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Brazil-China Relations: A Three-Decade Analysis of Knowledge Diplomacy (1994–2024)

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Abstract

China's rise has influenced global affairs, including its relations with Brazil. This study explores knowledge diplomacy - academic collaborations forming innovation networks that complement traditional state diplomacy. Marking 30 years of strategic partnership (1993-2023) and 50 years of Sino-Brazilian diplomatic relations (1974-2024), the research poses and addresses the following question: "To what extent does knowledge diplomacy manifest in Brazil-China bilateral relations?". Using a systematic literature review and social network analysis, the findings indicate that knowledge diplomacy between Brazil and China remains in its nascent stages. Only three initiatives related to the co-production of scientific knowledge were identified, involving a total of six researchers from both countries. Despite the comprehensiveness of the analysis, the results reveal that state-level, proactive engagement between higher education institutions in Brazil and China has remained superficial throughout the three decades under examination.

Keywords: Bilateral relations; Strategic partnership; Soft power; Higher education institutions; Scientific knowledge, Social network analysis.

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Introduction

Universities have long served as pivotal hubs for knowledge production and as spaces for the socialization of ideas and intercultural exchange. In response to the growing prominence of knowledge-based innovation, higher education institutions (HEIs) have increasingly sought to strengthen their capacity for generating research that drives development. Within this context, universities have established international networks of collaboration (Barbosa and Neves 2020), aimed at fostering entrepreneurial ecosystems and promoting innovation-led growth (Etzkowitz 2016).

Using these academic networks to develop research collaboration institutions contribute to a form of inter-state diplomacy that complements traditional state diplomacy (Vinet 2010). This approach, referred to as knowledge diplomacy (KD), is defined as “the role of international higher education and research in building and strengthening relations between countries” (Knight 2018a, 8). In essence, KD represents a mode of engagement that operates, in part, as a form of soft power (SP), wherein the internationalization of higher education is strategically aligned with research, innovation, and foreign policy objectives (Knight 2022b; 2022c). KD has been gaining significant traction in recent years, and, when considered as a bidirectional process (Knight 2022b), becomes a suitable framework for examining mutual cooperation between states, particularly in the academic sphere.

The commemoration of the 30th anniversary of the Brazil - China strategic partnership in 2023, alongside the 50th anniversary of diplomatic relations between the two countries in 2024, provides the impetus for this study. It seeks to examine the evolution and characteristics of KD between Brazil and China over the past three decades (1994-2024). The central research question guiding this inquiry is: To what extent does knowledge diplomacy manifest in Brazil–China bilateral relations?

To address this question, the study employs a sequential methodological framework grounded in contemporary international relations (IR) scholarship. First, a systematic literature review (SLR) is conducted to identify and analyze scholarly publications explicitly focused on Brazil-China relations. Second, a sociometric analysis is undertaken to assess the patterns and dynamics within the body of scientific literature. Finally, social network analysis (SNA) techniques are applied to map and interpret the relationships among authors, their affiliated institutions, and their respective countries, following the methodological principles outlined by Borgatti et al. (2018).

Revisiting KD within the Framework of IR Theory

The purpose of this section is to elaborate on the concept of KD and situate it within the broader debates in IR. KD has emerged as a conceptual framework for understanding the role of international higher education, research, and innovation (IHERI) in global affairs (Knight 2022c), as well as its contribution to strengthening ties between states. It extends beyond traditional forms of educational, scientific, and cultural diplomacy by offering a more comprehensive and integrated perspective on international engagement in the domain of knowledge (Knight 2022c). Accordingly, KD highlights the significance of academic and research collaboration, emphasizing mutual learning and reciprocity among states.

However, unlike other forms of diplomacy - such as educational or scientific diplomacy - KD is distinguished by its bidirectional and reciprocal nature (Knight 2022b). In KD, knowledge not only contributes to IR but is also enriched through inter-state collaboration, thereby advancing international higher education and research (Knight 2018b). KD prioritizes collaboration,

reciprocity, mutuality (Ruffini 2017) and the equitable sharing of benefits and expertise. Moreover, this approach transcends traditional state-centric diplomacy by actively engaging HEIs, research institutions, and non-state actors in fostering international cooperation (Knight 2022c; 2022d).

KD is multidimensional, emphasizing that “the whole is greater than the sum of its parts” (Morin 2015). It consists of three dimensions: (i) higher education and training, (ii) research focused on knowledge generation and sharing, and (iii) innovation applying new ideas for value creation (Knight 2018a). KD contrasts with soft power’s top-down approach by fostering horizontal relationships within academic networks, promoting cooperation among HEI, research centers, and regional centers of excellence (Knight 2018a; 2018b; 2022a). KD unlike issue-specific diplomacy (Melissen 2005), addresses global challenges that exceed the capacities of individual states by mobilizing international collaboration (Knight 2022a), expertise and research resources through cross-sectoral partnerships (Knight 2023). KD by its integrative and collaborative nature, strengthens IR by bridging research and practice, contributing to global knowledge and innovation ecosystems (Chaban 2024).

The integration of research and practice in addressing global challenges is reflected in several key initiatives within Brazil - China bilateral relations. In 2010, the Federal University of Rio de Janeiro and Tsinghua University jointly established the Brazil-China Center for Climate Change and Innovative Energy Technologies (“Brazil-China Partnership on the Frontiers of Science.” 2024). The following year, the Brazilian Agricultural Research Corporation (EMBRAPA) partnered with the Chinese Academy of Agricultural Sciences to launch the Joint Laboratory of Agricultural Sciences - the first such collaboration between China and a Latin American country (International Service for the Acquisition of Agri-biotech Applications 2011). As of 2025, Brazil hosts 12 Confucius Institutes, the highest number in Latin America (Confucius Institute n.d.), underscoring the role of higher education and cultural exchange. At the multilateral level, the China-CELAC Joint Action Plan outlines initiatives to support HEIs, research centers, and think tanks through academic exchanges, collaborative projects, and events such as the China-LAC Think Tanks Forum, the China-CELAC High-Level Academic Forum, and the China-LAC Youth Development Forum (Ministry of Foreign Affairs of People Republic of China 2021). Similarly, university alliances formed under China’s Belt and Road Initiative (B&RI) exemplify an outward-oriented approach to internationalization and knowledge exchange (Chou and Demiryol 2024).

Table 1 seeks to position the concept of KD within the broader theoretical landscape of IR. The emerging framework KD increasingly occupies a space at the intersection of classical and critical IR debates. As a cross-cutting concept, KD engages with dominant paradigms such as realism and the state-centric international order, while also incorporating constructivist perspectives that emphasize SP, norm diffusion, and the social construction of international engagement (Nye 2004; Wendt 1999). KD bridges traditional and evolving approaches to global cooperation.

