

RCAS Report

China-Pakistan Technology and Artificial Intelligence (AI) Cooperation: How Is It Evolving?

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About RCAS

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RCAS aims to become a leading research institute and think tank on Asian affairs in the Indo-Pacific region. To date, RCAS has conducted research programs on maritime disputes in the South China Sea (SCS), China's relations with the Indo-Pacific states, the Belt and Road Initiative (BRI), terrorism/counterterrorism in the Afg-Pak region, and so on. It is committed to promoting maritime cooperation, regional integration, and regional peace in the Indo-Pacific region at large.

RCAS has published nearly ten books in Chinese and English and more than 20 papers in SSCI/SCOPUS/CSSCI-indexed journals. Recent English publications include *Populism, Nationalism and South China Sea Dispute: Chinese and Southeast Asian Perspectives* (Singapore: Springer Nature, 2022); *Pakistan's Foreign Policy: Contemporary Developments and Dynamics* (London: Routledge, 2022); *Crossing the Himalayas: Buddhist Ties, Regional Integration and Great-Power Rivalry* (Singapore: Springer Nature, 2021); *The Reshaping of China-Southeast Asia Relations in Light of the COVID-19 Pandemic* (Singapore: Springer Nature, 2021); *Territorial Disputes, The Role of Leaders and The Impact of Quad: A Triangular Explanation of China-India Border Escalations* (2023); *Managing the South China Sea Dispute: Multilateral and Bilateral Approaches* (2022); *China-Pakistan Cooperation on Afghanistan: Assessing Key Interests and Implementing Strategies* (2022); *Hedging Against the Dragon: Myanmar's Tangled Relations with China since 1988* (2021); and *China-Pakistan Conventional Arms Trade: An Appraisal of Supplier's and Recipient's Motives* (2020).

RCAS has also published hundreds of articles, and its researchers have been interviewed in various local and international media outlets, such as *The Diplomat* in the United States, *East Asian Forum (EAF)* in Australia, *Bangkok Post* in Thailand, *Jakarta Post* in Indonesia, *Lian He Zao Bao*, *Think China* in Singapore, *South China Morning Post (SCMP)*, *China-US Focus* in Hong Kong, *CGTN*, *Global Times*, *World Affairs* in China. RCAS researchers have actively participated in international conferences or study visits in the United States, India, Pakistan, Sri Lanka, Nepal, Myanmar, Cambodia, and other places.

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Executive Summary

The new year opened with a striking illustration of China’s expanding technological footprint. A leading Chinese aerospace company, PIESAT, showcased advanced satellite-and drone-related technologies, particularly remote-sensing and Artificial Intelligence (AI)-enabled applications, at the AI Rise Expo in Islamabad, engaging directly with Pakistan’s national space agency, SUPARCO. What appeared to be a routine technology exhibition, in fact, signaled a deeper strategic moment in the evolving convergence of China-Pakistan cooperation in space, AI, and advanced technologies.

The timing of this development is significant. The intensifying U.S.-China competition for technological supremacy has placed AI and emerging technologies at the center of global strategic rivalry. The U.S. Artificial Intelligence Commission Report captures this anxiety cogently, warning that AI is widening a “window of vulnerability” for the United States and threatening its long-standing technological dominance (NSCAI). The report argues that China possesses the scale, talent, and ambition to surpass the United States in AI leadership if current trends persist, and that AI will be a decisive source of power for states and corporations alike.

This sense of vulnerability underscores a broader reality: China has emerged as a central technological actor and is actively integrating with partner countries. Technology is now embedded across nearly every domain of economic, social, and security life, rendering the technology sector intrinsically global. While the United States and China promote distinct AI governance models, their underlying emphasis on technological leadership is similar.

The critical difference lies in strategic orientation: the United States seeks to contain or deny China’s technological rise in pursuit of continued supremacy, whereas China emphasizes integration, connectivity, and shared technological ecosystems.

