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Synergy or Stalemate? Europe-China Science Technology and Innovation collaboration in shaping the BRI and Agenda 2030

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POLICY RECOMMENDATIONS

In recent years, the European Commission has been endeavouring to reconfigure its R&D ties with China, navigating technological Tide across various STI sectors. China is recognized as important knowledge producer, however in order to protect sensitive military or technical information Chinese participation in STI is mainly centred on sustainable economy, ecosystems, public health, nanomaterials, food, agriculture and pollution reduction. This adjustment comes in response to longstanding apprehensions about intellectual property issues and the potential unwitting contribution of European researchers to Chinese military technology development, especially in the light of the Sino-Russian collaboration. To tackle these issues, the EU should:

- Address limitations and risks for collaboration: geopolitical, IPR, data sharing and processing, possible dual technologies use and military implications;
- Emphasize the joint research efforts on cross-cutting themes in STI: carbon neutrality, climate change, healthcare, resource depletion, sustainable development policies & practices;
- Enhance data sharing security within the EU and reduce interaction with China in the critical technologies areas: biotechnology, big data, AI, deep space, and quantum systems;
- Protect critical technology areas: military, semiconductors, AI, quantum systems, biotechnologies;
- Increase macro policy coordination to optimize and balance cross-country risks and limitations to facilitate Sino-EU collaboration in important areas of STI.

Keywords

BRI

SDGs

STI

Innovations

Infrastructure

Development

Agenda 2030

Introduction

The European Union (EU) views China as a long-term strategic partner, emphasizing science, technology, and innovation (STI) through initiatives like the 2019 Strategic Outlook and the Regional Multi-annual Indicative Program (MIP) highlighting key collaboration priorities. This partnership aims to tackle global challenges and promote shared values, particularly the Sustainable Development Goals (SDGs) and climate change commitments. While collaboration has potential benefits, the EU- China relationship has evolved from a 'negotiating partner' to an 'economic competitor' and 'systemic rival' especially concerning sensitive technologies like DNA genetic engineering, AI, cyber security, quantum computing, and advanced microchips. Both China and the EU recognize the significance of technological advancement for future sustainable growth, addressing the UN Agenda 2030.

China's Belt and Road Initiative (BRI) focuses on win-win cooperation and aligns with multiple SDGs from UN Agenda 2030, promoting infrastructure, innovation and development across BRI countries and beyond. While Chinese investments in Europe, initially welcomed, provided economic benefits but later raised concerns over intellectual property and potential security implications leading to a cautious approach from number of EU countries. The paper provides evidence from Greece, Italy, Portugal and Germany.

The Russian military aggression in Ukraine in February 2022 has resulted in significant geopolitical shifts, introducing new layer of complexity for the EU-China STI collaborations. The EU's response to the war, which includes sanctions against Russia and support for Ukraine has also led to a change in research priorities and increased scrutiny of Chinese investments in critical infrastructure and technologies due to security concerns. Therefore,

future collaborations should take a more balanced approach, focusing on non-sensitive areas such as Agenda 2030, Climate Change, Circular Economy, public health, food, and agriculture, while using emerging technologies with caution: artificial intelligence, facial recognition, smart drones, ransomware, etc.

The EU-China history of STI collaboration in the context of BRI

China includes Europe in the Belt and Road Initiative (BRI) for FDI, trade, innovation, and infrastructural projects, and to serve as a connecting bridge between the Indian Ocean and Europe across the Red Sea. Chinese investments proved to be beneficial for Europe following the euro crisis in 2010-2012. The timely intervention of the first BRI investment projects at the end of 2013, particularly in Greece, Italy, and Spain, played a significant role in this regard.

The Chinese BRI massive investments went to Italy already in 2014 towards energy Eni, electricity Enel machinery Fiat Chrysler, and in 2015 the state-owned company ChemChina purchased 16,87 % of stocks from Italian tier maker Pirelli, investing 7,7 billion USD with involvement of newly founded Silk Road Fund (main areas: sustainable development, infrastructure, energy and resources, industrial cooperation), increasing the positive public and political perception of China. The collaboration with Italy continued throughout 2019 when the Italian Premier Giuseppe Conte signed the Memorandum of Understanding with China's President Xi Jinping in Rome. The MoU was followed by number of agreements with Port of Trieste and Genoa, where the infrastructural investment Platform from China Communication Construction Company took place.

