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THE IMPACT OF POLITICAL CONFLICTS ON IT SERVICES: DISRUPTION, RESILIENCE AND THE RESHAPING OF THE GLOBAL DIGITAL ECONOMY

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Abstract

Political conflicts have emerged as first-order determinants of the global IT services landscape. It spans trade wars, geopolitical rivalries, armed conflicts and sanctions regimes. This article examines the multi-dimensional impact of such conflicts on the production, trade and consumption of IT services. Drawing on empirical evidence from the Russia-Ukraine war, the escalating US-China technology decoupling and longstanding sanctions regimes, it is argued that political instability does not uniformly suppress IT service exports. Rather, it restructures supply chains, accelerates talent migration, fragments digital markets and in some cases creates competitive opportunities for neutral third-party nations. Ukraine recorded a peak of $7.3 billion in IT service exports in 2022 despite full-scale war. Russia lost an estimated 80,000 to 100,000 IT professionals between 2022 and 2024. Moreover, Uzbekistan's IT Park residents more than doubled exports from $140 million in 2022 to $344 million in 2023, with a further 40% surge to $620 million by 2024. The article concludes with policy recommendations for developing economies seeking to leverage their IT export potential in an increasingly fractured geopolitical order.

Key words

Digital Infrastructure, IT Services, Cyberattack, Human Capital, Political conflicts, semiconductor

Introduction

The globalization of IT services over the past three decades has been one of the most consequential economic phenomena of the modern era. Countries such as

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India, Ukraine, the Philippines, Poland and more recently, Vietnam, Romania and Uzbekistan have built thriving export industries by offering software development, business process outsourcing (BPO) and digital infrastructure services to clients in North America and Western Europe. This integration appeared, for a time, to be relatively insulated from geopolitical turbulence. Unlike physical goods, digital services can cross borders without ships, trucks or customs officials. A software engineer in Kyiv or Tashkent can serve a client in San Francisco or Frankfurt with only a broadband connection and a shared project management platform.

Yet the events of the 2010s and 2020s have shattered this assumption. The escalation of the US-China trade war into a full technology war demonstrated that IT services are deeply embedded in geopolitical competition. It started with export restrictions on advanced semiconductors, bans on Huawei network equipment and forced divestitures of Chinese-owned digital platforms. Russia's full-scale invasion of Ukraine in February 2022 disrupted one of Eastern Europe's largest IT outsourcing hubs virtually overnight, forcing hundreds of thousands of IT professionals to relocate and severing financial connections between Russian IT firms and Western clients. The subsequent exodus of Russian technology talent to Armenia, Georgia, Kazakhstan and Uzbekistan reshaped Central Asia's digital economy in ways that are still unfolding.

At the same time, the COVID-19 pandemic accelerated the global adoption of remote work and digital service delivery, expanding the addressable market for IT exports from developing countries while also lowering barriers to entry. The result is a landscape of heightened opportunity and heightened risk: countries with the right combination of talent, infrastructure, regulatory quality and geopolitical positioning stand to benefit enormously, while those caught on the wrong side of conflict or sanctions risk losing years of accumulated export capacity overnight.

This article provides a systematic analysis of how political conflicts affect IT services - not merely as a crisis management question, but as a structural feature of the twenty-first-century digital economy. Section 2 examines the principal mechanisms through which conflict affects IT service markets. Section 3 reviews empirical evidence from three major case studies. Section 4 draws policy implications for developing economies. Section 5 contains the conclusion of the article.

Mechanisms of Impact: How Political Conflict Affects IT Services

Political conflicts affect IT services through several distinct but interrelated channels. Understanding these mechanisms separately is important because they

operate on different timescales, affect different actors and call for different policy responses.

Disruption of Physical and Digital Infrastructure

Armed conflict literally destroys the physical infrastructure that underpins digital services. Military strikes, cyberattacks and long-term disruptions in the energy supply are threats to data centres, fibre optic cables, power grids and telecommunications networks. Ukraine's experience post-February 2022 is particularly illustrative: repeated attacks on energy infrastructure – which by late 2022 had destroyed an estimated 40% of the country's energy generation capacity – forced IT companies to invest heavily in backup power generation, relocate server infrastructure and in many cases evacuate staff from frontline regions.

