

Geopolitical Shifts: How Technology Reshapes the Global Order and Investment Landscape

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INTRODUCTION

After World War II, the United States emerged as a dominant global economic force, promoting technological innovation, open markets, and economic stability. This period reinforced expectations among investors that geopolitical events would generally have limited long-term effects on market performance. However, the role of the United States in global affairs is undergoing a transformation. It is encountering challenges to its technological dominance, particularly from China, which is reshaping geopolitical dynamics. Trade wars, economic sanctions, and export restrictions have intensified competition in critical technological areas such as artificial intelligence and semiconductors. As a result, financial institutions must now regard technology in combination with geopolitical changes as a structural factor influencing long-term market stability, rather than merely temporary disruptions.

Geopolitics and technology are intricately linked, influencing each other through a dynamic and cyclical relationship. Major

technological breakthroughs, such as steam power, electricity, and semiconductor technologies, have historically triggered economic transformations, societal shifts, and political realignments, redefining global power structures in the process.

This article explores the interplay between technology and geopolitics, highlighting the cyclical nature of these shifts. It also introduces a structured framework, combining short-term quantitative insights and long-term qualitative judgement, to help financial institutions navigate the growing complexity and uncertainty of today's technological development, in combination with a changing geopolitical landscape.

UNDERSTANDING THE RELATIONSHIP BETWEEN TECHNOLOGY AND GEOPOLITICS

Geopolitics examines how geographic, economic, political, cultural, and technological factors shape global power. Geopolitical risk involves potential disruptions from shifts in strategic power, national interests, territorial control, and

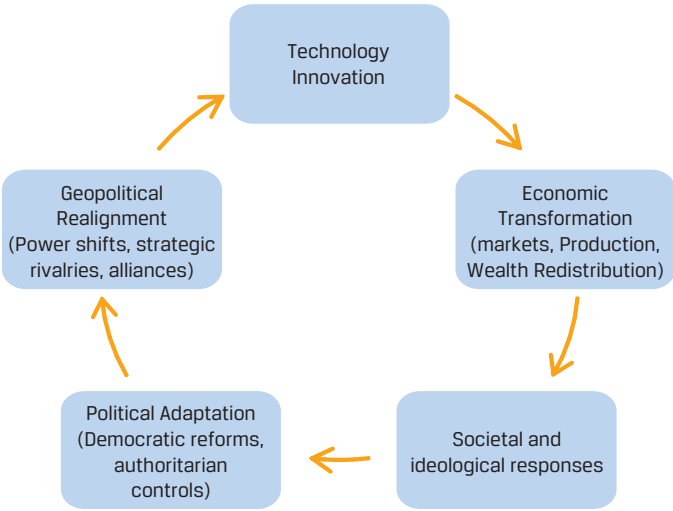
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diplomacy. Early theorists emphasised territorial dominance (Heartland and Rimland), but modern geopolitics has expanded to include information control, digital networks, and global connectivity.

It is important to take a historical perspective on the relationship between technology and geopolitics since it reveals a consistent pattern across technological revolutions. Namely, technology drives economic change, prompting societal responses and political adaptations, which then reshape geopolitical structures as illustrated in Figure 1. The relationship also shows the multidisciplinary nature of geopolitics. Understanding this cyclical relationship allows financial institutions to better anticipate geopolitical risks, comprehend current strategic rivalries, and make informed decisions in a complex global landscape.

Figure 1



TECHNOLOGY AS A KEY DRIVER IN GEOPOLITICS

To comprehend the cyclical relationship, we have analysed it in the context of technological revolutions, highlighting its effect on the development of geopolitics. After all, technological innovation fundamentally creates wealth, transforming economies by enabling new industries and enhancing productivity

During the **First Industrial Revolution (1760–1840)**, geopolitics centred predominantly around territorial expansion and resource control. The transformative technology of this era, steam power and mechanised production, reshaped economies, beginning with Britain, shifting economic power from agrarian-based societies to industrialised nations. This economic shift led to rapid urbanisation, creating entirely new social classes, such as the industrial working class and entrepreneurial capitalist elite and prompted strong societal responses, notably labour movements, public debates on inequality, and pressure for democratic reform. Technological innovation thus reinforced imperial expansion, seen in British French colonial rivalries in Africa and Asia.

