

# THE DIGITAL VULNERABILITY PARADOX: HOW TECHNOLOGY SHAPES GEOPOLITICS



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This brief is based on an essay for "Magtudredningen 2.0" and examines the "digital vulnerability paradox" and presents three hypotheses on the geopolitical impact of digitalization. Digital technologies are reshaping international politics, as deepening dependence on technologies both empowers people and nations and exposes societies across the world to unprecedented threats.

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## OVERVIEW

The rapid advancement of digital technologies and infrastructures, deployed for both civilian and military purposes, is reshaping the landscape of international politics. Digital technologies now play a central role in the political, economic, and military competition between nations, influencing the relationships between states, markets, and civil societies. In this CPH Tech Policy Brief, we examine how these developments give rise to a digital vulnerability paradox, where digital technologies simultaneously strengthen and undermine democracies. We then explore the implications of this paradox by introducing three key hypotheses on the geopolitical significance of digitalization:

- ➔ **Hypothesis 1:** Digital technologies are a double-edged sword for rights-based democracies across the world.
- ➔ **Hypothesis 2:** Digital technology is crucial for the future security and military battlefield.
- ➔ **Hypothesis 3:** Big technology companies take over roles and tasks of the state.

## THE DIGITAL VULNERABILITY PARADOX

Digital technological advancement, one of society's most promising developments, also poses some of the greatest security risks. Cyber threats have become critical dangers to

national security, businesses, and individual citizens alike (Jacobsen & Liebetrau 2022). While digital technologies are often viewed as drivers of economic growth and security worldwide, they also create significant vulnerabilities (Adler-Nissen & Eggeling 2024; Bradford 2023; Farrell & Newman 2019; Liebetrau 2023). This is evident in global disputes over Chinese Huawei's role in 5G-network infrastructure, the competition over microchip production, and the race to develop generative AI for both civilian and military use.

Digital technological development is a double-edged sword. On one side, it offers political, economic, and social opportunities; on the other, it introduces uncertainty, vulnerability, and risk. Governments, businesses, and citizens are all entangled in this digital vulnerability paradox, where reliance on technology both empowers and exposes society to unprecedented threats.

## DIGITAL TECHNOLOGIES AS A DOUBLE-EDGED SWORD FOR THE RIGHTS-BASED DEMOCRACIES

The competition over emerging digital technologies presents a double-edged sword for rights-based democracies. It increasingly disrupts key global agendas such as economic integration, climate change mitigation, health cooperation, and cultural exchange—pillars of a collaborative international order. Digital technologies once held a different promise. Just a decade ago, they were associated with economic growth, globalization, and the strengthening of rights-based

democracies. Today, however, digitalization has become a critical strategic factor that not only intensifies political, military, and economic competition but also redefines domestic relations between states, businesses, and citizens. More significantly, it challenges the very foundations of globalization, interdependence, and human rights.

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## DIFFERENCES IN ACCESS AND USE - THE URBAN-RURAL DIVIDE

Our current understanding of smartphone usage across socio-demographic groups is quite limited, also because data sources describing how people use their smartphones are hardly available to researchers. While existing research has largely focused on how individual socio-demographic attributes impact smartphone usage, environmental and geographical effects have remained unclear. Compared to individuals living

in urban areas, do individuals living in isolated and rural areas with limited accessibility to services and the possibility to physically connect use smartphones in different ways? Based on small-scale studies, it is suggested that people living in less urbanized areas use technology and social media less than people living in urban areas, but these hypotheses have not been tested at scale.

## DIGITAL TECHNOLOGIES ARE CRUCIAL FOR FUTURE MILITARY BATTLEFIELDS

Digital technologies are pivotal to future military battlefields. Competition over military tech has long been a cornerstone of geopolitical rivalry, and advancements like drones, artificial intelligence, and satellites, as seen in the war in Ukraine, are reshaping how wars are fought. The global race to develop, deploy, and manage military technology now focuses not just on current conflicts but on long-term security challenges (Breitenbauch & Liebetau 2021).

This creates a double vulnerability. First, militaries rely on a small number of big technology companies to supply critical digital tech, posing risks in terms of dependency, scalability, integration, and maintenance, given the rapid pace of innovation. Second, dependence on the same digital systems designed to revolutionize military power introduces new risks, as these infrastructures can become weak points. This raises urgent questions about how nations digitize their defense while managing these inherent vulnerabilities.

FIGURE 1 Drone comparison in the Ukraine war



## BIG TECH COMPANIES TAKE OVER ROLES AND TASKS OF THE STATE

Private firms are now central to the geopolitical tech race, driving research and innovation in both civilian and military spheres across the world. States increasingly rely on private sector cooperation, leading to new forms of public-private collaboration as they grapple with their loss of control. As a result, the changing relationship between state and market is key to understanding the paradox of digital vulnerability.

