



The Belt and Road Initiative (BRI): Historical Perspectives and Mapping of Documents Indexed in Scopus Database

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Abstract. This study used bibliometric analysis to illustrate study hubs and trends related to the Belt and Road Initiative (BRI) to anticipate future global growth better. The visuals included countries, institutions, writers, references, and keywords. Every year, the number of articles on Belt and Road expanded dramatically. Most of these publications are from 56 different states, 24 subject areas, 160 funding organizations, and 522 peer-reviewed journals. Wang Y had the most articles ($n = 18$), among others. Sustainability was the journal with the most articles ($n = 44$), and the Journal of Contemporary China was the most cited. The top most frequent topic was “China,” “Belt and Roads,” “Sustainable Development,” “Economic Development,” “Infrastructural Development,” “International Trade,” and “Investment.” We summarized the publication of BRI-related literature years from 2015 to 2012, including country and institution of origin, authors, and publication. This scholarly investigation gives experiences into the world and the project of the BRI, highlighting the hot topic, research area, active authors, and contributed countries towards scientific research. We further analyzed the hotspots and changes in the topic during the reported years with predicted future areas of interest within different groups of clusters.

Keywords: BRI, bibliometric, Scopus database, VOSviewer

1 Introduction

During his two separate state trips to Kazakhstan and Indonesia in September and October 2013, the Leader of the Individual Republic of China, Xi Jinping, formally unveiled the broader concept known as the Belt and Road Initiative (in the future named "BRI") ^[1]. It meant that the BRI had arrived at the genuine preparation and execution phase. China, in this manner, embraced possibly the main global program of the twenty-first century ^[2]. The initiative includes two components: the “Silk Road Economic Belt,” an overland Eurasian economic network linking China with Asian,

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European, and Middle Eastern countries, and the “21st Century Maritime Silk Road,” a maritime economic network running from Chinese coastal ports to the South China Sea, the Indian Ocean, Southeast Asia, the South Asian subcontinent, Africa, the Middle East, and Europe. The BRI is another way for China to further its monetary advancement and cross-line business cooperation with different states ^[3]. BRI expects to work on fiber optic frameworks, foundations, airports, terminals, roads, streets, and railroad networks by giving monetary advantages through change and enabling taking part states ^[4]. The Belt and Road Initiative (BRI) holds the potential to increase China's and the other Belt and Road countries' involvement. People-to-people relationships are one of the five goals the Chinese government has set forth, along with unrestricted commerce and financial integration. International academic collaboration and education are how this final goal is to be accomplished ^[5]. Consequently, BRI is one of the most aggressive global initiatives in recent memory since its influence has expanded well beyond the historic Silk Way. Global economic growth has benefited from the BRI, and as a relatively new field of study, it has raised interest among academics worldwide. Among other things, this study stream usually focuses on the economy, commerce, and energy ^[6, 7]. According to government publications, the “BRI” is a universal gift from China, “a noble cause that helps the people of the world” ^[8]. As a result, since its inception, the BRI has received increasing attention from the media, national governments, international organizations, and scholars worldwide. Numerous research findings related to the BRI have emerged, including over 100 fields in the Web of Science database and about over 100 nations and international organizations. The expansion of China's economy worldwide ^[9, 10]. Hou and Wang ^[11] used a bibliometric technique to analyze the characteristics of publications, academic hotspots, research foundations, and the evolutionary routes of studies in the fields of environment and energy. Maretti et al. ^[12] employed the methods of co-word, co-author, and co-citation analysis to determine the hottest topics in research. As a result, the BRI's appeal has grown, for example, an outcome of the Chinese administration's policy priorities ^[13]. The bibliometric analysis tool that explored information was adopted for mapping to provide responsibility for research trends and themes in BRI research. Many authors have described the use of bibliometric analysis to track the productivity of scientific research to help researchers and decision-makers better understand research productivity and track the advancement of scientific research in the vast amounts of data generated by the international scientific community ^[14]. The goal of the study was to map out research hotspots and trends in BRI using bibliometric analysis to gain a better understanding of future development on a global scale, as well as to further identify research gaps and future study direction.