In the **Second Industrial Revolution (1870–1914)**, the geopolitical significance of technological capability became more explicit. Breakthroughs in steel, electricity, and petroleum powered large-scale corporate and military-industrial expansion. The resulting economic and resource competition intensified societal nationalism and militarism, which in turn shaped political decision-making and foreign policy. Prompting political systems to increase military spending, form strategic alliances, and embrace expansionist policies. Geopolitics thus transitioned from territorial dominance towards strategic competition driven explicitly by industrial capability, technological innovation, and critical resource control, ultimately contributing to World War I.

The **Third Industrial (Digital) Revolution (1960–2000)**, centred on computing technology, telecommunications, and global digital networks, geopolitical competition evolved significantly. The advent of the internet transformed the world economic landscape, disrupting almost every industry in every country. The economic landscape shifted towards knowledge-driven globalised markets, creating unprecedented levels of global integration and interdependency. The United States and the Soviet Union competed in technology, but also in shaping societal models of governance, identity, and information control. This shift moved focus from territorial concerns to information dominance, digital network control, and global interconnectedness.

Post-World War II, **American global dominance** was evident as the United States promoted democracy, capitalism, and innovation. It positioned itself as the leader of the free world, especially during the Cold War. Tech giants like IBM, Microsoft, Apple, and Intel showcased liberal capitalism’s edge over Soviet communism. As digital technologies reshaped the global economy, America’s leadership solidified its influence on global norms, standards, and culture.

In the **Fourth Industrial Revolution (2000–present)**, we are witnessing the rapid advancements in digital technologies such as artificial intelligence and big data enabled by semiconductor technology. Also, significant progress is being made in other scientific areas such as biotechnology. What distinguishes this era is the scale and speed at which societal and cultural responses emerge. Social media can mobilise protests and disinformation may influence elections. Public backlash against automation and inequality is transforming political discourse. These societal shifts prompt significant political responses, where governments employ strategic regulatory frameworks, protectionist measures, and substantial investments in domestic technological capabilities.

The **U.S. global dominance** remains but is contested. Its position is now challenged by rivals, particularly China, whose authoritarian capitalist model has rapidly closed technological gaps in strategically vital sectors. All of these changes are creating a shift in the global order.

POLITICAL AND ECONOMIC SYSTEMS SHAPING TECHNOLOGICAL DIRECTION

For financial practitioners, understanding how political and economic systems shape technological direction is essential for effective risk assessments. These systems determine the pace of innovation but also how technology is governed, financed, and weaponised in global competition. As shown below they influence where regulatory fragmentation is likely to occur, how market access may be restricted, and which sectors are exposed to state intervention or protectionism.

Liberal democracies, such as the United States, prioritise private-sector innovation, entrepreneurial dynamism, and decentralised regulation. Historically, this model has driven rapid technological progress, reinforcing global influence through digital platforms, internet openness, and military innovation. However, it faces internal tensions due to rising concerns about data privacy vulnerabilities, wealth inequality, platform dominance, and the concentration of strategic technologies within few powerful companies.

Authoritarian capitalist regimes, notably China, rely on state-directed innovation and top-down planning. Massive state investments, subsidies, and tight collaboration with domestic tech giants drive rapid development in strategic sectors like artificial intelligence, semiconductors, electric vehicles, and renewable energy. While this accelerates technological advancement and geopolitical influence, it prioritises control over openness, employing technology for domestic surveillance and strategic international influence, resulting in global friction over data security, intellectual property rights, and market access.

