



ASIA PROGRAM

XIX CHINA ANALYSIS GROUP MEETING

REPORT XIX, YEAR III

JULY 8, 2020

Online discussion panel via Zoom

Speakers: Yan Li, Ronaldo Lemos

Coordinator: Tatiana Rosito

ARTIFICIAL INTELLIGENCE, TECHNOLOGICAL WARFARE AND CHANGES IN THE WORLD ORDER: CHINA, USA AND BRAZIL



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It is a non-profit institution, headquartered in Rio de Janeiro and internationally recognized. Today, its circa 100 associates represent diverse interests and economic sectors and mobilize a worldwide network of professionals and organizations. Moreover, CEBRI has an active Board of Trustees composed of prominent members from Brazilian society.

ASIA PROGRAM

The Program promotes a systematic monitoring of matters relevant to international relations and Brazilian development, particularly those related to China. Special attention has been given to monitoring the ongoing economic reforms and political transformations in China, considering their global effects and impacts in Latin America and Brazil. This continuous examination allows CEBRI to provide information and analysis to its members and partners and to the Brazilian government, contributing to the construction of Brazil's strategic position towards China, as well as helping increase knowledge about China within Brazilian society.

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Anna Jaguaribe

Member of CEBRI's Board of Trustees and Director of the Institute for Brazil-China Studies (IBRACH). She is currently Visiting Professor of the Public Policies, Strategy and Development Program at the Federal University of Rio de Janeiro (UFRJ). She has previously worked at the United Nations, in New York, and as a consultant for the United Nations Conference on Trade and Development (UNCTAD), in Geneva.



SENIOR FELLOW

Tatiana Rosito

CEBRI's Senior Fellow and China Analysis Group Coordinator. She is a diplomat and an economist, having worked over ten years in Asia, where she served at the Brazilian Embassies in Beijing and Singapore. She was Petrobras' Chief-Representative in China and General Manager for Business Development in Asia from 2017 to 2019. Previously, she was Executive Secretary at the Brazilian Foreign Trade Board (CAMEX) and Special Advisor to the Ministers of Finance and Planning, among other roles in the public service. She is also an invited member of the Consultative Committee of the Brazil-China Business Council. She holds a Master's degree in International Development from the Harvard Kennedy School and an Executive MBA from INSEAD and Tsinghua University.



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Julia Dias Leite is CEO at CEBRI. She has 20 years of experience in the area of International Relations. Previously, she was Executive Secretary of the Brazil-China Business Council (CEBC). She is a Fellow of the Inter-American Dialogue and Chairman of the Board of Directors of Piemonte Holding.

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Report by: Gabriel Torres

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Panelists' Bios



Tatiana Rosito, CEBRI

CEBRI's Senior Fellow and China Analysis Group Coordinator. She is a diplomat and an economist, having worked over ten years in Asia, where she served at the Brazilian Embassies in Beijing and Singapore. She was Petrobras' Chief-Representative in China and General Manager for Business Development in Asia from 2017 to 2019. Previously, she was Executive Secretary at the Brazilian Foreign Trade Board (CAMEX) and Special Advisor to the Ministers of Finance and Planning, among other roles in the public service. She is also an invited member of the Consultative Committee of the Brazil-China Business Council. She holds a Master's degree in International Development from the Harvard Kennedy School and an Executive MBA from INSEAD and Tsinghua University.



Yan Li, CASTED

Dr. Yan Li is a Senior researcher at the Chinese Academy of Science and Technology for Development (CASTED), a Beijing-based think tank specialized in science and technology for development studies. Over the years, Dr. Li participated in the preliminary investigation and strategic research of several major science and technology plans and policies published by the Chinese government. His research interests include formulation and implementation of science, technology and innovation policies, the continuous evolution of China's STI governance structure, and most recently EU science policies and Sino-EU relations.