The change of spirit towards Chinese investments came with the new Prime Minister of Italy M.Draghi in 2021, when the Pirelli contract came to an end, and again in 2023, when Italy left the BRI. However, in May 2024, Stellantis, which includes Italy's FIAT, partnered with Chinese electric car startup Leapmotor to sell EVs in Europe followed by Italian Prime Minister Georgia Meloni's visit to China to resume Sino-Italian collaboration, signing a 3-year plan with the Chinese government, which envisages collaboration in key areas of Chinese technological excellence – electric vehicles and renewable energy.

Another important investment within the *BRI framework in Europe* was China's COSCO Shipping's 2016 purchase of 67% of the Port of Piraeus (Greece), which amounted to almost 312,51 million USD initial investment as part of the trade collaboration with Europe. The port of Piraeus in collaboration with Vodafone is committed to embracing 5G and IoT digitalization through the implementation of a cutting-edge LTE network, benefiting from substantial investments in its infrastructure by COSCO. China sees its investment in Greece as a success with increased trade and job creation, but European experts believe that few new jobs were created and that the trade benefits China more than Greece or the EU.

Portugal is involved in the Belt and Road Initiative with Chinese green investments. China leads in electric vehicle production, aligning with Portugal's low-carbon goals and Industry 4.0 technology advances. Chinese high-tech companies like Tederic, Ningbo David, Medical Device, and Shyahsin are expanding in Portugal.

The EU aims to become carbon neutral by 2050 thanks to *European Green Deal*, emphasizing a transition to a *Circular Economy*, building renovation, energy innovation, and sustainable practices. China, with the highest-level CO 2 emissions, is striving to become a global climate change leader by achieving carbon neutrality by 2060, promoting sustainable investments in renewables, zero-carbon-emission zones, and the advancement of green technologies.

In accordance with the EU-China 2020 Strategic Agenda for Cooperation, both parties have committed to 'cooperating to establish a strategic policy framework for green and low-carbon development to actively address global climate change'. Particularly, in 2023, the Chinese and German governments signed a *Memorandum of Understanding to launch Climate and transformation dialogue*.

The city of Duisburg plays a pivotal role in the Belt and Road Initiative (BRI) with 100 Chinese companies present, showcasing green investments for a carbon-neutral economy in Germany. Duisburg is a key hub for transporting goods from China to Europe. Chinese tech company Huawei has provided IoT platforms for the city's private Wi-Fi and 5G networks, but plans for further collaboration are on hold. There were concerns about Chinese investments in critical infrastructure and human rights violations. Despite this, a significant deal was finalized in 2023 involving the Hamburg Port with investments from COSCO and 'Hamburg Haven and Logistics'. Germany and other EU countries aimed to limit Chinese investments in their critical infrastructure due to possible security implications.

The initial enthusiasm for Chinese Foreign Direct Investment (FDI) in Southern European countries was not universally embraced. Subsequently, prominent EU governments criticized these investments, characterizing them as predatory, competitive, and potentially subject to future misuse. This raised apprehensions regarding their prospective military application, 'debt-trap diplomacy' or utilization as leverage in negotiations. Furthermore, China's imposition of constraints on foreign investments within its domestic market has led to an increasingly imbalanced EU-China partnership.

EU-China STI strategic collaboration areas in the context of Agenda 2030

Although China has been identified as a competitor and systemic rival by the EU, it is important to remember that it is also simultaneously designated as a long term strategic partner in some issue areas. This is emphasized in various EU Flagship Projects such as the *2019*

Strategic Outlook Joint Communication, the *Regional Multiannual Indicative Program for Asia and the Pacific 2021-2027* correlating with the *14th Five-Year Plan for China*, highlighting STI as core elements for future international cooperation. This partnership is progressively intricate, as the EU declares collaboration with China to address global challenges and promote shared values and interests, with a key emphasis on upholding international commitments such as the *Sustainable Development Goals* and the *Paris Agreement on Climate Change*. Even though the advantages of collaboration are evident, the EU-China relationship has been increasingly complex over the past decade, from the enthusiasm of "negotiating partner" to "economic competitor" and "systemic rival" especially in Science, Technology, and Innovation (STI), particularly regarding four key technologies the EU is sensitive about: DNA genetic engineering, AI-powered systems, quantum computing, and cutting-edge microchips, which might have dual use with negative military and security implications for the EU.

