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COLLABORATION IN AI BETWEEN CHINA & ITS PARTNERS: A PROGNOSIS

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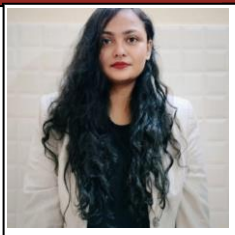

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Abstract

China has emerged as a significant player in the world in the domain of policy making in artificial intelligence (AI) owing to its talent pool with skill and knowledge and a large amount of the national investment being allocated for research and technology. This article explores Chinese AI R&D in close integration with innovation hubs of other AI leaders and partners across the world. It also suggests the implications for such kind of collaboration and the future pathways in the field of AI. Global collaboration and regulation is imperative for ensuring ethical and progressive use of AI.

Background

The Chinese Communist Party (CCP) has historically viewed state power through the prism of techno-nationalism[1]. Mao Zedong's leadership and China's bitter relations with the West, sought the nation to develop its technological capabilities[2]. Thus, the technical and scientific ecosystem in China was secluded for a very long time. However, the "reform and opening" phase of the 1970s[3] started to progressively adopt technologies required to transform the Chinese economy.

It involved:

(a) Deploying Chinese academia overseas.
(b) Enforcing mandatory technology transfers and infringement on intellectual property.
(c) Closely monitoring western technological breakthroughs.[4]

Chinese AI sector first came under the spotlight when Microsoft Research Asia (MSRA)[5] opened a research facility in Beijing in 1998.[6] The lab soon established its reputation as a hotspot of AI research[7] and drew the attention of outstanding Chinese researchers, who later headed some of China's global conglomerates and prominent AI firms.

The mid-2010s saw a shift, with more Chinese private sector entities willing to invest in AI.[8] Chinese businesses gained impetus[9], and AI quickly became mainstream globally after the Chinese government officially became involved in July 2017[10], when the State Council published its ***New Generation Artificial Intelligence Plan***[11], which outlined ambitious targets for the state's AI capabilities, such as ranking China "*the world's primary AI innovation hub" by 2030*[12]. Google launched their new AI lab in Beijing on Dec 2017[13] and in 2018, the Massachusetts University of Technology (MIT) proposed a five-year partnership with Chinese voice recognition company iFlytek.[14]

Implication of a Top-Down approach in China's AI Policy:

China's AI Policy briefly covers three dimensions as listed below:

(a) Promote Chinese innovation and research.[15]
(b) Increase the spectrum of AI-related goods and services.[16]
(c) Promote and expand China's AI market.[17]

China's AI strategy is crucial for their global position in terms of military capabilities and economic growth.[18] In their most recent five-year plan, the CPC have announced investments roughly accounting to $1.4 trillion for "developing 'new infrastructure' [19]using AI, 5G, data centres, the Industrial Internet, and other new technologies.[20] The

Chinese "military-civil fusion" (MCF)[21] allows both economic and technological gains while the military expands in size.

It indicates the Chinese deliberation to integrate AI in almost all the sectors in a top-down manner with the central government having the maximum control over decision making process followed by local and provincial leaders.[22] It also lays down a roadmap for 2025 for creating an AI sector worth 400 billion yuan and crossing 1000 billion won by 2030.[23]

The PLA believes that AI will significantly hasten the modernization of the armed forces, leading to major operational and organizational structures from specific battle models to equipment systems. China is always apprehensive of “surprise technical attacks" by the West[24] and are employing and training the AI models to obtain tactical superiority and take the lead in next-generation warfare. China’s AI security system framework is illustrated below:[25]