Ronaldo Lemos, ITS RIO

Ronaldo Lemos is an internationally respected Brazilian academic, lawyer and commentator on intellectual property, technology, and culture. Lemos is a co-founder and director of the Institute for Technology & Society of Rio de Janeiro (itsrio.org), and professor at the Rio de Janeiro State University's law school. He served as a board member of various organizations, including Stellar, Mozilla and Access Now. Lemos was one of the creators of Brazil's Internet Law (Marco Civil da Internet), enacted in April 2014, which created a comprehensive set of rights for the internet in Brazil, including freedom of speech, privacy and net neutrality. Lemos' academic qualifications include a J.D., University of Sao Paulo Law School, a Master of Laws degree, Harvard Law School, and a Doctor of Laws degree, University of Sao Paulo. In 2011, Lemos joined the Center for Information Technology Policy at Princeton University as a visiting fellow. In July 2013, he joined the MIT Media Lab as a visiting scholar. Lemos has received the Prix Ars Electronica Golden Nica in the category of digital communities. He writes weekly for *Folha de Sao Paulo*, the biggest national newspaper in Brazil, and has contributed to a number of other publications, including *Foreign Affairs*, *Harper's Bazaar*, and *Bravo*.

Guiding Questions

- 1.** How has the centrality of AI in the PRC's science, technology and innovation (ST&I) policy impacted the design, development and implementation of ST&I policy itself? For example, does AI imply a new relationship between the government and private sector that could be applied throughout society? How to deal better with the privacy issue? How could the new challenges feed into the new Five-Year Plan?

- 2.** Since the launching of Made in China 2025 (2015) and the Artificial Intelligence Development Plan (2017), the competition with the United States has markedly intensified and the bilateral relationship has been in its lowest point since its full re-establishment in 1979. What are the implications for overall scientific progress and technological advancement, from the standpoint of global scientific history?

- 3.** Building upon the Brazilian current legal framework for the Internet and digital activities, which lessons could be shared by China to promote Brazil as a valued partner? How could the bill that establishes the framework for the development and use of AI in Brazil, currently in Congress, affect the scenario for AI development in the country? How should Brazil position itself in a world increasingly fractured between different standards?

XIX Meeting Report

During its 19th meeting, CEBRI's China Analysis Group promoted insightful exchanges on opportunities and challenges faced by China and Brazil for the development of artificial intelligence (AI), in the context of aggravating technological competition and geopolitical rivalry between China and the US.

Given the multi-layered nature of AI development – encompassing scientific, technological, financial, as well as legal and institutional arrangements on data governance, human resources and connectivity infrastructure – exploiting AI's potential to advance national goals is particularly challenging for developing countries, such as China and Brazil. While China faces continuing challenges related to basic scientific research even as a world leader in AI applications in some fields, for instance, Brazil's massive gap in human capital represents a key bottleneck for AI development.

Nonetheless, through its “New Generation Artificial Intelligence Development Plan” (AIDP), China aims to overcome remaining obstacles and consolidate its leading position in global AI development and implementation – offering important lessons for Brazil, which still lacks a comprehensive national AI plan. In particular, AIDP's approach of establishing experimental zones to test AI policies locally before scaling up nationally can provide important insights into AI's potential risks and impacts, including on data privacy and employment disruption.

Ultimately, in a context of heightened global technological competition, participants stressed Brazil's urgent need to establish frameworks that promote domestic science and innovation – including by embracing 5G – in order to evolve from its status as a massive technology consumer to an “innovation producer”.

1. How has the centrality of AI in the PRC's science, technology and innovation (ST&I) policy impacted the design, development and implementation of ST&I policy itself? For example, does AI imply a new relationship between the government and private sector that could be applied throughout society? How to deal better with the privacy issue? How could the new challenges feed into the new Five-Year Plan?

The launch of the “New Generation Artificial Intelligence Development Plan” (AIDP), in August 2017, signaled a fundamental shift in the nature of Chinese aspirations for AI development in the medium- and long-term. As reflected by the wording “new generation”, participants argued that AIDP aspires to move beyond the so-called “weak AI” technology – limited to the execution of pre-determined tasks and to narrow decision-making capabilities. Powered by big data and quantum computing, the new generation of “strong AI” targeted by AIDP involves completely independent AI decision-making, approaching “self-conscious AI” and allowing ground-breaking applications. Despite concerns about the implications of self-conscious AI, participants argued that the debate over “singularity” often diverts attention from AI's practical potential to advance countries' development goals, including through improved public services.