2 Material and Methods

The Scopus database served as the study's data source. We examined the titles and screened for article types. The following was the presentation of the literature search strategy: BRI is based on the Bashir et al., 2021 paper that was previously published ^[15]. The only published works on BRI that were in English were included. Publications

were scheduled to run from the beginning of the year to 2021. To minimize bias resulting from daily changes to the Scopus database, all search effort was completed on a single day on December 1, 2021. Since this study only included the evaluation of secondary data and did not involve any interaction with human participants, informed permission was not necessary. This update makes use of the journal data from the Clarivate Analytics Web of Science basic collection, which is compiled through the Science Citation Index (SCI) and Social Sciences Citation Index (SSCI). To recover documents connected to major subjects, 'BRI' a keyword was employed in the creation of the search plan. Finally, 1183 retrieved the relevant literature on the BRI published from 2015 to 2021 (Fig. 1).

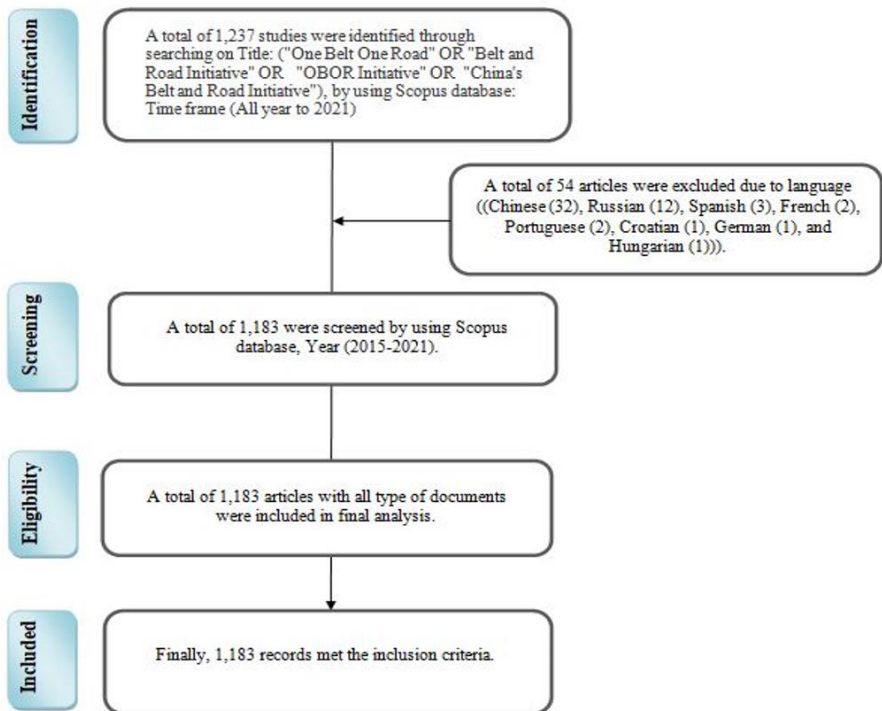


Fig. 1. Current graph of the revision collection on BRI from the Scopus database.

2.1 Bibliometric Analysis

VOS viewer software was used to evaluate the data [16]. HistCite [17, 18] Using Rstudio v.3.6.2 software with the bibliometric R-package [19] and VOSviewer version 1.6.10 software packages [20], academic analysis (bibliometrics) and descriptive analysis of the BRI literature were examined. The relevant figures were created using Origin Pro 9.0 software. Only the "topic," which had the "title, abstract, and keywords" elements, was included in the search parameters. Since peer-reviewed papers can reflect "certified

knowledge," we decided to use them instead of other document types, such as editorials, book chapters, records, letters, and reports, as well as later bibliometric studies. We also counted reviews, early-access papers, and articles published in academic journals [21, 22].

3 Results

3.1 Annual Trend of Publications

Fig. 2 indicates the number of publications for the BRI research effort has been trending upward, with 7 papers published in 2015, 182 articles in 2018, and 343 articles in 2020, which shows the comprehensive attention of the scientific community on BRI research globally.