Table 1. Comparative Perspectives on SP and KD in the IR

Class Approach: SP (Realism & Liberalism)	Critical Approach: KD (Constructivism, decolonial scholarship and post-structuralism)
Concept: SP is a state-centered strategy aimed at enhancing sovereign influence in global affairs (Nye, 2004). It is typically exercised through state-led initiatives in which governments mobilize intellectual and cultural resources to strengthen bilateral and multilateral ties, promote development, and support global governance structures (Nye, 2004; Falk, 2016). SP functions as an instrument for advancing national interests through attraction and persuasion rather than coercion.	 KD represents a mode of international engagement that operates, in part, as a form of SP. KD is oriented toward the construction of new epistemic hierarchies shaped by institutional prestige, linguistic accessibility, cultural diversity, and visibility. It fosters horizontal relationships and plays a central role in determining whose knowledge is recognized and legitimized within global discourses (Acharya, 2014; Tickner & Blaney, 2012). KD functions as a collaborative and transformative instrument, designed to address global challenges through inclusive and equitable knowledge exchange.
Aim: SP aims at shaping preferences of other actors through attraction and co-optation, rather than coercion or inducement, thereby enhancing a state’s ability to achieve its foreign policy objectives by fostering legitimacy and positive perceptions among global audiences (Nye, 2021). SP agenda is designed as an instrument of traditional state diplomacy. As Knight (2022) observes, SP is a strategic tool for states aiming to enhance their international standing and legitimacy by attracting foreign individuals and institutions through culturally resonant and ideologically compelling means.	 KD is a mode of international engagement to produce knowledge that contributes to strengthening bilateral and cooperative relations in international affairs. KD recognizes that academic output is widely recognized as a driver of innovation and a mechanism for building trust and shared expertise (Etzkowitz & Leydesdorff, 2000; Ranga & Etzkowitz, 2013). KD emphasizes reciprocity and mutual benefit over unilateral influence (Knight, 2022), positioning collaboration as a central principle. KD addresses global challenges that surpass the capacity of any single state, prioritizing horizontal, cross-border, and equitable exchanges rather than state-centric approaches. As both a supplement to and a challenge against traditional diplomacy, KD fosters inclusive partnerships and contributes to the development of a more interconnected and cooperative global knowledge community.
Approach: SP operates predominantly through a top-down approach, relying on the capacity to attract and persuade. It employs a range of cultural, educational, political, media, economic, and ideological instruments to cultivate adherence and influence international audiences. This form of power is outward-oriented, strategically projecting national values, cultural assets, and political ideals to enhance state appeal and legitimacy. It seeks to win hearts and minds through image-based influence and normative appeal. SP is purposive, unidirectional, and asymmetrical, with the initiating actor disseminating influence without necessarily engaging in reciprocal exchange. It tends to function unilaterally, with the influencing state maintaining control over the narrative and terms of engagement - ultimately benefiting one side.	 KD seeks to foster horizontal, non-hierarchical relationships among states and institutions by leveraging international higher education, scientific research, and innovation as instruments of engagement. It prioritizes shared benefits beyond the immediate interests of participating actors, emphasizing reciprocity, integration, and mutual exchange. Operating as a collaborative framework, KD centers on co-production of knowledge and the joint pursuit of solutions to global challenges. Rather than relying on centralized structures, it promotes decentralized linkages that enable diverse actors to engage on equal footing. KD facilitates trust-building, enhances scientific capacity, and contributes to global problem-solving (Park, 2024). It reframes intergovernmental relations by positioning knowledge exchange as a core pillar of diplomacy, elevating the role of academic and research communities in shaping international cooperation.

Continue

Continuation	
Shared:	
SP and KD share foundational principles rooted in influence through attraction and non-coercive means, with a strong emphasis on epistemic engagement. Both frameworks leverage cultural and educational exchanges to foster international relationships and are increasingly embedded within national strategies aimed at enhancing global image and reputational capital (Knight, 2022; Wilton Park, 2024).	
Actors, Dimensions & Outcomes	
SP involves a range of actors - including states, cultural institutions, media, higher education institutions, NGOs, and influential individuals - who shape public opinion and international perceptions. It encompasses multiple dimensions such as culture, heritage, diplomacy, education, media, innovation, values, branding, foreign aid, sports, and language. Through attraction, emotional resonance, and persuasion, SP serves as a tool for advancing foreign policy objectives and enhancing national influence. SP shapes international public perceptions.	KD engages HEI, research institutions, academic networks, and international education organizations, with scholars and academic leaders playing key roles in fostering global collaboration. Critical KD encompasses both formal and informal mechanisms through which knowledge is exchanged across borders. Indeed, informal diplomacy is a critical avenue for sustaining international cooperation (Pagliarello 2025). KD encompasses three dimensions: High Education and Training, Research and Innovation. Create long-term partnerships, enhance knowledge exchange, and contribute to global development (Knight 2022). KD generates transformational knowledge and new international epistemologies.

Source: Authors (2025).

Additionally, KD draws upon theories of epistemic communities and transnational advocacy networks, which underscore the influence of expert knowledge and norm entrepreneurs in shaping global governance (Haas 1992; Keck and Sikkink 1998). The concept is further informed by the literature on complex interdependence, which highlights the role of non-state actors and multilateral institutions in fostering cooperative international relations (Keohane and Nye 1977).

Classical approaches to KD often align with the principles of realism and liberal internationalism in the context of SP theory - conceptualizing knowledge exchange an instrument for fostering international cooperation, building trust, and enhancing sovereign influence in global affairs (Nye 2004). Within this framework, HEIs, research institutions, and educational exchanges are viewed as extensions of foreign policy, contributing to national interests through mechanisms of cultural diplomacy and capacity building (Knight & de Wit, 2018). In this vein, KD is thus framed as a state-led initiative, wherein governments mobilize intellectual resources to strengthen bilateral and multilateral ties, promote development, and support global governance structures (Falk 2016) – ***KD is an unilateral instrument of power.*** KD serves the interests of sovereign states by generating relational power differentiation, emphasizing that power relations can be constructed not only through material capabilities but also through technical collaboration, policy alignment, and institutional partnerships (Melchor 2020; Turekian et al. 2014).

Critical approaches to KD seek to move beyond state-centric paradigms, engaging with intersecting theoretical frameworks such as constructivism, postcolonial theory, decolonial scholarship, and post-structuralism. Viewed through this lens, KD is not merely a tool for cooperation but a dynamic process of constructing meaning, authority, and identity in global affairs. It challenges dominant epistemologies by foregrounding pluralism, reciprocity, and the co-production of knowledge, thereby reshaping the contours of international engagement. KD challenges the relational nature of international engagement, traditional paradigms of diplomacy and power. From a post-structuralist standpoint, discourse is not a neutral medium but a mechanism through which power is exercised and knowledge is legitimized. As Foucault (1988) asserts, “power produces knowledge (...) power and knowledge directly imply one another” (p. 27), emphasizing the inseparability of epistemic authority and political influence – **KD is a co-empowering instrument that operates through knowledge production**. Simultaneously, a decolonial lens reveals how dominant knowledge systems are historically situated and often serve to marginalize non-Western epistemologies. Mignolo (2009, 3) argues that “epistemic disobedience is the beginning of any epistemic de-colonial de-linking with all its historical, political and ethical consequences”, calling for a reorientation of global knowledge production toward pluriversality and justice. In this view, **KD becomes a site for both critique and transformation** - where academic collaboration can resist epistemic hierarchies and foster more inclusive, situated, and reciprocal forms of transnational engagement.

These perspectives challenge the assumption that KD is universally beneficial practice, instead arguing that it can reproduce epistemic hierarchies - structured systems of power that privilege certain forms of knowledge while marginalizing others (Connell 2007; Santos 2014). Rather than being driven by sovereign interests, these hierarchies are shaped by institutional prestige, language access, cultural diversity, and visibility, with HEIs, media, centers of excellence, and think tanks playing central roles in determining whose knowledge is heard and legitimized (Acharya 2014; Tickner and Blaney 2012). In this view, KD becomes a site **of epistemic contestation**, where new forms of relational power emerge that escape traditional instruments of sovereignty and challenge the dominant taxonomy of global power – **KD is an instrument transformation**.

KD is reconceptualized not merely as a technical or educational mechanism, but as a transformative practice that reconfigures the epistemic foundations of global engagement - a contested space shaped by horizontal cooperation between state and non-state actors. It embraces plurality and inclusivity, challenging traditional models of sovereign multilateralism. As Santos (2014) notes, “Since scientific knowledge is not distributed in a socially equitable way, its interventions in the real world tend to serve the social groups having more access to such knowledge.” This emphasizes how KD can reproduce epistemic asymmetries, privileging dominant institutions, languages, and funding structures

In this light, KD also contests the conventional state-driven logic of multilateralism, positioning itself as a tool for decoding emerging power hierarchies and imagining alternative

global futures - particularly those rooted in Global South and postcolonial perspectives. Acharya (2014) argues that IR as a discipline often marginalizes the voices and experiences of societies outside the Western core. Similarly, Connell (2007) critiques the dominance of Northern theory in global social science, noting that the majority world has long served merely as a data source. Scholars such as Tickner and Santos have further exposed the structural inequalities embedded in knowledge production, advocating for more pluralistic and equitable epistemic governance (Santos 2014; Tickner and Blaney 2012). As such, the relevance of KD is likely to grow, reshaping how power is constructed and how international relations are theorized.