The U.S. National Security Strategy (2025) seeks to close this perceived window of vulnerability by reaffirming American scientific and technological primacy and sustaining unrivaled “soft power” to advance U.S. interests globally. In contrast, the Communiqué of the Fourth Plenary Session of the Communist Party of China calls for deep integration between technological and industrial innovation, expanded domestic demand, wider global opening, and high-quality Belt and Road cooperation. This dual strategy combines self-reliance with outward connectivity, aligning domestic modernization with multilateral trade, infrastructure, education, and cultural exchange.

Against this backdrop, this policy brief examines the evolving trajectory of China-Pakistan cooperation in technology and AI. It argues that this cooperation has both strategic and operational dimensions. Strategically, it is three-dimensional, anchored in land, water, and space, and driven by science and technology cooperation. Operationally, it manifests through infrastructure connectivity, maritime and underwater security, and cyberspace. Together, these domains reflect both the breadth and depth of an increasingly consequential China-Pakistan technological partnership.

Introduction

China-Pakistan cooperation in science, technology, and artificial intelligence holds considerable promise for both countries. Yet, despite steady progress, several structural and institutional constraints have limited the full realization of this potential. These challenges include inadequate bilateral frameworks, resource limitations, talent gaps, weak inter-ministerial coordination, and the absence of a clearly articulated shared vision, particularly on the Pakistani side.

Robust frameworks for bilateral agreements and joint ventures are essential to guide collaboration, clarify protocols, allocate resources, manage projects, and govern the sharing of research outcomes. Pakistan, in particular, faces three interrelated constraints: limited and inconsistent resource allocation, underdeveloped technological infrastructure, and weak coordination across ministries and agencies responsible for implementation. The critical question, therefore, is whether China has assisted Pakistan in overcoming these constraints.

Evidence from the past two and a half decades suggests that both countries have made sustained efforts to address these limitations. Gradually, bilateral policies and institutional mechanisms have emerged to support deeper cooperation, signaling a growing commitment to transforming MoU's into implementation.

China's global outreach rests on two core pillars: infrastructural connectivity and economic interdependence. As the world's largest economy in purchasing power parity terms and the second largest by nominal size, China is also the world's leading exporter and a major producer of industrial goods (David Shambaugh). Today, 128 out of 190 countries trade more with China than with the United States. Even in the post-pandemic period, China has maintained an average growth rate of approximately 3 percent and stands out as the only major economy to register growth during the 1997 Asian financial crisis, the 2008 global financial crisis, and the COVID19 pandemic.

China's economic strength has been complemented by large-scale poverty alleviation, lifting over 850 million people out of poverty, an unprecedented achievement. In research and development, China accounts for roughly 23 percent of global spending, only marginally behind the United States. This sustained investment has sharpened

China’s technological capabilities and enabled the expansion of what scholars describe as Chinese “technology ecosystems.”

According to leading analysts, China’s scientific and technological capabilities are now increasingly world-class. Technology lies at the core of China’s globalization. Global exposure to China has increased markedly in the technology domain, with intensifying technology flows between China and the rest of the world. The crucial question for Pakistan, therefore, is the extent to which it has successfully harnessed this technological engagement. While the record is mixed, recent developments point toward tangible and substantive improvement.

For analytical clarity, this policy brief traces China-Pakistan technological cooperation over the past 25 years, divided into four distinct phases.

Evolution of China-Pakistan Technology Cooperation

Phase I: Institutional Foundations (2001-2015)

Formal technological cooperation between China and Pakistan began in December 2001 with the signing of a Memorandum of Understanding between the respective Ministries of Science and Technology, establishing a Joint Research and Development Fund. Despite this institutional foundation, progress remained slow for nearly 15 years. Pakistan’s constant engagement in the Global War on Terrorism diverted political attention and resources, relegating technological cooperation to a lower priority.

Weak coordination, an unclear shared vision, and the absence of policy continuity, particularly within Pakistan, further constrained progress during this phase. As a result, early cooperation remained largely symbolic rather than transformative.

Phase II: CPEC and the “Game Changer” Narrative (2015-2020)

The launch of the China-Pakistan Economic Corridor (CPEC) in 2015 marked a major expansion of bilateral cooperation. More than fifty Memoranda of Understanding were signed across multiple sectors, including science and technology, reinforcing the narrative of CPEC as a “game changer” for Pakistan’s economy and regional connectivity.