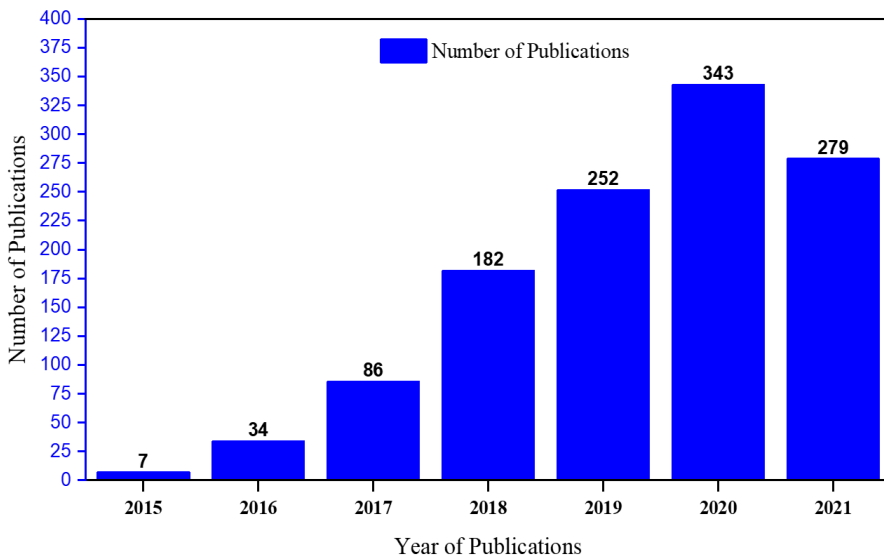


Fig. 2. Trend BRI investigation during 2015 and 2021.

3.2 General Statistics of BRI Research

For 1183 research papers on BRI were published from 2015 to 2021. With help from 159 organizations, these materials were created by authors from 56 different countries in 2016 and published in 522 publications Table 1. The total publications were received 8,281 with an average citation per document of 7 times, and an index between authors was 2.24.

Table 1. General statistics of BRI investigation.

Description	Results	Description	Results
Timespan	2015:2021	Keywords Plus (ID)	2397
Sources (Journals, Books, etc)	522	Author's Keywords (DE)	2366
Affiliation.	160	Authors	
Funding organizations	159	Authors	2016
Country	56	Author Appearances	2960
Subject area	24	Authors of single-authored documents	397
Documents	1183	Authors of multi-authored documents	1619
Total citations	8,281	Authors Collaboration	
Average years from publication	1.65	Single-authored documents	459
Average citations per documents	7.00	Documents per Author	0.587
Average citations per year per doc	2.282	Authors per Document	1.7
References	51493	Co-Authors per Documents	2.5
Document Contents		Collaboration Index	2.24

3.3 Top Highly Cited Articles on BRI Investigation (Top 10 Most Cited Papers)

The top 10 named papers are presented in Table 2. The citations range was 92 to 255 times. "Westward the China Dream and 'Belt and Road': Chinese foreign policy under Xi Jinping" is the most referenced work by Ferdinand P. (2016), published in "International Affairs," with 225 citations.

Table 2. Top 10 cited articles for investigation on BRI.

	Authors	Title	Source title	TC
1	Ferdinand P.2016	Westward the China dream and 'belt and road': Chinese foreign policy under Xi Jinping	International Affairs	255
2	Yu H.2017	Motivation behind China's 'belt and road' initiatives and establishment of the Asian infrastructure investment bank	Journal of Contemporary China	208
3	Liu W., Dunford M.2016	Inclusive globalization: unpacking China's Belt and Road Initiative	Area Development and Policy	205
4	Du J., Zhang Y.2018	Does Belt and Road initiative promote Chinese overseas direct investment?	China Economic Review	187
5	Ascensão F., et al. 2018	Environmental challenges for the Belt and Road Initiative	Nature Sustainability	147

6	Wang Y. 2016	Offensive for defensive: the belt and road initiative and China's new grand strategy	Pacific Review	140
7	Rauf A., et al., 2018	Testing EKC hypothesis with energy and sustainable development challenges: a fresh evidence from belt and road initiative economies	Environmental Science and Pollution Research	110
8	Cheng L.K. 2016	Three questions on China's "Belt and Road Initiative"	China Economic Review	110
9	Sidaway J.D., Woon C.Y. 2017	Chinese Narratives on "Belt and Road" in Geopolitical and Imperial Contexts	Professional Geographer	95
10	Saud S., et al., 2019	Impact of financial development and economic growth on environmental quality: an empirical analysis from BRI countries	Environmental Science and Pollution Research	92

3.4 Top Productive Papers

The top 10 creative papers on BRI research are presented in Table 3. A total of 522 journals contributed to published documents on BRI research. According to 468 citations, the Journal of "Sustainability" has the greatest ranking of any single journal with 44 total publications and is mostly fixated on the fields of science, technology, and other topics such as environmental sciences and ecology.