The Ukrainian IT sector showed remarkable resilience despite enormous challenges. In 2022, the year the full-scale invasion began, IT service exports reached a record $7.3 billion, according to the National Bank of Ukraine, before falling to $6.7 billion in 2023 and $6.45 billion in 2024.56 The fall in subsequent years was the result of compounding factors: the continuing emigration of skilled workers, enduring energy shortages and greater client uncertainty. But maintaining more than $6 billion in annual exports in the midst of active warfare is a notable achievement in business continuity.

Cyberattacks are a different but related threat. The 2017 NotPetya attack, believed to have been launched by Russian military intelligence initially targeting Ukrainian financial and logistics systems, caused an estimated $10 billion in collateral damage around the world, disrupting information technology operations for major multinational companies such as Maersk, FedEx and Merck. Since 2022, Ukraine has been subject to sustained cyberattacks on critical infrastructure, with Ukrainian and Western cybersecurity agencies jointly documenting Russian state-sponsored campaigns targeting energy grids, communications networks and government systems.

Sanctions, Payment Restrictions and Market Access

Economic sanctions are among the most powerful instruments of political conflicts and have severe and often immediate consequences for IT service markets. Financial sanctions have cut off IT companies' access to payment channels for their foreign clients or to pay for business inputs such as cloud computing services, software licenses, collaboration tools, and hardware.

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In March 2022, Russia was banned from the international payment system SWIFT, which immediately caused problems with the processing of payments for Russian IT companies working worldwide, even those not directly under sanctions. Many Russian IT firms had set up legal entities in Cyprus, Estonia or other EU jurisdictions specifically to facilitate international payments, a practice that has become much more complicated under the sanctions regime. Western payment processors including Visa, Mastercard and PayPal suspended operations in Russia, adding to the disruption of financial flows.

Technology-specific export controls are an additional layer of restrictions. In October 2022, the US Bureau of Industry and Security (BIS) imposed unprecedented export controls on advanced semiconductors, which were extended in October 2023 and December 2024.8 These controls applied not only to chips themselves, but also to the equipment and software used to produce them and barred US persons from supporting advanced Chinese chip fabrication facilities. Chinese semiconductor output dropped by around 17% in the first quarter of 2023, shortly after the controls were first imposed. Analysts now reckon China's semiconductor capabilities lag the global frontier by five to 10 years, but Beijing's huge domestic investment is slowly closing the gap.

Brain Drain, Talent Migration and Human Capital Flows

Political conflicts generate strong incentives for emigration of skilled IT workers, resulting in rapid, large-scale flows of human capital with complex consequences for both origin and destination countries. In the short term, emigration reduces the talent pool and can undermine organisational continuity in IT firms. In the longer run, diaspora networks can help to transfer technology, open up new geographies for markets, provide venture capital and generate remittance flows to fund domestic business investment, what the development economics literature calls the 'diaspora dividend.

The Russian invasion of Ukraine has triggered one of the largest flows of IT talent in recent history. Roughly 100,000 to 200,000 Ukrainian IT specialists moved abroad, mostly to Poland, Germany, Portugal, Czech Republic and other EU member states. Importantly, a significant share continued to work for Ukrainian IT companies on a remote basis, which allowed them to preserve export revenue while building professional ties with Western markets.

There was a dramatic exodus of IT professionals from Russia itself. According to RANEPA research, Russia has lost 80-100 thousand IT professionals through net emigration in 2022-2024. A study in EPJ Data Science analysed location data of active software developers on GitHub and found that by November 2022, 11.1% of

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Russian developers had listed a new country, compared to just 2.8% of developers from comparable non-conflict countries. Most importantly, the leavers were often the most active and networked members of the technical community, suggesting that the brain drain was concentrated among the highest value workers.

In 2022-2023, the main destination countries for Russian IT emigrants were Armenia, Georgia, Serbia and Kazakhstan. Along with the 15,000-20,000 Russian IT specialists who relocated to Armenia, where they received 20-30% premiums on their Moscow salaries and visa-free residence, Many retained remote contracts with Russian employers, while others started new businesses or were hired by local firms. This influx materially boosted the digital economies of Armenia and Georgia, though it also created wage inflation pressures in local technology labour markets.