Critical KD also encompasses both formal and informal mechanisms through which knowledge is exchanged across borders. Within this framework, informal knowledge diplomacy plays a pivotal role, referring to the circulation of ideas, expertise, and collaborative efforts that occur outside formal institutional structures. These interactions - such as unpublished collaborations, occasional academic networks, and personal exchanges - are instrumental in fostering trust, mutual understanding, and shared objectives among diverse actors (Knight 2022). Although often undocumented, such engagements contribute meaningfully to the soft infrastructure of IR by enabling flexible, context-sensitive flows of knowledge. This is particularly relevant in Global South, where formal diplomatic mechanisms may be limited or politically constrained, making informal diplomacy a critical avenue for sustaining international cooperation (Cino Pagliarello 2025). These practices not only facilitate continuity during periods of geopolitical tension or institutional instability but also reinforce the transformative potential of KD beyond traditional, state-centric models.

The classical and critical perspectives on KD coexist in dynamic tension, offering complementary analytical lenses through which to examine Brazil-China relations. This interplay between tradition and critique constitutes the theoretical framework and practical relevance of the present research, which is situated precisely within this space of tension and complementarity.

The classical perspective conceptualizes KD as an extension of SP, framing academic exchange as an instrument of statecraft. It emphasizes asymmetric bilateral engagement and the projection of national influence through educational diplomacy. In contrast, the critical perspective views KD as a co-empowering process rooted in knowledge generation, fostering critique, transformation, and the construction of new epistemic hierarchies. This approach challenges conventional understandings of IR by foregrounding authority, identity, and meaning-making. Together, these frameworks illuminate how Brazil-China academic relations are shaped not only by diplomatic intent or technical collaboration, but also by broader power structures reflecting sovereign interests and epistemic contestation. While Brazil often positions itself as a bridge between the Global North and South, and China increasingly asserts its role as a global knowledge producer, asymmetries in visibility, agenda-setting, and institutional influence persist. KD thus emerges as a site of both cooperation and negotiation, where the promise of mutual learning is tempered by uneven access, recognition, and legitimacy.

Literature Review and Methodology

The study employed a methodological approach that integrated a systematic literature review (SLR) with social network analysis (SNA) (Wasserman and Faust 1994a, 1994b; Silva et al. 2022). The SLR was conducted in accordance with PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) 2020 guidelines (Page et al. 2021). These updated guidelines are designed to enhance the reliability and replicability of research (Sarkis-Onofre, Catalá-López, Aromataris, and Lockwood 2021). Table 2 shows the search results from major academic databases that index leading scientific journals (Webster and Watson 2002). The searches were conducted in Portuguese, English, and Chinese. Additionally, searches in Portuguese on the SCIELO.org database allowed for the inclusion of publications in Spanish.

Initially, we conducted searches in the SCIELO.org database (which indexes scientific journals from Latin American countries) and the .periodicos.CAPES database (which indexes both Brazilian and international journals). These searches were performed using descriptors in Portuguese. Each article's abstract was reviewed by the authors, and if it aligned with either the theme “Brazil-China relations” or “Brazil-China cooperation” (as well as “BRICS”) it would be deemed to have met the inclusion criterion. The converse - that an article's main topic did not align with Brazil-China relations, Brazil-China cooperation, or BRICS - would constitute grounds for exclusion. Other exclusion criteria included: (i) if duplicate articles were found in other databases; and (ii) if the articles were not peer-reviewed.

Table 2. Review of academic databases

Database	Search string	Results	Included
Language: Portuguese			
SCIELO.org	(ti:(brasil)) AND (ti:(china))	24	19
	(ti:(brasil)) AND (ti:(china) AND (ti:(relação)))	0	0
.periodicos.CAPES	Title: Brasil-China AND Title: relação Limit to: Artigo	0	0
	Title: Brasil-China Limit to: Artigo	43	31
Language: English / Chinese			
SCOPUS	(TITLE-ABS-KEY (brazil-china) AND TITLE-ABS-KEY (relationship))	171	154
Web of Science	brazil-china (Topic) AND relationship (Topic)	136	62
China National Knowledge Infrastructure (CNKI)	Title “China”(Zhongguo, 中国) + Title “Brazil”(Baxi, 巴西) Selection condition: (i) 1994–2024	228	108
	(ii) Academic Journals (Only include SCI, EI, CSSCI, CSCD, AMI, 北大核心)		
	Title “China-Brazil Relations” (Zhongba Guanxi, 中巴关系) Selection condition: (i) 1994–2024	23	20
	(ii) Academic Journals (Only include SCI, EI, CSSCI, CSCD, AMI, 北大核心)		
Total:		625	394

Source: Authors (2025).

The SCIELO.org search returned 24 articles, five of which were removed for not meeting the inclusion criterion. The .periodicos.CAPES search returned 43 articles in total, with nine removed for failing to meet the inclusion criterion and four excluded as duplicates from the previous search. Further searches were conducted in the SCOPUS and Web of Science (WoS) indexing databases in English. The SCOPUS search returned 171 records, with 17 exclusions, while WoS returned 136 records, with 74 exclusions. Finally, searches were conducted on the China National Knowledge Infrastructure (CNKI) indexing platform for Chinese journals, in both English and Chinese.

The CNKI platform does not offer a peer-review filter. Therefore, additional criteria were adopted: (i) a paper must only be published in journals from SCI, EI, CSSCI, CSCD (Chinese Science Citation Database); (ii) the paper must pass the AMI (evaluation system for Chinese journals in humanities and social sciences); and (iii), it must be catalogued in 北大核心 (A Guide to the Core Journals of China, conducted by Peking University). The CNKI searches returned 251 records, of which 123 were eliminated by the exclusion criteria, leaving 128 articles. Our SLR identified a total of 625 articles, with 231 excluded, leaving 394 that met the inclusion criterion.

To complement searches for studies aligned with the research proposal, we used Connected Papers (Eitan et al. 2021) to identify seminal and derivative studies based on a primary study selected by the authors. The criteria for choosing a study to use on the ConnectedPapers platform included its title and abstract's alignment with the theme "Brazil-China relations", and it had to have been published for at least 10 years by the time this research was conducted (to ensure the selected study had a substantial number—50 or more—of citations). Consequently, the study entitled "China and Brazil: Economic Impacts of a Growing Relationship" (Jenkins 2012) was selected.

The ConnectedPapers platform generates a connection graph¹ grounded in co-citation and bibliographic coupling (Eitan et al. 2021). From this graph, the platform identifies a set of seminal articles² - such as Athukorala (2009); Eichengreen et al. (2007); Greenaway et al. (2006); Jenkins and Edwards (2006); Lall and Albaladejo (2004); Lall et al. (2004); Lederman et al. (2008); Moreira (2004); Rodríguez et al. (2006); and Rodríguez-Clare et al. (2006) - stemming from Jenkins (2012). These seminal works are those most frequently cited by papers within the connection graph (Eitan et al. 2021). Additionally, the platform highlights derivative articles³ - including Barker (2021); Cunha et al. (2013; 2022; 2023); Jenkins (2022); Jenkins and Edwards (2015); Stanojevic et al. (2020); Urdínez (2017); Welslau et al. (2024); and Xu (2016). Derivative articles

¹ The connection graph generated for this study is available at: <https://www.connectedpapers.com/main/f75f0fa46fccb678e130c9d2cfb3291da8a3be4a/China-and-Brazil%3A-Economic-Impacts-of-a-Growing-Relationship/graph>