CPEC projects were categorized into short-, medium-, and long-term timelines, with completion targets set for 2020, 2025, and 2030 (Ministry of Planning, Development and Special Initiatives (Pakistan)). Energy projects accounted for approximately 61 percent of total investment and were widely expected to resolve Pakistan’s chronic energy shortages.

By 2020, most major power projects, including plants at Karachi, Sahiwal, Hub, and Thar, along with several wind farms, were completed and operational, significantly alleviating supply constraints.

Transport infrastructure also advanced rapidly, with projects such as the Hazara Motorway, Multan-Sukkur Motorway (M-5), and Phase II of the Karakoram Highway enhancing north-south connectivity. Development at Gwadar Port, including the East Bay Expressway, also progressed. Despite these tangible achievements in energy and transport, cooperation in advanced technology and digital sectors remained relatively limited during this phase.

Phase III: Strategic and Operational Turn (2020-2024)

From 2019 onward, China-Pakistan technological cooperation entered a more substantive phase.

During Prime Minister Imran Khan’s visit to China, six major agreements were signed, including the second phase of the China-Pakistan Free Trade Agreement and cooperation agreements in marine sciences and economic and technical development.

A pivotal development was the establishment of the Joint Working Group (JWG) on Information Technology under the CPEC framework. The JWG held meetings in July 2022 and May 2024, identifying concrete avenues for collaboration in ICT infrastructure, digital connectivity, and skills development.

An important milestone was the operationalization of fiberization projects under a Memorandum of Understanding between Pakistan’s Ministry of Information Technology and Telecommunications and China’s Hunan SUNWalk Group. Over 1,000 kilometers of optical fiber have been completed, supported by telecom investment and local employment. Further surveys and agreements aim to extend fiber connectivity along ML-1 and across major urban corridors.

Overall, Phase III represents a transition from declaratory intent to practical implementation, embedding digital infrastructure and institutional coordination at the core of the China-Pakistan partnership.

Phase IV: Frontier and Emerging Technologies (2024-Present)

Since 2024, cooperation has expanded into frontier domains, including artificial intelligence, quantum computing, advanced ICT, and cloud technologies. In August 2024, the two countries signed 32 MoUs in IT and AI cooperation, with commitments to train large numbers of Pakistani youth. These initiatives quickly yielded results, including large-scale ICT training programs launched in early 2025.

Additional agreements with Chinese technology firms focus on quantum research, AI applications, optical fiber corridors, cloud services, and local manufacturing under Pakistan’s “Made in Pakistan” policy. Chinese investments in EVs, telecom infrastructure, and digital platforms further signal a deepening technological footprint.

Key Domains of Cooperation

I. Infrastructure Development: Land Connectivity

China-Pakistan cooperation on land-based infrastructure encompasses construction technologies, power generation, telecommunications, agriculture, and industrial automation. Chinese firms provide advanced construction machinery, digital surveying, and project management systems for roads, bridges, and highways under CPEC. In the energy sector, automation and control technologies support coal, hydropower, and renewable projects.

In telecommunications, Chinese firms dominate Pakistan's hardware ecosystem, supplying core network equipment and consumer devices. Chinese smartphone brands now account for a large majority of Pakistan's handset market, while Chinese companies play a central role in local assembly and optical fiber connectivity.

In agriculture and industry, cooperation includes mechanized farming, irrigation systems, smart machinery, industrial automation, and special economic zones. In the automotive sector, Chinese electric vehicle manufacturers are reshaping the market, supported by Pakistan's National Electric Vehicle Policy and significant Chinese investment (Government of Pakistan).

II. Maritime Connectivity: Water and Underwater Domains

Maritime cooperation has expanded through joint naval exercises, port development, shipping, submarine cables, and underwater surveillance. China has supported Pakistan's naval modernization and port infrastructure, including Gwadar and Port Qasim. Submarine fiber-optic cable projects, notably the PEACE cable, have enhanced Pakistan's digital connectivity and reduced dependence on alternative routes.