Social democracies, exemplified by the Nordic countries and the European Union, seek a balance between innovation and public oversight. They emphasise ethical regulation, digital rights, sustainability, and technology use for societal benefit. The EU demonstrates leadership through regulatory frameworks like GDPR and initiatives around digital sovereignty, leveraging regulatory standards as geopolitical instruments. Although this approach intends to foster stability and trust by ensuring transparent data protection standards and clear compliance expectations, it may lag behind more aggressive industrial policies in global competitiveness.

Integrating these political-economic dynamics into decision making helps institutions anticipate geopolitical shifts, structural shifts in economic growth and the ESG impact of their investments.

Moreover, recognising the rising power of technology corporations, who shape global standards and public discourse, adds an important dimension to understanding market dynamics and potential regulatory backlash. For example, the Big US Tech firms, like Apple, Google and Microsoft are key drivers of technology standardisation and as such have a powerful voice in setting these standards.

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Case Study 1: Digital Regulation and the EU's Geopolitical Influence

Rapid digitalisation has accelerated global economic integration, but it has also introduced systemic risks, such as cybersecurity threats, data misuse, digital monopolies, and regulatory fragmentation. In response, the European Union has adopted a proactive, rules-based approach to digital governance. Its flagship regulations, the General Data Protection Regulation (GDPR) and the Digital Markets Act (DMA), prioritise privacy, consumer protection, fair competition, and digital sovereignty. These policies shape the behaviour of global tech giants operating in Europe but also export EU regulatory standards worldwide, allowing the bloc to project geopolitical influence through normative power.

By contrast, China's regulatory approach is driven by state control, strategic planning, and domestic surveillance objectives. While this enables rapid technological scaling, it introduces deep policy unpredictability for investors. A stark example is the Chinese government's crackdown on the fintech sector in 2020, the halted IPO of Ant Group and the forced transition of for-profit tutoring firms into non-profit entities that led to hundreds of billions in lost market value. Chinese tech giants like Alibaba and Tencent also saw significant drawdowns, despite solid fundamentals, underscoring the risk of politically driven devaluation.

In the United States, a market-led approach grounded in private-sector dynamism and fragmented oversight has created a fertile environment for innovation, but also new forms of risk. Regulatory uncertainty around antitrust enforcement, data privacy, and platform accountability is growing. For instance, both Alphabet (Google) and Meta (Facebook) have come under antitrust scrutiny for its practices in both the U.S. and EU. These regulatory headwinds have had direct consequences for stock valuations and long-term investor confidence, when enforcement patterns shift without warning.

For investors, digital regulation is no longer just a compliance issue, it is a form of geopolitical risk. As a result, institutions must carefully assess the political logic behind each jurisdiction's regulatory regime, as these shape the operating environment of digital firms and have an impact on investment valuations. Understanding and anticipating divergent trajectories in digital governance is critical to navigating both regulatory disruption and opportunities arising from policy arbitrage.

MANAGING A SHIFTING TECHNOLOGICAL LANDSCAPE AMID GEOPOLITICAL RISKS

The financial landscape is becoming complex, particularly on the intersection of rapid technological advancements and the unpredictable nature of geopolitical risk. Traditional investment models and risk assessment frameworks, which are often based on historical data series, correlations and stable conditions, are no longer sufficient in navigating the evolving environment. Financial institutions and investors therefore should consider embracing a multidimensional approach to portfolio construction, integrating both quantitative and qualitative methods specifically focused on emerging risks. Technological changes, when coupled with geopolitical uncertainty, can manifest in both short-term volatility and long-term structural shifts. Short-term risks are driven by the volatility resulting from political realignment triggered by technological shifts, while long-term risks revolve around the broader economic and societal transformations that these technologies bring. Each horizon demands a tailored response: short-term effects necessitate measures to mitigate downside risk, while long-term effects require vigilance to avoid investing in potentially stranded assets, similar to climate change-related risks.