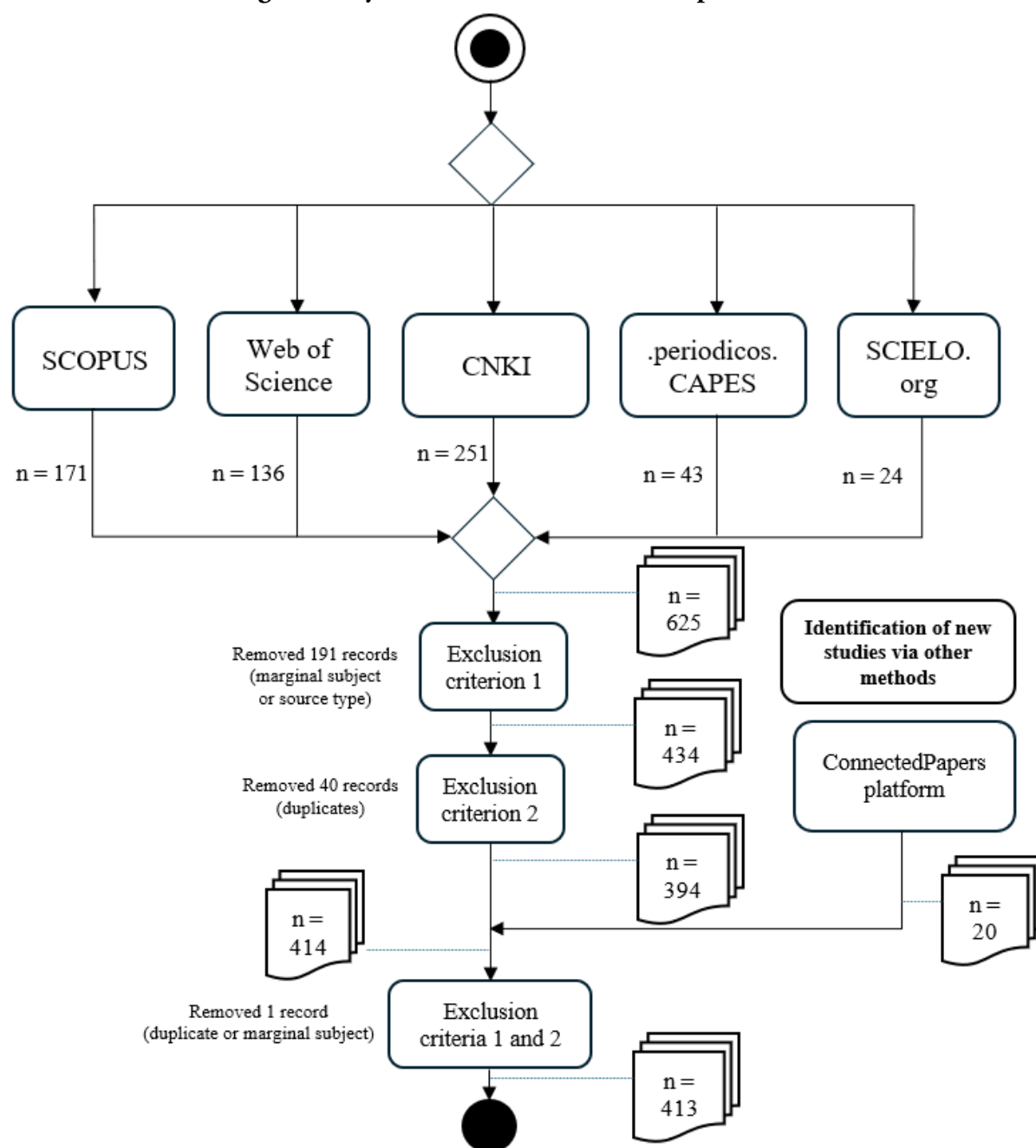
² The table of seminal studies is available at: <https://www.connectedpapers.com/main/f75f0fa46fccb678e130c9d2cfb3291da8a3be4a/China-and-Brazil%3A-Economic-Impacts-of-a-Growing-Relationship/prior>

³ The table of derivative studies is available at: <https://www.connectedpapers.com/main/f75f0fa46fccb678e130c9d2cfb3291da8a3be4a/China-and-Brazil%3A-Economic-Impacts-of-a-Growing-Relationship/derivative>.

are characterized by their extensive citation of studies in the graph, suggesting they represent recent, thematically aligned contributions to the field (Eitan et al. 2021).

Based on the data from the SLR (Table 2) and the list of seminal and derivative articles from the ConnectedPapers platform, a total of 413 articles were included in the research database. Figure 1 shows SLR process, which was derived from the PRISMA 2020 flow diagram.

Figure 1. Systematic literature review procedure



Source: authors based on PRISMA 2020 flow diagram.

After identifying the 413 articles, we imported the PDF or .RIS files for each article into the Zotero reference manager. Once the records were imported, we exported the articles' metadata (such as title, name(s) of author(s), journal where each was published, date/year of publication, etc.) in .CSV format to an Excel spreadsheet.

Using Power Query, we transformed the data by initially having each author's name in a single spreadsheet cell. We then separated the names into individual rows and duplicated the corresponding metadata (such as title, place of publication, year, etc.) for each author. This standardization ensured that each row now represents a single author. This process allowed us to create new columns for each author's gender, affiliation (including the affiliation's acronym/abbreviation), and country of affiliation. We manually classified this information for a total of 879 records. Data analysis was conducted using the PivotTable feature in Excel, and social network analyses were performed with UCINET© 6.799 and NetDraw (version 2.190) (Borgatti et al. 2002).

Given that the dataset was limited in terms of the number of connected nodes, three types of social network analyses were employed (Borgatti et al. 2002; 2018). First, centrality measures were applied to identify the most influential nodes within the network, drawing on degree, closeness, and betweenness centrality as the primary metrics. Second, k-core analyses were conducted, where a k-core is defined as a subnetwork in which each node is connected to at least k other nodes. Finally, components were examined, understood as subnetworks in which all nodes are directly or indirectly connected, without ties to nodes outside the component (Borgatti et al. 2002; 2018).

Analysis and Discussion

We began the analyses by identifying the number of authors based on their country of affiliation. As shown in Table 7, the majority of authors are from China (399; 47.7%), followed by Brazil (124; 14.8%), Russia (51; 6.1%), and the United Kingdom and the United States (33; 3.9%). The predominance of authors from China and Brazil was as expected, due to the focus of the study and the criteria applied for identifying the studies. However, there is a significantly higher number of Chinese researchers than from Brazil (e.g., Nguyen and Choung 2020), indicating that China may have a larger pool of researchers, or that a few researchers are publishing many studies.

China, Brazil, and Russia stand out for having the highest numbers of authors involved in publications during the analyzed period (1994 - 2024). However, the aggregation by authors may not accurately represent the country/publication relationship, as a single publication can have multiple authors from one country, inflating the data for that country. Therefore, we grouped the data by article and respective affiliations of the authors.

China leads with 203 publications (43.7%), followed by Brazil (64; 13.5%), Russia (25; 5.3%), the United Kingdom (23; 4.8%), and the U.S. (22; 4.6%). These figures highlight China's prominent scientific contribution within the context of Brazil-China relations and the BRICS framework. Knight (2018) emphasizes that the horizontal structure of KD fosters collaboration

among research centers, universities, colleges, and regional centers of excellence. To explore this dynamic, we analyzed the authors’ affiliations to identify the universities most frequently represented in collaborative Brazil-China publications (Table 3).