Moreover, the centrality of AI among China's overall ST&I priorities can be explained by the “inclusivity” of AI technology: Rather than stemming from a single technological resource, AI constitutes a “comprehensive regime” that comprises multiple correlated technologies – from computer vision and natural language processing to machine learning and deep learning. As such, participants argued that AI-related policy-making should necessarily address a series of interdependent layers, encompassing data governance, human resources and connectivity infrastructure – each featuring different ethical norms, regulatory settings and governance structures. Ultimately, due to the complex and layered structure of AI development, it would be convenient and legitimate for China to prioritize AI as a strategic technology within China's ST&I policy, demanding a “whole-of-government” approach.

Given AI's multi-layered nature, participants argued that a country's competitiveness in AI can only be as strong as its weakest link in the overall AI technological chain. In this context, it was acknowledged that China still lags behind in a number of strategic aspects of AI development – particularly regarding basic theory, critical equipment and core algorithms. Accordingly, since the launch of AIDP, a range of policy reforms have been adopted in order to address systemic challenges and constraints in basic scientific research. For instance, participants highlighted recent policy reforms aimed at revising criteria for evaluating scientific research personnel and institutions in China – switching emphasis from the quantity of scientific publications as a proxy for scientific progress, to the quality and real contributions of new research.

Most significantly, in September 2019, the issuance of the “Work Guidelines on the Establishment of National New Generation Artificial Intelligence Innovation Development Experimental Zones” in China marked an important milestone for the implementation of AIDP. Reflecting a general modus operandi of Chinese policy-making, the guidelines designate eleven cities as experimental zones for technological demonstrations – testing AI development policies at the local level before scaling up to nation-wide adoption. According to participants, the potential risks and dangers of AI's complex interactions with human societies still remain largely speculative, surrounding issues such as data privacy and ethics, as well as employment disruption. In this context, the local experimental approach allows the identification of risks and externalities under controllable circumstances – providing important insights into key sectors negatively impacted by AI through labor reallocation and unemployment.

As AI popularizes worldwide, its potential disrupting impact on employment becomes a key global debate. According to AI expert Kai Fu Lee, up to 40% of current jobs worldwide could be displaced by automation in the next fifteen years. In the case of China, the scenario is aggravated by demographic trends and expected decreases in the active labor force in coming years. On the other hand, it is also expected that the popularization of AI will create new positions and generate new jobs, particularly in fields related to data analysis.

As national plans for AI development are enacted worldwide, the strategic importance of cooperation between academia, the public and private sectors is reinforced as critical. In this respect, however, participants argued that the public-private component of the design and implementation of AI policy in China does not differ from the pattern already observed in Chinese overall ST&I policy, in which a “triple helix” model ensures a synergic relationship between universities, companies and local governments.

2. Since the launching of Made in China 2025 (2015) and the Artificial Intelligence Development Plan (2017), the competition with the United States has markedly intensified and the bilateral relationship has been in its lowest point since its full re-establishment in 1979. What are the implications for overall scientific progress and technological advancement, from the standpoint of global scientific history?

As illustrated by the language and purposes of the US “Executive Order on Maintaining American Leadership in Artificial Intelligence”, issued in February 2019, participants emphasized the politicization of the bilateral rivalry in AI development, with harmful consequences to overall scientific progress. At the international level, AI development has been increasingly framed in terms of competition and conflict. On the other hand, at the domestic level, participants noted a markedly different rhetoric in China, where AI is emphasized as an engine for economic development rather than a channel for international competition. According to participants, the excessive politicization of AI development has a negative effect on the pace of technological advancement worldwide.