Market Fragmentation and Digital Decoupling

At the systemic level, the political conflict is contributing to the disintegration of a unified global digital market. The 'splinternet' – a global internet increasingly fragmented along geopolitical lines – encapsulates the trend towards regulatory divergence, data localisation requirements and incompatible technology standards among major blocs. The most advanced examples of this trend are China's Great Firewall and Russia's sovereign internet laws, but similar dynamics are increasingly visible in the European Union's data localisation requirements under the GDPR and in US restrictions on Chinese technology providers in critical infrastructure.

The most potent example of this fragmentation is in the US-China technology conflict. From restrictions on Huawei on the entity list in 2019, to the semiconductor export controls in October 2022, to tightening in 2023 and 2024. The United States and China are poised to become more technically separated after further restrictions by the Trump administration at the beginning of 2025. In response, China has doubled down on a policy of technological independence, investing heavily in domestic semiconductor fabrication, AI infrastructure and cloud platforms.

For IT service exporters to third countries this fragmentation is both an opportunity and a source of uncertainty. Companies that once served customers in both the US and Chinese ecosystems are now faced with a choice between competing regulatory environments, or the significant compliance costs of running dual-track operations. But companies that are seen as neutral in both markets can claim the role of critical intermediaries in a fragmented global technology environment.

Investor Uncertainty and Foreign Direct Investment Flows

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Political differences generate widespread uncertainties that discourage foreign direct investment (FDI) in IT services industries. Apart from the capital infusion, FDI also brings in technology transfer, managerial expertise and access to global client base, which are the major factors contributing to export of IT related services. The research has demonstrated that a country's reputation for political instability and the proximity of the conflict are significant negative factors on FDI inflows, especially in knowledge-heavy industries which demand long-term stability for investment.

Meanwhile, the disruption to existing IT hubs can provide a divert of FDI for more stable alternatives. Russia's disruption as a leading outsourcing destination, coupled with heightened risk perception in Ukraine in spite of the fact that the country boasts a high technical talent pool, has led to a surge in interest in its fellow Central Asian and Southeast Asian IT markets

Case Studies in Political Conflict and IT Services

Ukraine: Resilience Under Fire

The 2022 invasion of Ukraine has been a textbook example of how the IT industry can overcome hardship and persevere. Before the invasion, the Ukrainian IT industry grew on average by 27% annually for 10 years, including 36% growth in 2021, which highlighted the country's rich talent pool in the fields of mathematics and technical know-how, low labour costs compared to Western Europe and high exports of software services.

During the days that followed the invasion on February 24, the IT Ukraine Association and its member companies took swift action to deal with business continuity: employees were moved to safe zones, resources were scattered across various regions and intensive communication with clients and activation of contingencies for remote and distributed work were implemented. The Ukrainian government made the IT industry a national priority and introduced several regulatory incentives, such as a procedure for transferring companies to the territory and simplified rules on currency. The pre-war level of IT export in 2021, around $7.3 billion, was exceeded by around 7.4% in 2022, which was the highest value ever recorded for the IT sector.22 The United States was the main market for IT exports, accounting for $2.4 billion of exports in 2024. The top five partner countries were the UK ($565 million), Malta ($502 million), Cyprus ($394 million) and Israel ($296 million) and subsequent years experienced a steady decline of $6.7 billion in 2023 and $6.45 billion in 2024—due to cumulative attrition of talent, the ongoing damage to energy infrastructure and a few developers opting for direct

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Western employment. However, IT still accounted for around 37-42% of the total Ukrainian exports of services.

The US-China Technology Conflict: Decoupling and Its Discontents

The present-day technology competition between the U.S. and China is the most significant. A reconfiguration of the global IT services and semiconductor market on a long-term scale. Trade war and Huawei entity listing in 2018-2019 marked the beginning of an active phase of the conflict, although the 2022-2023 BIS semiconductor export controls were a qualitative escalation for the first time, the United States not only targeted specific companies, but also it aimed to systematically limit China's capacity to produce advanced semiconductors at home.

Allied coordination then took the same action for ASML's extreme ultraviolet, a Dutch company.

The lithography equipment company and the Japanese semiconductor equipment company. The most recent round of exports occurred in the most recent period. New types of semiconductor manufacturing were limited by controls, which came into effect in December 2024. In addition to its equipment restrictions, it made three more types of software for chip development subject to controls and increased by 140 Chinese companies to the Entity List.