Table 3. Relationship Between Authors’ Institutional Affiliations and Their Country or Region

Country/Region	Affiliattion of the authors	Total	%
Brazil	Federal University of ABC	4	0.7
Brazil	Federal University of Pernambuco	5	0.9
Brazil	Federal University of Rio Grande do Sul	5	0.9
Brazil	Federal University of Uberlândia	4	0.7
Brazil	University of Brasilia	6	1.0
Brazil	University of Campinas	5	0.9
Brazil	University of São Paulo	12	2.1
China	Beijing Normal University	5	0.9
China	China Agricultural University	8	1.4
China	Chinese Academy of Agricultural Sciences	5	0.9
China	Chinese Academy of Social Sciences	26	4.5
China	Hubei University	4	0.7
China	Renmin University of China	10	1.7
China	Tsinghua University	5	0.9
China	University of International Business and Economics	4	0.7
Macau SAR (China)	University of Macau	4	0.7
Russia	Russian Academy of Sciences	7	1.2
United Kingdom	University of Oxford	4	0.7
U.S.	Tufts University	4	0.7

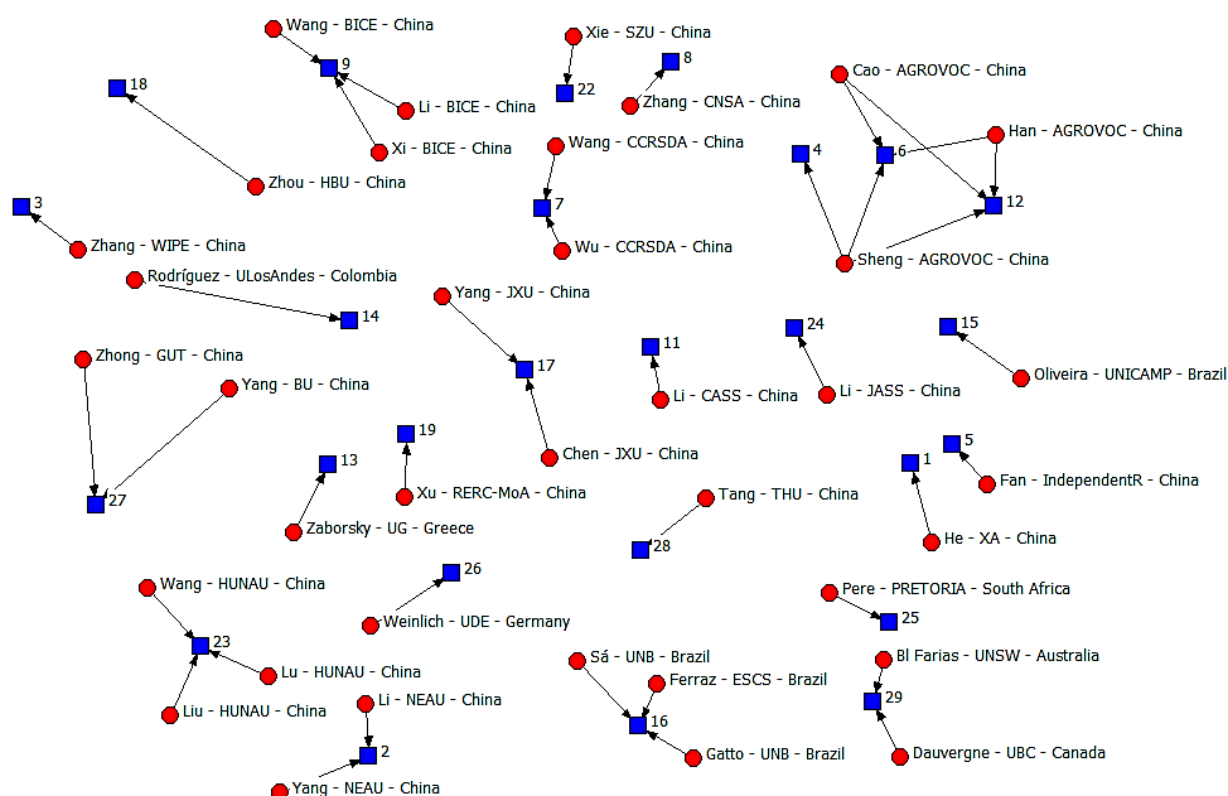
Source: authors (2024).
Note: Only universities with more than three publications are presented in the tables.
It is possible for a single publication to have authors with different affiliations, resulting in multiple counts.

The data in Table 3 highlight the prominence of the Chinese Academy of Social Sciences, which accounts for the highest number of publications (26 or 4.5%). It is followed by the University of São Paulo (12 or 2.1%), Renmin University of China (10 or 1.7%), China Agricultural University (8 or 1.4%), and the Russian Academy of Sciences (7 or 1.2%). These findings show that these institutions have made the most significant contributions to studies on Brazil-China relations or on BRICS. However, it is unclear whether collaborations exist among these institutions or others identified in the study.

The following sections present a temporal analysis of the data and their connection networks. Between 1995 and 2005, the number of authors producing scientific knowledge about Brazil and China was relatively low. During this period, a total of 41 authors contributed, averaging 4.1 per year. Our SLR did not identify any publications before this timeframe. This absence may be because the strategic partnership agreement between Brazil and China was only signed in May 1993 (Oliveira 2010), and academic interest was likely not stimulated until a few years afterwards.

To explore potential collaboration during this period, we analyzed the network of connections between the publications and their authors. This network includes numerical data and details of the authors (e.g., last name, affiliation (acronym), and country), as presented in Figure 2.

Figure 2. Network of Publications (1995-2005)



Source: Developed by the authors using UCINET software.

Notes: The number associated with the blue squares refers to the article identifier in the database developed by the authors.

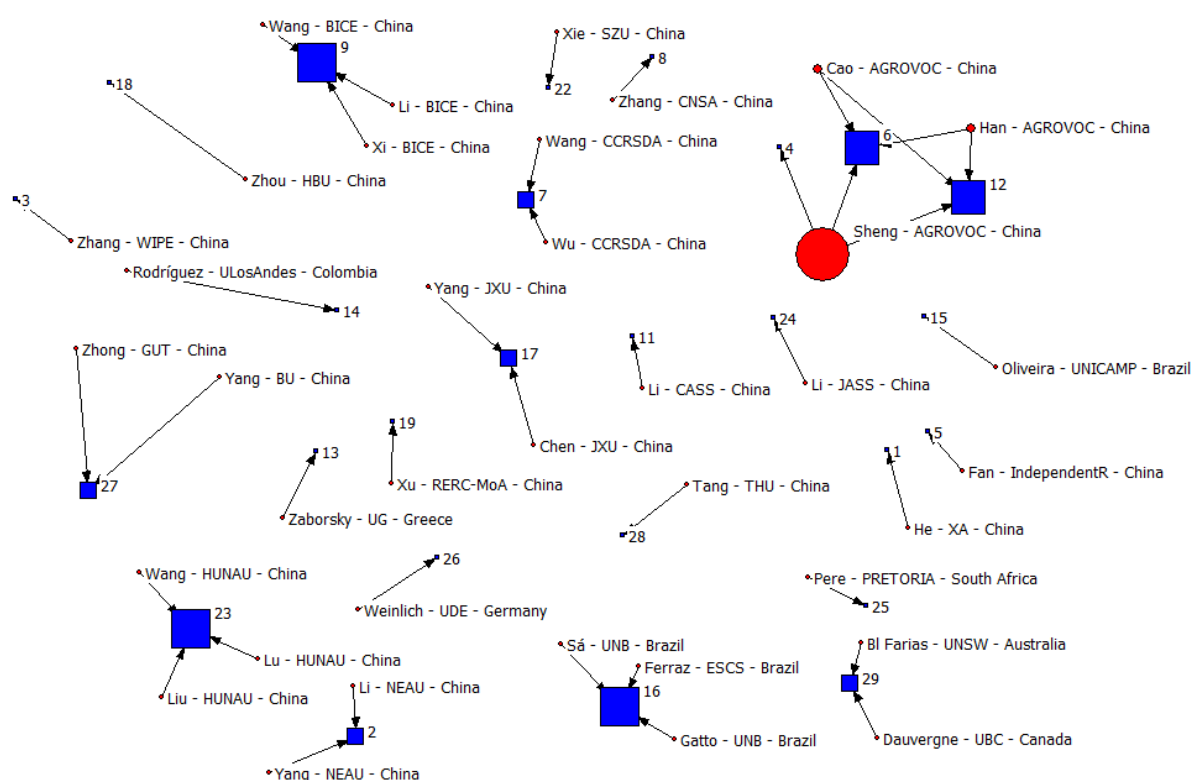
The red circles represent the authors associated with the article.