The *Chinese Belt and Road Initiative* (BRI), or One Belt One Road, stands as the cornerstone of President Xi Jinping's foreign policy. According to official Chinese documents, the Belt and Road aims to promote win-win cooperation, common development and prosperity, peace, openness, inclusiveness, mutual understanding, and trust, aligning with the values of the 2030 Agenda. As an infrastructure and innovation development project, BRI primarily focuses on SDG.9 "Industry, Innovation and Infrastructure", possibly contributing to other SDGs in the STI area due to their interlinked nature:

- SDG.3. "Good health and wellbeing": e-health, IoT, 3D printing, nanomedicine, biotechnologies for environment and health;
- SDG.7. "Affordable and clean energy": solar panel energy, bladeless wind energy, 3D printed solar energy trees, solar energy from waste etc.;
- SDG.8. "Decent work and economic growth": AI, digitalization, smart buildings, etc.;
- SDG. 9 "Industry, Innovation and Infrastructure": Industry 4.0, technologies 4.0, 5G, Big Data, AI technologies, green innovations;
- SDG.11. "Sustainable cities and communities": e-town, smart car, digital citizen, green urban planning, smart waste management, IoT, smart water management etc.
- SDG.17. "Partnerships for the goals": knowledge sharing in STI, AI, digitalization, co-creating sustainable technologies, and capacity building for STI.

Chinese BRI aims to align closely with the SDGs, both of which the European Union and China as two large global players are committed to.

Nowadays, the BRI has aspirations to become a new digital "Silk Road Initiative", connecting Asia with Europe and Africa via marine and land routes, providing greener investments in infrastructure and technology, increasing connectivity, and transitioning to carbon free energy.

The integration of science, technology, and innovation (STI) is vital in the pursuit of the Sustainable Development Goals (SDGs), considering its complex nature driven by the rapid pace of technological advancements and new technologies development (AI). STI has the potential to transform the current business model to be more inclusive and sustainable by means of new technologies and digitalization. Therefore, fostering innovation and partnerships is essential in addressing the multidimensional and interconnected challenges of sustainable development, particularly concerning striving for eradicating poverty, well-being for all, healthy life, clean water and sanitation, climate change, resources depletion, decent work, responsible production and consumption etc.

European Union and China framework and background bases for STI cooperation

For the European Union, China is the second most important economic partner, however the STI collaboration has waned over the past decade due to the suspicion of potential dual technologies use, Intellectual Property Rights (IPRs) violations, transparency, and reciprocity issues with exception of climate change, public health, environment, energy transition, sustainable food and agriculture areas.

China's STI policy has undergone a transformation, from Deng Xiaoping's focus on technology transfer, *special economic zones (SEZ)*, *863 Program*, and opening up, to Hu Jintao's "Indigenous innovation" (自主创新), focus on R&D, Sustainable Development and Xi Jinping's "new era" emphasis on self-reliance "Made in China", AI, 5G, digital innovations and broader geopolitical vision across BRI. Internal challenges and the global context have shaped Chinese innovation-related policies. They have evolved from embracing learning from others, and collaboration to self-reliance and aspiration for leadership in emerging technologies.

The European Union and China collaboration history in the STI area started in 1998 with the Science and Technology Cooperation Agreement and was reinforced in 2012 by the *EU-China Innovation Cooperation Dialogue*, EU *Regional Multi-annual Indicative Program* (MIP) and complemented in 2019 by *EU-China Strategic Outlook* where the EU is discussing with China the Roadmap to future cooperation in the aforementioned fields. Such cooperation foresees future collaboration between partners from industry environment, academia as well as policymakers.

Moreover, in 2015, the European Union signed the *Arrangement with National Natural Science Foundation of China*, which showed commitment from both sides to develop and expedite different types of research mobility and enable new partnerships in the area of science, technology and innovations with key Flagships: Climate Change, Biodiversity, Biotechnology and Agriculture. The 2024 *EU and China commitment on the cooperation in the field of CE* is important international stride towards realizing a carbon-free future by 2050-2060. The Circular Economy stands at the core of EU policies, offering solutions to resource depletion, biodiversity loss, climate change, and paving the way for sustainable development and growth while safeguarding the environment. In March 2024, *the EU conference concerning Climate Change 2040* took place in Beijing, where scientists and policymakers discussed the future development perspectives in the area.