In early 2023, China's semiconductor production dropped by about 17%. But Beijing has been assertive – the Chinese government pledged hundreds of billions of yuan for the development of its domestic semiconductor industry with the National IC Industry Investment Fund ('Big Fund') and other initiatives. By 2024, the major data center operators in China had built data centers using primarily Chinese hardware. There is still a large technological chasm between the Chinese and the frontier, which is estimated to be between 5 and 10 years on advanced logic fabrication, but it seems to be closing in on the frontier.

For the global IT services industry, the US-China conflict creates structural uncertainty about the long-term viability of cross-cutting business models. The emergence of a 'China plus one' strategy among

multinational corporations - seeking to reduce dependence on Chinese IT supply chains by developing

alternative capabilities in Vietnam, India, Mexico, or other markets - has generated significant IT investment and talent demand in a range of developing countries, creating new openings for emerging IT

exporters.

Central Asia as a Beneficiary: Uzbekistan's Emergence

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Political conflicts between major powers frequently create commercial opportunities for countries

occupying neutral positions in the geopolitical landscape. The Russia-Ukraine war and subsequent Western sanctions generated a notable relocation of Russian IT talent, capital and corporate entities to countries that maintained relationships with Russia while retaining access to Western financial systems – particularly Armenia, Georgia, Kazakhstan and Uzbekistan.

Uzbekistan has emerged as the most ambitious and systematic beneficiary of this geopolitical realignment. Established in 2019 the country's IT Park provides a favorable tax regime for resident companies, such as exemption of corporate income tax, personal income tax of 7.5% (as opposed to 12%), customs duty exemption on IT equipment. An end of November 2023 IT Park had 411 foreign capital companies, with total businesses exceeding 1,600 (34% more than in 2022) and a total of 6,125 people employed.

The IT export revenue has seen a huge growth. In 2022, the IT Park exported $140 Million in services. This value rose to $344 million in 2023 (around 146% growth per year) and is expected to reach an estimated $620 million by the end-2024 (a further 40% increase per year). companies, which by the end of 2024 reached 936 (+170% since 2023) and served clients in 78 countries, have a goal of $5 billion in annual IT activity set by President Mirziyoyev.

By 2028, he wants to hit a $1 billion goal and ultimately reach a $10 billion goal by 2030.

Since October 2024, companies that generate at least 10% of their annual income from exports and have a revenue of UZS 100 billion ($8.7 million) or more will be required to pay tribute to export orientation.Since October 2024, companies whose annual revenue is UZS 100 billion ($8.7 million) or more and export share is 10% or more, will be required to pay tribute to export orientation.

The factors behind Uzbekistan's success illuminate broader lessons for IT export growth. Its young population -median age approximately 29 years, literacy rate exceeding 99% - provides a large potential talent base. Strong pre-existing traditions in mathematics and engineering from the Soviet educational system, combined with recent expansion of IT-focused higher education (362 institutions as of end-2023, with 73% located in regions outside the capital), are producing increasing numbers of technically trained graduates. The country's multi-vector foreign policy positioning allows it to attract a broad range of international clients and investors without being caught in the sanctions crossfire.

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Policy Implications for Developing Economies

The above evidence points to a series of interrelated policy recommendations for developing countries that would like to create or expand their own IT service export industries, in an increasingly geopolitically turbulent world.

Geopolitical Positioning and Multi-Vector Foreign Policy

Countries seen as stable, politically neutral and open to various geopolitical groups are much better positioned to attract IT investment and talent than those viewed as aligned with conflict sides. This supports the need for clear foreign policies that keep good relationships across geopolitical divides. These policies should include bilateral investment treaties, double taxation agreements and trade facilitation deals with major economies.

However, neutrality has its limits. Countries that host sanctioned entities, help evade sanctions or let their financial systems be used for illegal transactions face the risk of secondary sanctions. These sanctions could cut off their access to Western financial systems. Policymakers need to balance the business benefits of multi-vector engagement with compliance needs that protect access to the global financial system.