Our analysis begins in 1995 because no publications were found for 1994.

Figure 2 displays a total of 37 authors and 26 articles. The findings indicate that, during the analyzed period (1995 - 2005), no joint knowledge production occurred between Brazil and China through diplomatic channels (Knight 2018a). Instead, scientific collaborations were confined to researchers affiliated with either the same or different HEIs within the same country.

Figure 3 presents an analysis of centrality measures for the 1995–2005 publication network, revealing a single central node. This node - highlighted by a red circle and labeled “Sheng – AGROVOC – China” - corresponds to Sheng Jinshan of the Chinese Academy of Agricultural Sciences. Between 1995 and 2005, Sheng authored three articles, all of which focused on the introduction of a Brazilian crop, upland rice, to China. These contributions positioned him as the central figure in the scholarly output of that decade.

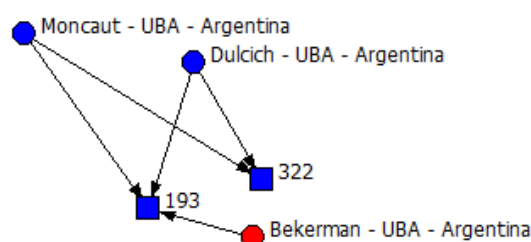
Figure 3. Centrality Measures in the Publication Network (1995–2005)



Source: Developed by the authors using UCINET software.

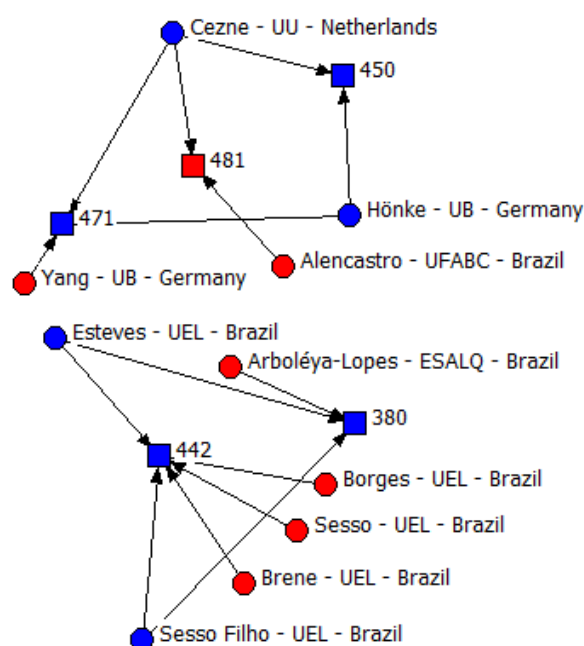
Note: Our analysis begins in 1995 because no publications were found for 1994.

The blue squares in Figure 3 represent nodes with higher centrality, denoting articles with more connections or a larger number of authors. These nodes are highlighted in the centrality measure only because the same paper has several authors, but no external connections. In the following decade (2006 - 2015), the number of published articles increased significantly to 190, involving 306 authors. Even with this increase, however, the connections in the network remained relatively simple. To demonstrate this low complexity, we conducted an analysis of the k-cores of the network, which allows for the identification of the network's core, which are highly connected nodes with a greater density of interactions (Figure 4).

Figure 4. *k*-cores of the network of publications between 2006 and 2015

Source: Developed by the authors using UCINET software.

The *k*-core of the network is represented by authors Marta Bekerman, Nicolás Moncaut, and Federico Dulcich, all affiliated with the University of Buenos Aires, Argentina. The studies included in the *k*-core (IDs 193 and 322) examine the expansion of economic relations between China and Latin American countries, particularly Brazil and Argentina. These works frame the relationship as a short-term opportunity for increased exports of primary goods and improved terms of trade. However, the authors also highlight long-term risks, noting that without effective management, such dynamics could exacerbate external structural vulnerabilities (Bekerman et al. 2014). We conducted a subsequent centrality analysis of the publication network spanning 2016 to 2024. The dataset comprises 215 published articles and 452 authors who contributed to these publications during this period. In fact, this period had the highest number of publications and authors since 1994. However, although the network of publications is denser in terms of number of nodes, it remains relatively simple, as indicated by the *k*-core analysis (see Figure 5).

Figure 5. K-Core Analysis of the Publication Network (2016–2024)

Source: Developed by the authors using UCINET software.

The analysis of the k -core for the publication network from 2016 to 2024 revealed two groups of highly connected nodes that are characterized by a greater density of interactions. The first group, located at the top of Figure 5, includes authors Eric Cezne (affiliated with Utrecht University, Netherlands), Jana Hönke, and Yifan Yang (both affiliated with the University of Bayreuth, Germany), along with Mathias Alencastro (Federal University of ABC, Brazil). The publications produced by this group (Alencastro and Cezne 2023; Cezne and Hönke 2022; Hönke et al. 2023) address key issues relating to South-South relations. They emphasize the roles of governments, local elites, and corporations in shaping development practices and expectations. In the context of the Brazilian mining company Vale's operations in Mozambique and Guinea, these relationships extend beyond the initial promises of horizontal partnerships. For example, the article on Mozambique (Cezne and Hönke 2022) focuses on the actions of Mozambican elites and Brazilian professionals, who, by employing cultural imaginaries, seek a different vision of corporate responsibility. Conversely, the case study of Guinea (Alencastro and Cezne 2023) illustrates the failure of an extractive ambition due to political tensions and economic disputes.

In this group, we observe the concept of liminality in Brazil–China relations (Hönke et al. 2023), which underscores the ambiguity inherent in South-South identities and policies, particularly in their engagements with Africa. This perspective highlights the complex challenges and dilemmas faced by Global South actors operating within African contexts, and the implications these dynamics hold for investment strategies and international identity formation (Hönke et al. 2023).

