deal with the global impact of the use of technology in a security context. There needs to be a collaborative effort to develop global norms and regulations that can regulate the ethical use of technology and avoid misuse that could harm international stability. Thus, while technology brings various benefits, these challenges highlight the need for a proactive approach and global cooperation to maintain international security in the digital era.

4. CONCLUSION

The role of technology in global geopolitics has significant and complex impacts. Technological advances bring changes in the dynamics of international security, diplomacy, economics and inequality of access. Cyberattacks, the proliferation of weapons of mass destruction, and uncertainty regarding the future use of technology pose serious challenges to global stability. Although technology provides opportunities for economic progress and ease of communication, it also brings new risks that require rapid and collaborative responses from the international community. In the face of this reality, it is important to develop an effective global regulatory framework, strengthen international cooperation, and ensure strong cybersecurity. Concerted efforts are needed to address the challenges of weapons proliferation and manage uncertainty regarding future technologies. In addition, an emphasis on ethics in the development and use of technology is key to ensuring that technological progress provides positive benefits for global prosperity. In conclusion, in an era where technology is the main driver of change, the balance between innovation and security must be carefully maintained. Only through global cooperation and wise leadership in policy design can the international community overcome challenges and exploit the positive potential offered by technological progress.

REFERENCES

1. Al Syahrin, M. N. (2018). China versus Amerika Serikat: Interpretasi rivalitas keamanan negara adidaya di kawasan Asia Pasifik. *Jurnal Global dan Strategis*, 12(1), 145-160.
2. Arianto, A. R. (2018). Cyber Security: Geometri Politik Dan Dimensi Pembangunan Keamanan Dunia Era Horizontal Abad 21. *Jurnal PIR: Power in International Relations*, 1(2), 108-118.
3. Baskoro, R. M. (2017). Konseptualisasi dalam Gastro Diplomasi: Sebuah Diskusi Kontemporer dalam Hubungan Internasional. *Insignia: Journal of International Relations*, 4(02), 35-48.
4. Djelantik, S. (Ed.). (2015). *Asia-Pasifik: Konflik, Kerja Sama, dan Relasi dan Antarkawasan*. Yayasan Pustaka Obor Indonesia.
5. Fonna, N. (2019). *Pengembangan revolusi industri 4.0 dalam berbagai bidang*. Guepedia.
6. Hendrianto, E. L. (2021). Strategi Keamanan Siber Israel dalam Menghadapi Ancaman Siber untuk Menjaga Stabilitas Keamanan Nasional. *Jurnal Ilmu Hubungan Internasional LINO*, 1(2), 137-146.
7. Iswardhana, M. R., & Arisanto, P. T. (2022). Implementasi Smart Power Dan Linkage Issues Indonesia Dalam Perlindungan Kedaulatan Maritim Di Kepulauan Natuna. *Madani Jurnal Politik dan Sosial Kemasyarakatan*, 14(02), 210-245.
8. Moleong, L. J. (2014). Metode penelitian kualitatif edisi revisi. *Bandung: PT Remaja Rosdakarya*.
9. Novianti, E., Luthfiyyah, A., & Wulung, S. R. P. (2019). Multikulturalisme pada Teknologi Internet dan Kekuasaan Global. *PETANDA: Jurnal Ilmu Komunikasi dan Humaniora*, 2(1), 1-8.
10. Patria, Y. Y., Mustakim, S., & Ahiruddin, A. A. (2018). Kemitraan Antara Public-Swasta: Perspektif Tujuan, Publik Dan Tata Kelola Pemerintahan. *JISIP: Jurnal Ilmu Sosial dan Politik*, 1(1), 65-83.

11. Quaralia, P. S. (2022). Kerja Sama Regional dalam Rantai Pasokan Pertanian untuk Mencapai Ketahanan Pangan Berkelanjutan: Studi Kasus ASEAN. *Padjadjaran Journal of International Relations*, 4(1), 56-73.
12. Rachmat, A. N. (2014). Tantangan dan Peluang Perkembangan Teknologi Pertahanan Global Bagi Pembangunan Kekuatan Pertahanan Indonesia. *Transformasi Global*, 1(2).
13. Rahman, L. L. A. (2020). Implikasi Diplomasi Pertahanan terhadap Keamanan Siber dalam Konteks Politik Keamanan. *Jurnal Diplomasi Pertahanan*, 6(2), 1-93.
14. Rizki, M. (2022). Perkembangan Sistem Pertahanan/Keamanan Siber Indonesia dalam Menghadapi Tantangan Perkembangan Teknologi dan Informasi. *Politeia: Jurnal Ilmu Politik*, 14(1), 54-62.
15. Roza, R. (2013). Dual-Use Technology Jepang dan Kepentingan Keamanan Nasional Amerika Serikat. *Jurnal Hubungan Internasional*, 1(2), 107-122.
16. Satris, R. (2015). Peningkatan Anggaran Persenjataan Militer China sebagai Bagian dari Security Dilemma di Kawasan Asia Pasifik. *The POLITICS: Jurnal Magister Ilmu Politik Universitas Hasanuddin*, 1(1), 95-104.
17. Wangke, H. (2021). *Diplomasi digital dan kebijakan luar negeri Indonesia*. Yayasan Pustaka Obor Indonesia.
18. Yadav, A. S. (2022). *Indo-Pasifik: sebuah konstruksi geopolitik*. Elex Media Komputindo.