From a “history of science” perspective, the speed of technological progress depends essentially on the available room for new knowledge and scientific discovery. As argued by Thomas Kuhn’s “Structure of Scientific Revolutions”, periods of faster or slower scientific progress have marked the history of science, varying according to the overall circumstances for new knowledge generation. In this context, participants agreed that global AI development – as well as science and technology in general – is currently experiencing an innovation plateau, in which major paradigmatic breakthroughs are not expected in the short-term. In fact, most current AI-related innovations relate to new applications and the more efficient implementation of existing technologies, rather than new scientific discoveries. In this scenario, participants stressed that China’s remarking implementation capabilities – a strategic advantage over the US – have largely motivated concerns over Chinese influence and competitiveness in AI development. According to participants, if in the past

the US has stood alone as a global leader in science and technology, the current innovation plateau aggravates competition with countries that were previously “followers”.

However, despite China’s implementation capabilities, participants noted that it still faces major gaps in AI development, as reflected by China’s goal to achieve by 2025 the development of key algorithms still controlled by the US. Although the current global innovation plateau and the shrinking room for new knowledge are unlikely to change in the near future, participants voiced hopes that new scientific discoveries could lead to a “new plateau” in the long-term, in which scientific and technological competition is less fierce.

3. Building upon the Brazilian current legal framework for the Internet and digital activities, which lessons could be shared by China to promote Brazil as a valued partner? How could the bill that establishes the framework for the development and use of AI in Brazil, currently in Congress, affect the scenario for AI development in the country? How should Brazil position itself in a world increasingly fractured between different standards?

In contrast to a global trend towards the adoption of national AI plans, Brazil still lacks a comprehensive plan outlining priority actions for AI development and regulation. On the other hand, participants highlighted the recent conclusion of a national “Internet of Things” plan, addressing some AI-related topics. Based on a thorough study developed by a consortium of relevant public and private stakeholders, the “IoT plan” sets guidelines and institutional arrangements to develop and implement IoT applications nation-wide. However, participants voiced concerns about the slow pace of implementation since the plan’s announcement, which reflects overall obstacles for policy implementation in Brazil.

Another relevant policy instrument for AI development refers to the Brazilian “Data Protection Law”, enacted in 2018 and expected to enter into force in 2021 – even though its precise effectiveness date is still under debate. Largely based on the model of the European General Data Protection Regulation (GDPR), the Data Protection Law creates a set of norms and rules for data collection and processing in Brazil, including for AI purposes. As most data protection instruments worldwide, the Brazilian law is essentially two-folded as it seeks to strike a balance between protecting individuals’ rights and enabling innovation.

Given the multi-layered aspect of AI development, which requires coordinated national efforts on different fronts – from data governance to human capital formation – participants stressed the difficulties faced by developing countries, such as Brazil, to fully develop AI capabilities. These difficulties are reflected in the limited use of AI for public sector services in Brazil, especially within

the government's executive branch. On the other hand, the Brazilian judiciary branch offers remarkable examples of efficient AI applications in the public sector: through initiatives such as Sinapses, developed by the Court of Justice of the State of Rondonia, repetitive tasks are optimized in order to streamline judicial processes. In this respect, the paper "The Future of AI in the Brazilian Judicial System", prepared by a diverse group of researchers from Columbia University, provides important insights into the framework for how to deal with ethical and safety value assessments, and how to audit the use of AI in the judiciary.

A key limitation for AI development in Brazil, however, refers to the massive skills shortage for AI-technology production and application: While around six million developers are trained per year in China, this volume is limited to thirty thousand per year in Brazil. In order to reach the skill supply levels observed in China, proportionate to the size of each population, Brazil would need to increase the annual training of developers more than ten-fold - to 400 thousand per year. As it is unlikely that the public sector will succeed in single-handedly filling this massive gap, participants noted that start-ups may contribute to building human capital - for example, the start-up "Tribe" has been playing a relevant role in providing free training for new developers in Brazil.

Paradoxically, the small numbers of developers that actually receive AI training in Brazil are often not employed towards AI development. In addition to a shortage in skills supply, a general lack of demand from both the public and private sectors constrains AI development in Brazil. In order to address this issue, participants highlighted the strategic importance of partnerships between universities and both the private and public sectors.