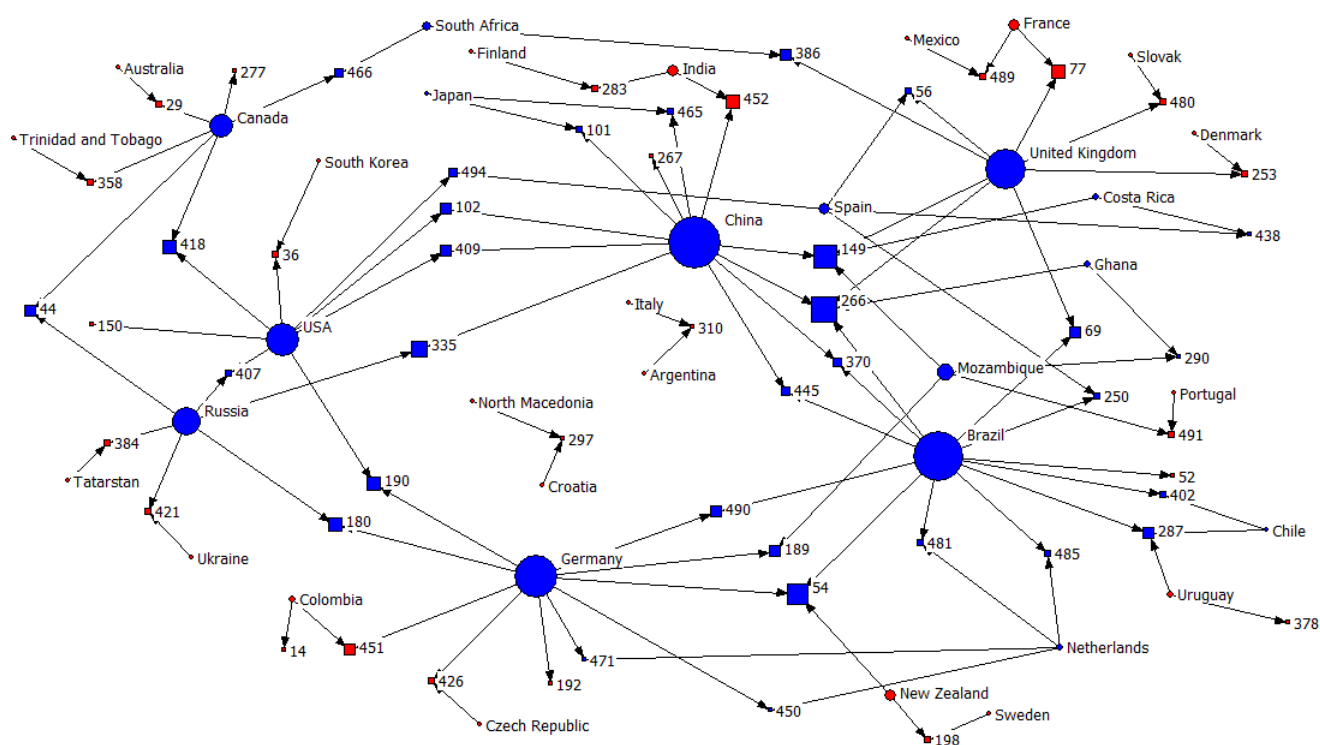
The second cluster of highly interconnected nodes (Figure 5) consists exclusively of authors affiliated with Brazilian institutions - namely, the State University of Londrina and the Luiz de Queiroz College of Agriculture at the University of São Paulo. It is worth noting that these authors are not necessarily all Brazilian nationals. Their publications (Arboléya-Lopes et al. 2020; Sesso Filho et al. 2022) investigate the contribution of agribusiness to global GDP across 63 countries (1995-2015), and its correlation with the Human Development Index (HDI). The studies reveal a declining trend in agribusiness's share of global GDP, which coincides with rising HDI levels. Countries with higher HDI tend to exhibit a greater contribution from industrial and service sectors within the composition of agribusiness GDP.

Subsequently, we analyzed the centrality measures of the publication network spanning the period from 2016 to 2024. Among the publications in our dataset, Study ID 410 (Guan et al. 2021) - which includes nine authors - emerged as the most central according to these measures. While the number of authors contributes to the publication's prominence in terms of centrality, it does not necessarily enhance the complexity of the network's connectivity. This pattern is consistent across other notable publications from the same period.

Our findings point to limited inter-institutional collaboration and minimal cross-national engagement, particularly between Brazilian and Chinese researchers. To examine international collaboration more closely, we classified publications as either “cross-country” (defined as those involving at least two authors affiliated with institutions in different countries) or “non-cross-

country.” To visualize these collaborative patterns, we constructed a co-authorship network based on authors’ institutional affiliations by country. Despite the relatively modest sample -comprising 55 publications and 146 authors - this network reveals a more intricate pattern of international cooperation than previously observed. Moreover, our centrality measure analysis, illustrated in Figure 6, identifies two prominent nodes: China and Brazil. The network visualization shows China’s collaborative links with Brazil, the U.S., the United Kingdom, Russia, Japan, Ghana, and Costa Rica, while Brazil has connections with China, Germany, Chile, the Netherlands, New Zealand, Ghana, Uruguay, and the United Kingdom. We found it particularly notable that direct Brazil-China collaborations were limited to three publications (266, 370 and 445) (Escher and Wilkinson 2019; Rossi et al. 2022; Scoones et al. 2016). The institutional composition of these three collaborative works is as follows: Paper 266 was co-authored by researchers from China Agricultural University, the Federal University of ABC (Brazil), University of Ghana, and University of Sussex (one author from each institution); Paper 370 was a collaboration between China Agricultural University and the Federal Rural University of Rio de Janeiro (one author from each); and Paper 445 was a joint work between Fudan University (one author) and the State University of Campinas (UNICAMP) (two authors).

Figure 6. Centrality Measures in the Co-authorship Network of Publications Across Institutional Affiliations



Source: Developed by the authors using UCINET software.

Note: The graph only considers articles that have been previously identified as a cross-country publication.

The three collaborative studies previously discussed each addressed distinct research themes. Scoones et al. (2016) examined Brazil and China's agricultural engagement in Africa, proposing a novel cooperation paradigm rooted in state-business relations that seeks to move beyond conventional narratives of South-South cooperation or neo-imperial expansion. Escher and Wilkinson (2019) analyzed the Brazil-China soy-meat complex, exploring how Chinese meat demand and Brazilian soy production have reshaped global agri-food systems and influenced Chinese investment strategies in Brazilian agribusiness. Rossi et al. (2022) conducted a comparative analysis of income tax distribution in both countries, highlighting that although China employs a more progressive tax structure, it does not necessarily reduce inequality due to the design of exemption thresholds and income brackets.

The identification of only three co-authored scholarly publications between Brazilian and Chinese institutions - despite three decades of deepening bilateral relations and the establishment of multiple high-level diplomatic frameworks aimed at fostering academic collaboration - should not be interpreted as a methodological limitation. Rather, it constitutes a critical empirical insight that exposes enduring structural and epistemic asymmetries within Brazil-China KD. When analyzed through the dual theoretical lenses outlined in our framework - namely, classical (state-centric and soft power-oriented) and critical (co-empowering instrument of transformation) - this scarcity of direct scholarly co-production serves as a diagnostic indicator of the disjunction between diplomatic rhetoric and epistemic practice.

From a KD classical perspective, the proliferation of bilateral agreements - such as the Brazil-China Center for Climate Change (2010), the EMBRAPA-CAAS Joint Laboratory (2011), and China's support for Confucius Institutes in Brazil - suggests the existence of an institutional architecture for knowledge exchange. However, the near-absence of co-authored research outputs challenges the assumption that formal diplomatic structures inherently lead to substantive academic collaboration. This discrepancy reveals a coordination deficit: while states may articulate shared agendas (such as sustainable agriculture and clean energy), the translation of these agendas into joint research initiatives remains constrained by divergent academic incentives, bureaucratic hurdles, language barriers, and misaligned funding cycles.

Moreover, the fact that all three identified collaborations involve elite institutions - Tsinghua, Fudan, and China Agricultural University on the Chinese side; UNICAMP, UFABC, and UFRRJ on the Brazilian side - suggests that KD in this bilateral context is highly concentrated. This reflects what Haas (1992) describes as the formation of "epistemic communities" among a narrow stratum of globally connected researchers. While this pattern aligns with liberal institutionalist expectations (Keohane and Nye 1977), which posit that cooperation emerges among capable, like-minded actors, it also underscores the limitations of such cooperation in scaling beyond elite nodes and fostering broader epistemic inclusion.