Cooperation also extends to port security systems, underwater monitoring, subsea engineering, and maintenance technologies. As global competition increasingly shifts to the seabed, where fiber-optic cables carry the vast majority of transoceanic data, China-Pakistan collaboration in this domain carries growing strategic significance.

China-Pakistan cooperation also covers subsea engineering and maintenance technologies required for underwater infrastructure. This includes cable-laying vessels, remotely operated vehicles (ROVs), seabed inspection tools, and repair equipment used for the installation and maintenance of submarine cables. Chinese technical teams and equipment have been involved in the deployment, testing, and long-term maintenance of Pakistan's undersea cable systems, supporting operational continuity and fault repair.

It deserves our attention, as Lynn Kuok has perceptively observed that the seabed has become an arena of great-power competition, sabotage and surveillance. Fiber-optic data cables carry 99 percent of transoceanic digital traffic, including financial flows and government, diplomatic, and military communications. Kuok cautions, 'as risks grow and trust erodes, global cabling is splintering into U.S led, Chinese led and non-aligned

blocks, with routes and landings increasingly mirroring geopolitical alignment rather than commercial logic’.

III. Cyberspace and Space Cooperation

China and Pakistan cooperate closely through SUPARCO and the China National Space Administration. Joint satellite development, launch services, ground stations, and data systems support applications in remote sensing, agriculture, environmental monitoring, and disaster management.

Until recently, Pakistan shared its “Cloud First Policy” and welcomed Chinese cloud service providers. Deeper cooperation in artificial intelligence, software, and big data is proposed, including establishing joint innovation centers in Shenzhen, Karachi, and Islamabad, and strengthening technical talent training through joint programs.

China’s cooperation with Pakistan in cyberspace reflects a shift toward state-controlled internet governance, challenging U.S.-led norms. The United States promotes a free and open internet managed through a multi-stakeholder model, where governments, private companies, and civil society all share decision-making. However, the U.S. has faced criticism for mass surveillance programs and its control over ICANN (Internet Corporation for Assigned Names and Numbers), the organization that ensures every website has a unique address and that internet traffic reaches the right place.

By aligning with China, Pakistan supports cyber sovereignty, where states control their own networks and digital rules, signaling a move toward a multipolar cyber order that prioritizes national authority over global U.S.-led frameworks.

Conclusion

China-Pakistan technological cooperation has evolved from MoUs to deep strategic and operational integration across land, sea, and cyberspace. Infrastructure development, maritime connectivity, space cooperation, and AI-driven digital transformation have collectively strengthened Pakistan’s economic capacity, security, and global connectivity.

At the same time, this deepening engagement has increased Pakistan’s exposure to China. Recent assessments rank Pakistan as the most China-exposed country globally, with a high dependence in the technology subcategory. While this partnership delivers clear benefits, investment, market access, and technology transfer, it also underscores the need for Pakistan to strengthen domestic capacity and diversify international partnerships to ensure long-term resilience.

The three-dimensional China-Pakistan technological partnership now spans thousands of kilometers of infrastructure, advanced ports, satellite systems, and a rapidly growing

pool of trained professionals. This integration represents a significant shift in regional and global power dynamics.

Pakistan currently faces a critical window of opportunity. To maximize gains, it must develop strategic clarity on priority technology domains, strengthen institutions, align education with industry needs, and focus on becoming a producer rather than merely a consumer of technology. In this context, maritime and digital security cooperation will be particularly decisive.

Future Directions and Policy Recommendations

- Develop Pakistan as a regional digital transit hub by routing a larger share of Chinese global internet traffic through Pakistan and upgrading optical fiber capacity in phased increments.
- Seek Chinese technical support for national policies on fiberization.
- Collaborate on green, energy-efficient data centers, cloud computing, and AI infrastructure nationwide.
- Ensure transparency in all technology agreements, with public disclosure of key clauses and costs.
- Strengthen linkages between the National Center for AI, academia, and industry, and expand joint research and training programs with Chinese institutions.
- Develop a mutually agreed framework on intellectual property rights to support technology transfer and joint innovation.

About Author



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