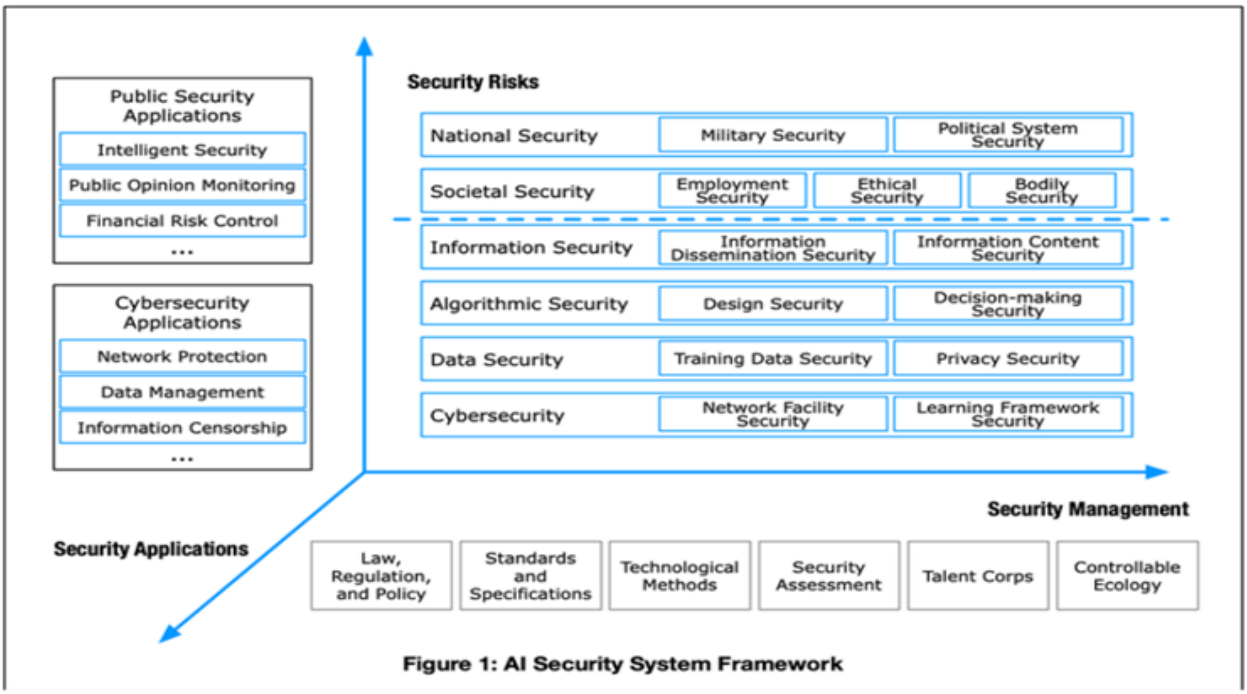

Figure 1: AI Security System Framework

U.S. and Finnish Centre for Artificial Intelligence (FCAI) are facing challenges with China's synthesis into international AI R&D networks. The intervention through R&D partnerships or hardware suppliers at present, is under scrutiny from governments, universities, corporates, and civil society. This consensus is driven by four indicators: [26]

1. The increasing functionality of AI and its implications on economy and national security[27].
2. China's unfair use of AI, such as the implementation of AI tools for state surveillance, particularly the Uyghurs of Xinjiang[28].
3. The increase in Chinese aspirations to excel in Artificial intelligence and machine learning[29].
4. The policies used by the Chinese government to strengthen capacities on emerging as a global player in AI, such as state-directed projects and covert tech transfers from external sources.[30]

Addressing these issues, two important questions need to be highlighted:

1. Is Chinese technology intervention with its partners, ruling out the possibilities that other democratic nations can also indigenously develop their own AI capabilities?
2. To what degree are developers and MNC's in democracies supporting China's use of authoritarian AI tools?

AI R&D collaboration between China and other nations:

The civil R&D, three important questions need to be highlighted:

(a) Is partnering on AI R&D with China a risky approach, in paving the way for new research resource?
(b) Are these Chinese partners connected in any way to the Chinese security services, the Seven Sons of National Defence in particular?
(c) What are the possible applications of the R&D in the real world, on partnering with Chinese?

From 2007 and 2010, there was a certain reduction in the volume of China's AI research journals. Overall, China's output of articles and reviews has generally increased over the past 20 years. AI research output of China in comparison to the global output between 1997-017 is shown through the graph below[31].

Figure 2-2 China's AI paper output and as a percentage of the global total from 1997 to 2017

(a) Although U.S.-China partnerships dominated, cooperation in AI research with China does not imply an exclusively American phenomenon. The volume of AI research articles with authors from both countries nearly doubled between 2010 and 2021, reaching 9,458. The vast scope of joint research between the United States and China reflects that these nations had an edge in AI.[32] There is a high enrolment by Chinese aspiring students and scholars in US universities, specially in the domain of AI.[33]

(b) More than 30 science and technology aid programmes have been carried out in Africa by China, which has also inked bilateral agreements on scientific cooperation with 16 African nations.[34] China has also undertaken more than 130 joint research projects in energy infrastructure, design, and simulation. Huazhong University of Science and Technology and the University of Pretoria is partnering to deploy AI for the green energy power generation and modern agriculture in African nations[35]. Hubei Province is working to implement BRI in Africa[36] with a shared future, committing to benefit Africans through Chinese AI R&D.