SHORT-TERM RISK MANAGEMENT: PROTECTING AGAINST DOWNSIDE

Though long-term investment strategies are a focus for many institutions, emerging technologies may provoke significant societal shifts. This can lead to a backlash, from the public, as these technologies are seen as threatening to existing job markets and economic stability. In such times, financial institutions must be diligent in managing short-term downside risks, which could result in considerable financial losses or even broader economic dislocations.

Monitoring Short-Term Risks: Tools and Models

A variety of tools are available to assess geopolitical and technological risks in the short term. Several models rely on analysing geopolitical unrest, often utilising technology to process large volumes of data from news sources and political analysis. These models assist investors in gauging public sentiment and understanding potential shifts in political and economic stability. However, it is essential to recognise that these models are not designed to forecast political events' specific progressions, but rather to provide a snapshot of current conditions.

Forecasting geopolitical events presents significant challenges. Historical patterns may offer some insights, but predicting the course of future events with precision remains uncertain. Given this uncertainty, two widely adopted approaches for short-term risk management are stress testing and scenario analysis.

Stress Testing typically involves methods such as Monte Carlo simulations or the analysis of outliers. These tools allow financial institutions to explore potential outcomes under extreme or divergent conditions. While these techniques are valuable for

gauging risk exposure, they do not attempt to predict the future but rather simulate potential scenarios based on existing data.

Scenario Analysis is a commonly adopted approach for short-term geopolitical risk management. Investment firms produce a diverse range of short-term predictive scenario sets, which are accessible online. The advantage of these short-term scenarios lies in their quantifiability, making them well-suited to the processes of most financial institutions.

Although geopolitical events are challenging to predict, short-term scenario thinking may provide valuable insights to decision-makers. It helps identify unintended concentrations within portfolios. Equally important, it instils confidence in addressing extreme scenarios arising from geopolitical risks. The goal of these discussions is to mitigate boardroom dynamics that may lead to panic-driven responses.

Additionally, it is important to note that regulatory bodies, such as the Dutch Central Bank (DNB), expect financial institutions to proactively assess the impact of geopolitical risks, including operational consequences such as shifting sanctions and escalating cyber threats. To achieve this, it is recommended to enhance above mentioned quantitative analyses with qualitative assessments. Assets like government bonds or currencies may behave differently during geopolitical tensions, making it essential for financial institutions to diversify their holdings or businesses. A focused strategy minimising sector and regional concentrations can help manage these risks. For Example, geopolitical risks may prompt a reassessment of inflation-linked products, as evidenced by the price volatility caused by sanctions on Russia during the 2022 invasion of Ukraine.

LONG-TERM RISK MANAGEMENT: NAVIGATING MEGATRENDS

Long-term financial predictions are generally based on historical data series, correlations and financial instrument behaviour. However, the combination of technological advancements and climate change is set to act as a transformative force, potentially breaking from the historical patterns on which many investment strategies are built. These changes could arrive swiftly, leaving little time to adjust portfolios, potentially leading to the accumulation of stranded assets. Financial institutions must remain aware that long-term concentration risks in certain sectors or regions can amplify the effects of technological disruption.

Incorporating Megatrends Analysis

While many financial institutions continue to rely on historical data series for decision-making due to its quantifiable nature, supplementing this analysis with megatrends (broad, long-term shifts in society, technology, and the environment) can offer a clearer view of future opportunities and risks. Megatrends analysis helps identify areas of potential exposure within portfolios as they evolve, providing a more comprehensive view.

Given that regulators are requiring financial institutions to consider long term climate change effects, enhancing this with

broader technological change is only a small step. For example, climate change and technological advancements are strongly intertwined, and integrating both into long-term portfolio strategies is essential for robust risk management.

Storytelling and Scenario Planning

A variety of methods exist for long-term scenario construction, with exploratory scenarios being the most effective for navigating uncertainty and strategic planning. This approach aligns with Shell’s well-established methodology, which encourages the development of multiple scenarios to avoid the pitfalls of relying on a single prediction. By exploring diverse, plausible futures, Shell engages stakeholders in strategic discussions, fostering a deeper understanding of potential disruptions and how external forces may reshape industries. These scenarios are not intended to predict the future but to offer a framework for creating flexible strategies that can withstand various possible outcomes.