Viewed KD through a critical, decolonial lens, the scarcity of co-publications must be interpreted as symptomatic of deeper epistemic asymmetries. As Santos (2014) and Connell (2007) argue, global knowledge production is structured by hierarchies that privilege Northern -

and increasingly Sinocentric - epistemologies, methodologies, and publication venues. In the Brazil–China case, this asymmetry manifests in two interrelated dimensions:

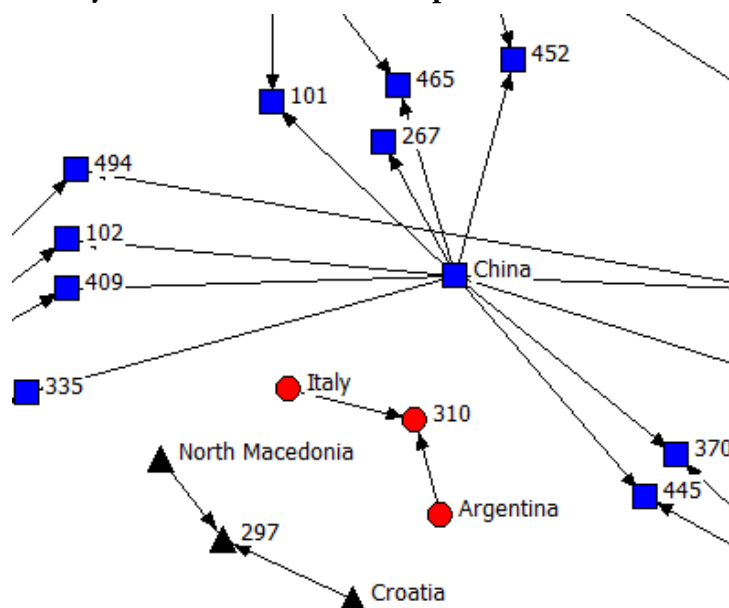
1) Agenda-setting dominance: Chinese institutions, supported by substantial state investment in science and technology (such as the academic arm of the B&RI), often define the research priorities. Brazilian partners may be invited to contribute data or local expertise, but rarely participate as co-architects of the conceptual framework. The three co-authored publications reflect this dynamic: two focus on agricultural systems framed through Chinese food security concerns, while the third addresses climate policy under Chinese institutional leadership. This reproduces what Mignolo (2009) terms “epistemic coloniality,” wherein collaboration conceals underlying patterns of epistemic extraction.

2) Visibility and legitimacy gaps: Despite Brazil’s strong tradition in critical social sciences and agroecology, its scholarly contributions remain less visible within dominant academic circuits - particularly English-language, SCI-indexed journals - that Chinese institutions increasingly navigate and shape. The asymmetry is not merely quantitative (i.e., fewer Brazilian authors), but qualitative: whose theoretical frameworks, ontologies, and policy recommendations gain traction? The near-invisibility of Brazilian epistemic agency in joint outputs - even when Brazilian institutions are formally listed - signals a deeper structural inequity that classical models of knowledge diplomacy, with their emphasis on “mutual benefit,” tend to obscure.

Thus, as previously noted, the empirical finding of only three co-authored publications should not be interpreted as a failure of diplomacy, but rather as evidence of its contested nature. It demonstrates that knowledge diplomacy is not a neutral conduit for exchange, but a site where power - both sovereign (state-driven agendas) and epistemic (knowledge validation regimes) - is actively negotiated. The Brazil - China relationship exemplifies what Acharya (2014) describes as the “global IR” paradox: rising powers such as China expand their knowledge infrastructures globally, yet this expansion often reproduces, rather than reconfigures, existing hierarchies. Brazil, despite its self-positioning as a Global South intellectual bridge, continues to struggle for epistemic parity.

This tension between the rhetorical promise of reciprocity in KD and the empirical reality of asymmetrical co-production emphasizes the study’s central theoretical contribution: KD must be understood not only as an instrument of statecraft, but as a contested field of epistemic power. The scarcity of joint publications, far from being a marginal detail, is emblematic of the unresolved contradictions at the heart of South-South knowledge diplomacy in an era of multipolar realignment.

To complete our analysis, we conducted a component analysis (CA), defining components as sub-networks where nodes maintain internal connectivity but lack external connections, as illustrated in Figure 7.

Figure 7. Component Analysis of the Co-authorship Network Across Institutional Affiliations

Source: Developed by the authors using UCINET software.

The component analysis revealed a notable pattern of isolation among certain countries within the network of international publications on Brazil–China relations. Specifically, North Macedonia, Croatia, Italy, and Argentina produced research without establishing connections to other authors or publications in related thematic areas. This fragmentation suggests limited integration into broader transnational academic networks and raises questions about the structural and epistemic conditions shaping international collaboration. Three interrelated factors may explain this isolation:

(i) **Limited International Connectivity** – The absence of co-authorships and cross-referenced publications indicates restricted access to global academic networks focused on Brazil–China relations. This may stem from linguistic barriers, lack of institutional support, or insufficient participation in international research consortia. Without structured mechanisms -such as joint conferences, mobility schemes, or bilateral funding - collaborative relationships remain difficult to establish, limiting both visibility and the potential of knowledge diplomacy.

(ii) **Minimal Engagement with the Topic** – The thematic scope suggests that Brazil–China relations may not be a priority for researchers in these countries. National research agendas may focus on other geopolitical concerns, and limited awareness or incentives further reduce engagement. Consequently, relevant research often remains disconnected from broader academic conversations.

(iii) **Institutional Concentration** – The data reveal a strong concentration of research within domestic institutions, with little evidence of cross-border collaboration. This insularity may reflect structural constraints such as limited funding, bureaucratic hurdles, or a lack of strategic vision. When research is confined to national universities, it undermines horizontal collaboration, mutual learning, and the development of shared epistemic communities - core elements of knowledge diplomacy.

Conclusion

This study revisits the central research question: To what extent does knowledge diplomacy manifest in Brazil-China bilateral relations? Addressing this question requires situating the findings within the dynamic tension between two coexisting theoretical perspectives - classical, which frames KD as an extension of statecraft and soft power, and critical, which emphasizes its transformative potential as a co-empowering, purposive, and horizontal practice capable of addressing global challenges. The interplay between these lenses offers a nuanced framework for understanding the complex and often contradictory nature of Brazil-China knowledge diplomacy.

From the classical perspective, the proliferation of bilateral agreements and institutional collaborations promotes attraction, legitimacy, and control over the international agenda, thereby reinforcing existing hierarchies. In this sense, it is reasonable to assert that a degree of knowledge diplomacy exists between Brazil and China. However, from a critical standpoint - which we posit as the concept's natural evolution - where KD is conceived as a generative instrument for new epistemologies, the study demonstrates that such transformative engagement, if present, remains in an embryonic state.

The evidence presented in this study suggests that scientific collaboration between Brazil and China is primarily driven by isolated efforts of individual researchers, rather than by collaborative, horizontal networks capable of generating transformative impact. Despite an extensive literature review, only three joint initiatives were identified, involving a small cohort of six researchers, with no sustained institutional partnerships over the past three decades. This reflects a broader pattern of fragmentation, characterized by limited international connectivity, a concentration of research within domestic universities, and a lack of clearly defined shared interests.

The findings indicate that, in the current state of Brazil-China relations, critical KD remains in its infancy and has yet to yield transformative outcomes in addressing global challenges. Both countries continue to rely on classical models of knowledge production and influence, lacking a visionary framework that aligns academic collaboration with transformative actions capable of a global impact. This absence of coordinated direction undermines the potential of KD to serve as a catalyst for innovation, mutual understanding, and global influence.

For policymakers, these findings underscore the need to move beyond symbolic agreements toward mechanisms that enable equitable co-design, co-authorship, and co-ownership of research. Examples include joint PhD programs with shared supervision, bilingual publication support, jointly operated laboratories, and funding schemes tied to parity metrics. For international relations theory, this calls for a reconceptualization of knowledge diplomacy beyond the soft power paradigm. The transformative potential of knowledge diplomacy lies not in its capacity to enhance state influence, but in its ability to advance transformation - a goal that demands deliberate decolonial praxis rather than a mere increase in the volume of collaboration.

While this study adheres to established methodological standards, certain limitations must be acknowledged. The conceptual framework of KD employed herein imposes constraints, as the conclusions are primarily derived from patterns of scientific cooperation and higher education

engagement. One notable limitation is the exclusion of impact of informal diplomacy. Furthermore, future research should broaden the analytical scope to include variables such as policy coordination, funding mechanisms, institutional capacity, and informal diplomatic practices, which may either reinforce or challenge the findings presented in this study.

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Data Availability Statement

The data supporting the findings of this study are openly available in the Harvard Dataverse repository at <https://doi.org/10.7910/DVN/3DQTZ6>. The dataset is cited as: Frogeri, Rodrigo; Leandro, Francisco José; Li, Yichao (2025), “Replication Data for: Brazil–China Relations: A Three-Decade Analysis of Knowledge Diplomacy (1994–2024)”, Harvard Dataverse, V1.

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