(c) Singapore, and to a limited degree Indonesia, Malaysia, and Thailand, are the main hotspots for AI partnerships between China and Southeast Asian governments and corporations.[37] These include constructing data centres, establishing headquarters, or operating affiliates abroad, setting up R&D labs, collaborating on smart cities, providing AI technologies with surveillance and training modules.

(d) China under BRI is aiding the Bangladesh Network Infrastructure Project to project digital Bangladesh. [38]

(e) Pakistan's collaboration with China is mostly through setting up of AI Labs in the CPEC Corridors.[39]

(f) Nine of the ten countries in Latin America have significant Chinese technological influence, compared to only five of the ten (all of which the US & China are both partnering with the nations) that have significant American AI impact. 90% of these nations prefer Chinese AI compared to the United States, is due to trade restrictions, Chinese AI can be availed at cheaper rates and greater accessibility is giving China a geopolitical advantage.[40]

(g) Both Russia and China aspire to be global players in AI & ML, IT, and cyber security by combining their vast R&D capacities. President Putin during his meet with President Xi stated on, "***The secret to sustainability is technological autonomy. We suggest enhancing strategic alliances in particular industries even further."***[41] In addition to trying to alter the laws governing the cyber domain behaviour, two autocratic regimes are collaborating to develop technology that global community is not as inclined to sell.

(h) EU-China High Level Dialogue on Research and Innovation highlighted the progress and cooperation between China and Europe for the Science Technology Initiative and AI corporations as the roadmap for a sustainable future.[42]

Is AI partnership between China and other Nations simply a collaboration or a Strategic Move?

With invisible mergers, these unregulated hardware and software components are proliferating into the developing countries through AI collaborations.

(a) Apart from the Made in China 2025 and New Generation AI Development plan, China has invested into several projects like the Belt and Road Initiative (BRI), Maritime Silk Road Initiative (MSRI), Digital Silk Road (DSR), Silk Road Economic Belt (SREB), to emerge as global leader in quantum computing, robotics, machine learning, artificial intelligence and 5G[43].

(b) To reduce American interest and power, Chinese deep interventions into the Caribbeans and Latin America with AI & Machine Learning (ML)[44] have sparked security concerns for the US. Out of 195 countries, 75 nations including 10 Latin American countries are directly employing AI tools for surveillance. 63 nations use AI technology supplied by China, and 36 of them are directly partnering for the BRI project. [45]

(c) Biometric scanners, smart patrolling platforms, surveillance technology, and other AI solutions are provided to Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Panama, Uruguay, and Venezuela by Huawei, Hikvision, Dahua, and ZTE. Out of these countries, only Venezuela and Bolivia are partners in BRI.[46] Thermal cameras were sent to Columbia by the Chinese espionage firm, DaHu. [47] China is also supplying technologies to Peru, Trinidad and Tobago, British Virgin Islands, Guatemala, and the Dominican Republic. However, it is difficult to detect if China is assisting these countries to employ AI in their decision-making processes.

(d) The PRC defence sector is connected to the China National Electronics Import & Export Corporation (CEIEC) which "has provided to the security apparatus via digital platforms to numerous nations of Latin America[48]." Since Latin America AI indigenous capabilities are still in a nascent phase, these automation deliverables from China are helping businesses on saving money and operate more effectively.[49]

(e) The "smart city systems inbuilt with AI and surveillance" are present across 40+ nations and territories with a majority located in Europe, Africa, and South America," as per Huawei 2020 annual report.[50]

(f) China has a wide range of interests from securing the Maritime Sea Road (MSR) to exploiting Africa's rare-earth metal deposits. Thus, it has demonstrated a keen desire to promote the expansion of Africa's technological sectors. China and Africa are collaborating actively through digital economy, environment, educational exchange programs, and trade and commerce. Australian Strategic Policy Institute (ASPI) highlights Chinese technology efforts by Huawei, across Africa[51], including 5G infrastructure, smart-city projects, and skill and educational programmes. The company has also built 70% of Africa's 4G

networks, furnished African Union's Addis Ababa connectivity, and established probably the most widely recognized network operator in the continent.[52] The Ugandan authorities used facial recognition technology from Huawei for political objectives while operating under cover of enforcement agencies. Egypt, Botswana, South Africa, Kenya, Nigeria, Ghana, and Zambia have all purchased the same AI systems from China.[53]

(g) While initially concentrating on the South-East Asian domestic market, China sells tech using AI, ML, and biometrics, exploiting inherent loophole that the Chinese can leverage to expand its influence and power[54]. In certain situations, Chinese tech firms home delivered directly to Southeast Asian defence and law enforcement institutions with AI enabled security mechanisms.[55]

(h) The military dictatorship in Myanmar is deploying AI systems sourced from Chinese tech giants Hikvision, Huawei, and Dahua to increase public surveillance[56]. Sensors in public places automatically scan faces and vehicle license plates, alerting authorities to arrest people from wanted lists.