In 2022, the EU and China signed an Administrative Arrangement for the period from 2021-2024 to establish a *Co-funding Mechanism*. The mechanism will support research projects on Food, Agriculture, Biotechnology (FAB), Climate Change, and Biodiversity (CCB). It will provide funding for Chinese entities involved in these projects and will be supported by the Ministry of Science and Technology of the PRC.

Europe leads global innovation, investing almost 100 billion EUR in *Horizon Europe* (HE) 10th Framework Program, the largest initiative for 2021-2027. In line with the Global Approach and the ongoing discussions on the 'Joint Roadmap for the future of EU-China cooperation in science, technology, and innovation', cooperation between European and Chinese researchers and entities under Horizon Europe is encouraged mainly under Food, Agriculture, and Biotechnology, and Climate Change and Biodiversity flagships.

China also participates in *European Cooperation in Science and Technology* (COST) as non-COST member, providing Chinese academics with networking opportunities and capacity -building initiatives to address various scientific, technological, and societal challenges through university collaborations less influenced by geopolitics.

However it may be, the *2023 Business Confidence Survey* performed by the EU Chamber of Commerce in China, discovered that 45% of respondents feel that China's enforcement of intellectual property protection laws is inadequate, with instances of forced technology transfer being reported. Access to vital Chinese databases, such as CNKI, has been restricted for EU researchers and businesses in open science and access. This lack of reciprocity in openness poses challenges in following the cooperation roadmap.

EU-China STI collaboration: navigating the complex issue

The EU's approach towards China at the current stage is a nuanced balance between defensive risk management and the proactive pursuit of mutually beneficial partnerships and collaboration.

The growing imbalances between Chinese and European partners underscore the need for a fresh EU-China collaboration strategy, particularly focused on sustainability, transparency, IP respect, and equality based on the 3 P's: Promote, Protect, and Partner. It is imperative for the EU to adopt a more forward-looking approach to China and to engage in negotiations for collaboration on equal footing in key developmental areas such as climate change, human well-being, innovation, and social issues to ensure the establishment of mutually beneficial future partnerships.

The realization of the Sustainable Development 2030 Agenda, "The Future We Want" necessitates collaboration on a global scale. Addressing critical global challenges like 'No Poverty'; Climate Change'; and 'Partnership for the Goals' calls for concerted efforts and engagement from multiple stakeholders across continents and countries. Therefore, the active participation of major global players is essential.

Drawing from the momentum of the BRI Initiative and Agenda 2030, the China-EU collaboration has the opportunity to not only explore new markets and strengthen financial and people-to-people connections but also to facilitate the transition to a more sustainable business model, thus enhancing its economy, competitiveness, political image, innovation development, while having the UN 2030 Agenda at its core.

The Belt and Road Initiative (BRI) intertwines perfectly with the goals of Agenda 2030, possibly making an important shift in development paradigm policies and practices. The EU and China are dedicated to addressing global challenges through green investments and infrastructure development, transitioning from fossil fuels to renewable energy sources, and fostering a more inclusive, smart and resilient business model. The optimal strategy involves finding a compromise between competition and collaboration on a reciprocal and transparent basis - maximizing gains while mitigating risks.

The ongoing Russian war in Ukraine has intensified political tensions and altered global alliances. It has affected collaborations between China and European nations in several ways: disrupting collaborative projects and shifting European focus towards security, cybersecurity, energy security, and defence-related technologies. Additionally, economic sanctions and trade barriers have increased, leading to heightened strategic competition. There is a growing emphasis on protecting intellectual property rights (IPR) and technological sovereignty, resulting in a more self-reliant and competitive science, technology, and innovation (STI) environment.

To move forward the EU-China relationship, a strategy focused on sustainability, transparency, and intellectual property respect is recommended. The collaboration between the EU and China presents an opportunity for genuine partnerships that emphasize innovation, and advancement in science and technology to respond to pressing global challenges like

climate change, pandemics, resource depletion, energy transition, environmental degradation etc. However, for these partnerships to succeed, it is crucial that to address security concerns, including the protection of sensitive technologies, their possible dual use, and cyber security. By focusing on a balanced relationship that promotes technological cooperation while safeguarding intellectual property and security interests, the EU and China can contribute to sustainable global growth, helping achieve the goals outlined in Agenda 2030.

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