A key element of Shell’s approach is storytelling, which helps decision-makers grasp the potential changes and risks in the future. This enhances alignment among stakeholders and strengthens strategic coherence within the organisation.

Shell's approach to scenario construction

- 1. Identify Key Drivers:** Gather insights into the most significant forces affecting the future, including technological, political, economic, and social factors. It is important in this phase to include diverging opinions from specialists with different backgrounds and opposing research to avoid blind spots.
- 2. Develop Critical Uncertainties:** Identify the uncertainties that could have the greatest impact on the future. The idea is to acknowledge that the future is uncertain, therefore these factors will be difficult to predict but highly influential.
- 3. Create Plausible Scenarios:** Develop multiple scenarios (not too many) based on different combinations of key drivers and uncertainties. These scenarios should be extreme, diverse yet plausible. The intention is not to reach a consensus or to create predictions.
- 4. Explore Implications:** Analyse the potential impact of each scenario on the organization. This helps in understanding how different futures could shape the business environment.
- 5. Formulate Strategic Options:** Identify robust strategies that will work across a range of scenarios, enabling flexibility and improve resilience as portfolio construction and strategic thinking is approached with a broader view.
- 6. Monitor and Adapt:** Regularly review and adjust strategies as the actual future unfolds.

For financial institutions, while this qualitative method does not aim to predict exact outcomes, it provides a way to develop more robust, resilient strategies. By identifying actions that remain effective across multiple scenarios, organisations can prepare for future risks without being overly dependent on predicting a specific outcome. This approach builds flexibility and adaptability in the face of long-term uncertainty.

Implications for Financial Institutions

As financial institutions engage in long-term resilience planning, they must consider how shifting technological trends, and geopolitical risks will impact their investment strategies. Does this imply that financial institutions should take active decisions based on scenario planning? This is a complex issue, as evidenced by the recent debates surrounding Dutch pension funds’ investment strategies and their approach to climate change. While institutions may opt to invest in emerging markets or new technologies, particularly those focused on sustainability, the key discussion is the recognition that continuing to invest in the status quo is, in itself, also a decision. One thing is certain: the world will change. The pace and nature of these changes remain uncertain, making it essential for decision-makers to continuously monitor and engage in regular discussions regarding these evolving dynamics.

CONCLUSION

The intricate relationship between technological progress and geopolitical dynamics underscores the importance of proactively integrating these factors into strategic risk management and investment frameworks. Throughout history, technological revolutions have consistently catalysed economic, societal, and political shifts, profoundly reshaping global power balances. In our current era, the rapid advancement of artificial intelligence, biotechnology, and semiconductors highlights a geopolitical landscape marked by intense competition for technological ecosystems, digital sovereignty, and strategic supply-chain dominance.

Predicting geopolitical events, much like any human behaviour, remains challenging due to their complex and unpredictable nature. However, this is not a reason for financial practitioners to ignore this risk. Short-term scenario thinking can be a valuable tool for providing insights. It equips decision-makers to anticipate for material geopolitical events and mitigates the risk of unnecessary losses, such as those arising from unintended portfolio concentrations. This requires decision-makers to abandon their reliance on historical financial instrument behaviour, correlations and return data.

World history has shown that in the long run technological changes will create shifts in the world order. For example, the decline of American exceptionalism can have a significant impact on global trade and capital flows and as such on existing business portfolios. To prepare for such changes, it is recommended to integrate megatrend analysis and scenario planning in decision-making processes to build resilient, future-proof strategies. Taking a step back and reassessing decisions and

discussing future states of the world from different perspectives, such as the Shell scenario methodology, can be beneficial. This approach can help in minimising the risk of long-term investments in technological assets that may become obsolete. It is recommended to further embed these analysis and planning processes in core organisational decision-making processes.

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