(i) Huawei & China Railway International Group Co. (CRIG) are also significantly enhancing Bangladesh’s "information superhighway” to reach 62 percent of the nation's population and territory.[57]

(j) The China-Pakistan Digital Corridor (CPDC) paves the way for China to maintain long term economic, strategic, and diplomatic dominance in Pakistan and protect its investments in CPEC. [58]

A Prognosis:

(a) China holds excellent potential in the AI chip semiconductor market, over the entire semiconductor sector. Even with less sophisticated manufacturing techniques, AI chips have better functioning systems and are fairer priced than cutting-edge GPUs.

(b) China's geopolitical power and defence capabilities will be impacted by its achievements in the civilian use of AI and semiconductors since it weakens the diplomatic and economic pressure exerted by the West on China.

(c) The effectiveness and fatality of autonomous weapons will undoubtedly rise with the application of ML and extremely complex AI algorithms. There is speculation whether these autonomous systems will be able to evaluate the operational environment and choose the best course of action.

(d) Platforms with AI capabilities can save priceless human resources and influence the outcome of a battle at the tactical level. A technical asymmetry in AI with China does not bode well for India's successful development and deployment.

(e) US and European are better placed to contest the Chinese lead in the AI domain.

(f) There is a problematic nature of the AI-driven social governance architecture including the *Social Credit System*[59] in China (Roberts et al, 2020). Deploying AI in social credit system (SCS), China is trying to monitor, assess, and shape the behaviour of all citizens and enterprises.[60]

(g) There are numerous exemptions and loopholes that allow the government (and private entities that CPC has implicitly authorised) to circumvent privacy protection and have unrestricted access to the vast amount of personal data. Further, the Civil-Military fusion of AI raises severe concerns as it will lay down pathways for easy exchange of private and commercial data for defence technology development.[61]

(h) There is also the risk of gene editing beyond gene mapping with the use of AI in healthcare and the ethical concerns surrounding it.

(i) India is pursuing a path to regulate AI to form a protective environment. Principles for the responsible management of AI in India are aligned to the Constitution under Fundamental Rights (such as Article 14: Right to Equality; Articles 15 & 16: Right against Discrimination; Article 21: Right to Life and Healthcare; and Article 38: State Directive for Economic Equality) (Niti.gov.in, 2021)[62]. As of now, there are no specific laws in India that relate to AI, BD, or ML (Singh et al., 2022)[63]. As we move further into the digital age, it is important to consider the challenges and opportunities presented by AI and work to ensure that it is used responsibly and for the benefit of all.

(j) International standards play an important role in increasing trust in AI and help support public and private decision-making, ISO (International Organization for Standardization)/IEC (International Electrotechnical Commission) 23894 offers strategic guidance to organisations across all sectors for managing risks connected to the development and use of AI.[64]

Conclusion:

The role of AI in the new world is becoming increasingly important. From healthcare to transportation, from finance to education, AI is transforming industries and enabling us to solve problems in new and innovative ways.

For more than 20 years, China has been intricately entwined in the global network of artificial intelligence from harbouring US corporate AI labs and contributing to the advancement of AI techniques globally. These connections and their ramifications were generally ignored in the policy realm for most of the time. AI extends a possible grey zone for contestation rather than cooperation. It will need financing, commitment, and a determination among within the committee of nations to push for substantial shift if other nations intend to dominate the world in AI.

Chinese AI footprints are deeply rooted into other countries due to multifaceted initiatives like BRI, MSRI etc, so the loopholes also the extend to other domains. Thanks to AI, China will be able to extract the necessary information, and use it as a weapon against other nations. Additionally, it is difficult to detect to what extent are these partner countries willing to exercise AI for their benefit, since mapping their ethical use of AI is not available on the public domain. Although UNESCO adopted a global consensus on standard and ethical use of AI through General Conference regarding the Recommendation on the Ethics of Artificial Intelligence in 2021, but the actual will unfold after AI gets to smarter-than-human intelligence.

DISCLAIMER

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