Digital Infrastructure as Strategic Investment

Reliable electricity supply, high-speed broadband connectivity, modern data center infrastructure, and robust cybersecurity capability are the physical and digital foundations of IT service delivery. Governments should treat these not as routine public utility expenditure but as strategic economic infrastructure with direct implications for export competitiveness. The Ukrainian experience demonstrates that IT services can sustain exports even under severe infrastructure disruption - but at significant cost in resilience investment that diverts resources from growth.

Human Capital Development and Talent Retention

Human capital is the fundamental determinant of IT export capacity. Tertiary education systems producing graduates with strong competencies in software engineering, data science, artificial intelligence and digital business are more important than any tax incentive or special economic zone. However, education system outputs alone are insufficient if graduates emigrate: talent retention policies - including competitive compensation environments, enabling frameworks for technology entrepreneurship and high-quality living conditions - are equally important.

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Uzbekistan's expansion of IT education -from roughly 50 IT-focused programs in 2019 to 362 institutions by end-2023, combined with attractive conditions for IT Park residents - represents a constructive integrated model, pairing supply-side education investment with demand-side incentives that create compelling domestic career opportunities.

Diaspora Engagement and the Migration-Trade Nexus

The development economics literature increasingly recognizes that the short-run costs of talent emigration can be offset in the longer run by diaspora network effects. Emigrants maintain professional connections with their origin countries, facilitate introductions between foreign clients and domestic IT firms, provide business intelligence about target markets and in some cases return with capital and knowledge acquired abroad - what Docquier and Rapoport (2012) characterize as the transition from 'brain drain' to 'brain gain.

Governments can cultivate these dynamics through diaspora engagement programs: dual citizenship arrangements, favorable investment frameworks for diaspora capital, professional network facilitation and programs that recognize diaspora knowledge as a national development asset. The Ukrainian IT sector's ability to maintain exports during wartime was partly attributable to the diaspora network of Ukrainian IT professionals already embedded in Western companies and markets before the invasion.

Regulatory Quality and Reducing Digital Trade Restrictions

Transparent contracting frameworks, intellectual property protection consistent with international

standards, streamlined company registration, accessible cross-border payment systems and low levels of

corruption are crucial for attracting and retaining international IT investment. Digital trade restrictions (DTRs) - including data localization requirements, restrictions on cross-border data flows and burdensome regulatory compliance requirements - impose measurable costs on IT service exports.

The OECD's Digital Services Trade Restrictiveness Index (DSTRI) documents wide variation in these restrictions across countries and has been shown in empirical research to negatively and significantly affect IT service export performance. IT exporting countries should compare their regulatory regimes with the best practice in the region and globally and make sure that the reforms they make do not place undue, unnecessary restrictions on the provision of digital services across international borders.

Conclusion

Political conflicts have emerged as a defining structural force in the global IT services market, operating through mechanisms that are diverse, interconnected and only partially understood. They disrupt physical and digital infrastructure, sever payment channels and market access, accelerate talent migration in directions that create both short-run costs and long-run opportunities and drive the progressive

fragmentation of an integrated global digital market.

Yet the empirical record of recent years also reveals the resilience of digitally delivered services under conditions that would be catastrophic for goods-based industries. Ukraine's ability to sustain over $6 billion in annual IT exports under full-scale military conflict, Russia's IT sector continuing to function despite comprehensive Western sanctions and dramatic talent outflows and Uzbekistan's explosive IT export growth from $140 million in 2022 to $620 million in 202447 - all suggest that IT services possess

distinctive attributes of geographic flexibility, human capital portability and organizational adaptability

that make them more resilient to political shocks than most export sectors.

For developing economies, the geopolitical turbulence of the 2020s represents both a risk and an opportunity. Realizing that opportunity requires sustained, coordinated investment across multiple policy domains: digital infrastructure, human capital development, institutional quality, diaspora engagement and multi-vector geopolitical positioning. Countries that navigate this environment successfully will be positioned to capture a growing share of a global IT services market that, despite powerful fragmentation pressures, continues to expand.

Future research should examine these dynamics more rigorously through panel econometric methods - including Pooled Mean Group (PMG) estimation and Common Correlated Effects Mean Group (CCEMG) approaches -tracking how measures of political stability, geopolitical alignment, conflict exposure, digital trade restrictions, 48 and human capital endowments affect IT service export performance across a broad sample of developing countries over multiple decades.

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