Furthermore, in light of the Chinese overall experience with AI development, participants noted a few lessons to be learned and applied by Brazil. First, the general Chinese policymaking modus operandi of testing policies locally before scaling up nationally could render interesting results in the context of the Brazilian federation. In this respect, the case of Sinapses already offers a successful example of AI instrument applied locally, by the State of Rondonia, before being nationalized by the National Council of Justice (CNJ). Second, participants highlighted a glaring difference in the depth of public debate surrounding AI and its implications in both Brazil and China - where AI and technology are a recurrent topic of presidential addresses and a more present aspect of societies' daily-lives.

Finally, in respect to the ongoing debate about the national security implications of 5G technology and the possible adoption of investment screening measures, participants stressed the urgency of 5G development in Brazil. In that perspective, postponing the bidding for 5G radio frequencies would waste a key window of opportunity to reverse the current Brazilian status quo in global innovation – the position of a massive technology consumer, without a stake in the production of technology and innovation. Having in mind safety and security concerns related to 5G and information infrastructure in general, participants argued that high standards for national security in IT are indeed essential, but should be applied equally to all companies, regardless of nationality. Ultimately, the longer it takes for Brazil to adopt 5G, the more likely the country would remain an “innovation consumer” for decades to come.

Attachments

THEMATIC GUIDELINES

The ongoing China-USA competition and how it has exacerbated under the impact of COVID-19 are the subject of much debate nowadays. There could be a myriad of approaches to it with regard to both the nature and the future of the current rivalry, encompassing geopolitical, military, economic, technological and financial consequences to the competitors, third party countries, international relations and the international order. **Artificial Intelligence (AI) has been handpicked by the Chinese government as the main driving force for China’s industrial upgrading and economic transformation in the next decades**,¹ as stated in “The New Generation Artificial Intelligence Development Plan (AIDP)”, issued by the State Council in July 2017².

This document unifies many policies established in previous years (Internet+, some features of Made in China 2025, the 13th Five-Year Plan) and underlines the importance of AI in various sectors, including defense, social welfare, and the need to develop standards and ethical norms for its use. AI was included in many documents before AIDP as one technology among others, whereas the new document clearly puts it at the center of a national comprehensive strategy and as a fundamental tool for international competition.

Meanwhile, the United States 2017 National Security Strategy states that “China, for example, combines data and the use of AI to rate the loyalty of its citizens to the state and uses these ratings to determine jobs and more”. The new “United States Strategic Approach to the People’s Republic of China”, issued last May, underscores AI use in surveillance technologies in Xinjiang and the

1. Roberts, H., Cowls, J., Morley, J. et al. The Chinese approach to artificial intelligence: an analysis of policy, ethics, and regulation. *AI & Soc* (2020). <https://doi.org/10.1007/s00146-020-00992-2>

2. China Science and Technology Newsletter. No.17, September 2017. Next generation Artificial Intelligence Development Plan. <http://fi.china-embassy.org/eng/kxjs/P020171025789108009001.pdf>

importance of reinforcing screening mechanisms for Chinese investments and export controls in order to prevent the acquisition of technology by the Chinese firms/government. It also highlights the importance of the “Executive Order on Maintaining American Leadership in Artificial Intelligence”, issued in February 2019³, which states “The United States is the world leader in AI research and development (R&D) and deployment. Continued American leadership in AI is of paramount importance to maintaining the economic and national security of the United States and to shaping the global evolution of AI in a manner consistent with our Nation’s values, policies, and priorities...Maintaining American leadership in AI requires a concerted effort to promote advancements in technology and innovation, while protecting American technology, economic and national security, civil liberties, privacy, and American values and enhancing international and industry collaboration with foreign partners and allies”. The said document also confers priority upon AI in Federal agencies, in a whole-of-government approach, including prioritization of funds and research.

The PRC’s AIDP plan defines a set of key steps and goals for China, which include the achievement of a major breakthrough in basic AI theory by 2025 and to be world-leading in some applications, while codifying law ethical standards for AI. By 2030, China seeks to become the world’s innovation center for AI, with further upgrades in the laws and standards. One key aspect of the AIDP is that although it is a national strategy, it relies heavily on the private sector and local governments for implementation. Thus, China has appointed some national champions (e.g. Baidu – autonomous vehicles, Alibaba – Smart Cities, Tencent – medical diagnosis) and enhanced incentives for them, while maintaining a high degree of competition.