Ian Bremmer, president of Eurasia Group, argues we are living in a technopolar age where tech giants not only compete with each other but also with states for geopolitical power (Bremmer 2021). Their control over society's digital infrastructure gives them outsized influence over economy, security, and social cohesion. Russia's invasion of Ukraine underscored this, revealing Ukraine's reliance on companies like Microsoft, Google, Amazon, and Starlink for survival. These companies have now emerged as security and defense actors in their own right. Yet, classic political questions of control, accountability, and transparency remain unresolved as tech giants take the lead.

## IMPLICATIONS

The race to develop and harness digital technologies will shape international, national, and local politics for decades to come. Digitalization is becoming a critical lens for understanding developments in global politics, ranging from rights-based democracy and sovereignty over great power competition to the role of private tech companies. The implications of digitalization extends far beyond the US and

Europe, with regions like Asia, Africa, and Latin America also contending for digital influence. In countries such as China, India, and Brazil, digital technologies are reshaping both domestic governance and international strategy, while African nations strive to close the digital divide with the risk of becoming key battlegrounds in the global tech race.

The digital vulnerability paradox is thus likely to intensify. This underscores the need to integrate discussions about the international political significance of digital technologies with broader societal debates on digitalization and the influence of tech giants. Given the uncertainty and intricacy surrounding the future of digital technology, it is difficult to predict all the opportunities and challenges it will bring. However, how we perceive these technologies today directly influences how we shape future policies dealing with digitization. Policy-makers, experts, and the media must be cautious, as their predictions can shape expectations and reinforce certain policy directions.

One major challenge is that the debate about technologies is seen as either overly speculative or too technically complex. This complexity is exacerbated by the shift of power from states to global tech companies, which creates a significant knowledge gap. Tech giants not only have far larger research and development budgets (see figure 2), but they also enjoy protection through trade secrets, confidentiality, and legal resources. Governments and civil society struggle to access reliable information and retain talent to compete with private firms, leaving elected representatives and the public disadvantaged. This dependence on corporate knowledge and innovation limits democratic oversight and control over the direction and impact of digital technologies, making it harder to set independent agendas or regulate their rollout effectively.

**FIGURE 2** Public sector R&D budget allocations in 2022 (top EU countries) vs Big Tech

| RANK | REGULATION  | €m        |
|------|-------------|-----------|
| 1    | Amazon      | 69,625.56 |
| 2    | Germany     | 43,085.30 |
| 3    | Alphabet    | 37,564.50 |
| 4    | Meta        | 33,606.44 |
| 5    | Apple       | 24,964.70 |
| 6    | Microsoft   | 23,310.91 |
| 7    | France      | 17,899.71 |
| 8    | Italy       | 12,654.46 |
| 9    | Spain       | 7,956.80  |
| 10   | Netherlands | 7,751.55  |

Source: Eurostat; <https://www.macrotrends.net>. Note: Country data refers to government budget allocations for R&D (GBARD).

## POLICY RECOMMENDATIONS

### **Ensure access to cutting-edge interdisciplinary knowledge:**

To harness the full societal potential of digital technologies and empower democracies, it is critical to improve access to the latest interdisciplinary expertise. Currently, this access is limited, creating a knowledge gap that hinders effective decision-making and policy development. Governments and civil society must invest in independent research institutions that can provide impartial guidance and advice on the development, implementation, and regulation of digital technologies, including emerging fields like generative AI. These institutions should focus on upskilling public sector agencies, civil society organizations and advising private companies, ensuring that investments in digital innovation are informed by ethical, technical, and societal considerations. Without a well-informed public sector capable of understanding and managing digital transformation, societies risk increasing their digital vulnerabilities and losing control over how these technologies shape public life and international politics and security.

**Strengthen cooperation among democratic states:** Global challenges posed by digital technologies require a collective response. Rights-based democracies worldwide must collaborate more closely to address the digital vulnerability paradox and safeguard democratic values in the digital age. This includes creating shared frameworks for the governance of digital technologies, setting global standards on data privacy, cybersecurity, and AI ethics, and forming strategic alliances that counter the influence of authoritarian regimes in the digital space. Enhanced cooperation between democratic nations can facilitate the exchange of best practices, promote innovation in secure digital infrastructures, and strengthen collective resilience against cyber threats. Such alliances should extend beyond traditional Western powers, incorporating democracies from Africa, Latin America, Asia, and other regions to ensure a truly global effort in shaping a secure, equitable, and rights-based digital future.



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