As addressed by Roberts, H., Cowls, J., Morley, J. et al. (2020), beyond understanding the technological aspects of the dispute in AI, **it is important to understand why China has chosen AI to underpin its long-term strategy.** At least three aspects emerge as fundamental, because they could make a substantial difference within China:

- International competition: AI will enhance China’s national competitiveness and allow for “leapfrogging developments” in the military. One should consider, though, the risks of a new arms race and China has been highlighting the importance of avoiding unintentional escalations and building an appropriate international framework.

3. White House. “Executive Order on Maintaining American Leadership in Artificial Intelligence”. <https://www.whitehouse.gov/presidential-actions/executive-order-maintaining-american-leadership-artificial-intelligence/>

- Economic development: with the diminishing contribution of traditional factors to Chinese economic growth (abundant labor force, urbanization), innovation (i.e. TFP) needs to gain center stage in driving the economy and could have positive effects amid the profound changes of automation and robotization, with the creation of new jobs. There are many concerns, however, with underlying risks and growing inequality.
- Social governance and moral governance: using AI for better targeting social services and improving social welfare to mitigate challenges such as population aging, environmental challenges and even improving moral values. Examples include improvements in the health system, administration of justice and the Social Credit System. The main area for concern here is the trade-off between efficiency and privacy.

The AIDP also establishes the desire of China to become a world leader in defining ethical norms and standards for AI. There have been increasing attempts on that side: in March 2019, the Ministry of Science and Technology established the National New Generation Artificial Intelligence Governance Expert Committee, which issued eight principles; and the Standardization Administration of the PRC released a white paper on AI Standards. Other government agencies, universities and companies have also developed their AI principles. One of the most contentious issues is the debate over what type of data should be protected. It is generally acknowledged that in Asian societies group and community relations are more important than individualistic rights. Notwithstanding cultural, ideological and public opinion aspects, the issue of protection of personal information is also taken very seriously by Chinese respondents according to local surveys. Accordingly, China has been in many aspects a leader in trying to deal with this issue in Asia. Moreover, voluntary standards in China have substantial clout in enforcing government policy standards. The loopholes are mostly due to the weak administration of justice and the government's power to collect and use data.

As briefly introduced above, the role of Artificial Intelligence as an economic driver and one of the main areas for intense competition in the international arena in the next decades has broad implications for economic leadership, military advancements and social transformation. It also implies vast requirements for regulation and standard-setting in digital ethics. With these implications in mind, we invite our speakers and audience to address the session's main theme and hereby suggest a few aspects to be discussed:

- How has the centrality of AI in the PRC's science, technology and innovation (ST&I) policy impacted the design, development and implementation of ST&I policy itself? For example, does AI imply a new relationship between the government and private sector that could be applied throughout society? How to deal better with the privacy issue? How could the new challenges feed into the new Five-Year Plan?
- Since the launching of Made in China 2025 (2015) and the Artificial Intelligence Development Plan (2017), the competition with the United States has markedly intensified and the bilateral relationship has been in its lowest point since its full re-establishment in 1979. In times of technological warfare and decoupling, what role will the China Standards 2035 Plan have in shaping China's position for stronger competition? What are the implications for third countries?
- Brazil has important and substantial economic links with both the United States and China. In a world that could be increasingly fractured between different standards, will it be possible to maintain an open technological environment and not choose sides? How should Brazil position itself in the standard-setting debate?
- Building upon the Brazilian current legal framework for the Internet and digital activities, what concrete partnerships could we consider with China and the USA in order to advance our social and economic development? What lessons could be shared to promote Brazil as a valued partner? How could the bill that establishes the framework for the development and use of AI in Brazil, currently in Congress, affect the scenario for AI development in the country?

XIX Meeting Participants

The meeting had **397** attendees, including representatives from the government, companies, banks, third sector and academic institutions, who joined the event either via Zoom or the YouTube live stream.



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