Table 3. Top 10 creative journals for investigation on BRI.

Journal (n=522)	h_index	TC	NP	IF (2020)	Research Domain
Sustainability	12	468	44	3.251	Science & Technology- Other Topics Environmental Sciences & Ecology
Environmental Science and Pollution Research	8	330	15	4.223	Environmental Sciences & Ecology
Journal of Contemporary China	6	411	15	3.748	Area Studies
Journal of Cleaner Production	8	253	13	9.297	Science & Technology - Other Topics Engineering Environmental Sciences & Ecology
Transportation Research Part E: Logistics and Transportation Review	9	316	11	6.875	Business & Economics Engineering Operations Research & Management Science Transportation

China and World Economy	7	208	10	2.357	World Economics and Politics
China Quarterly of International Strategic Studies	5	56	10	0.7	China's International Strategy, China's Foreign Policy, World Economy, Global Governance, International Security.
Asia Policy	5	88	9	NA	Research based on policymaking on issues related to the Asia-Pacific
China: An International Journal	3	22	9	0.675	Area Studies
Chinese Economy	4	29	9	1.6	China's current economic development research

TC: Total Citations; NP: Number of Publications; IF: Impact Factors

3.5 Top-Producing States

Table 4 shows that 1183 papers from 56 different nations were published in total. China accounted for the largest percentage of publications ($n = 428$) articles, followed by the USA ($n = 52$) articles, Australia ($n = 32$), and United Kingdom ($n = 32$) articles.

Table 4. Top 10 productive states for investigation on BRI.

Country (n=56)	Articles	Freq	SCP	MCP	MCP_Ratio	TC	AAC
China	428	0.54384	313	115	0.2687	3651	8.53
USA	52	0.06607	37	15	0.2885	438	8.42
Australia	32	0.04066	22	10	0.3125	222	6.94
United Kingdom	32	0.04066	18	14	0.4375	309	9.65
Singapore	27	0.03431	19	8	0.2963	376	13.93
Hong Kong	24	0.03050	14	10	0.4167	476	19.83
Malaysia	14	0.01779	9	5	0.3571	113	8.07
India	13	0.01652	12	1	0.0769	58	4.46
Poland	13	0.01652	13	0	0.0000	86	6.61
Pakistan	12	0.01525	8	4	0.3333	44	3.67

SCP: Single Country Publication; MCP: Multiple Country Publications; TC: Total Citations; AAC: Average Article Citations.

3.6 Top Productive Journal

A total of 16 authors contributed to BRI research productivity. Among the top authors listed in Table 5, Wang Y is the leading active author for research with 18 articles, Li Y with 12 articles, and Zhang X with 12 articles.

Table 5. Top 10 active authors for investigation on BRI.

Element (n=2016)	h_index	TC	NP	PY_start
Wang Y	6	305	18	2016
LI Y	6	102	12	2018
Zhang X	7	185	12	2018
Lee PTW	8	165	11	2018
LI J	5	127	11	2018
Wang X	7	90	11	2018
Zhang Y	5	232	10	2018
LI X	4	77	9	2019
Liu W	6	311	8	2016
Zhang Z	3	39	8	2018

Complete research papers made up 65.3% of published publications, with book chapters coming in second at 14.3%. There were papers covering 24 issue classifications; 34.5% of the exploration of BRI was in the sociologies, trailed by 13.7 percent in the monetary sciences and 11.6 percent in the business and management sciences.

3.7 Most-Frequency Keyword Analysis

The content and orientation of hot documents based on the annual trend of keywords plus those associated with BRI research-related topics are presented in Fig. 3A. The topmost frequency based on the number of occurrences was “China” (249), “Belt and Road” (181), “sustainable development” (71), “economic development” (70), “infra-structural development” (66), “carbon dioxide” (56), “international trade” (45), “investment” (42), “commerce” (39), and “development strategy” (39) (Fig. 3B).

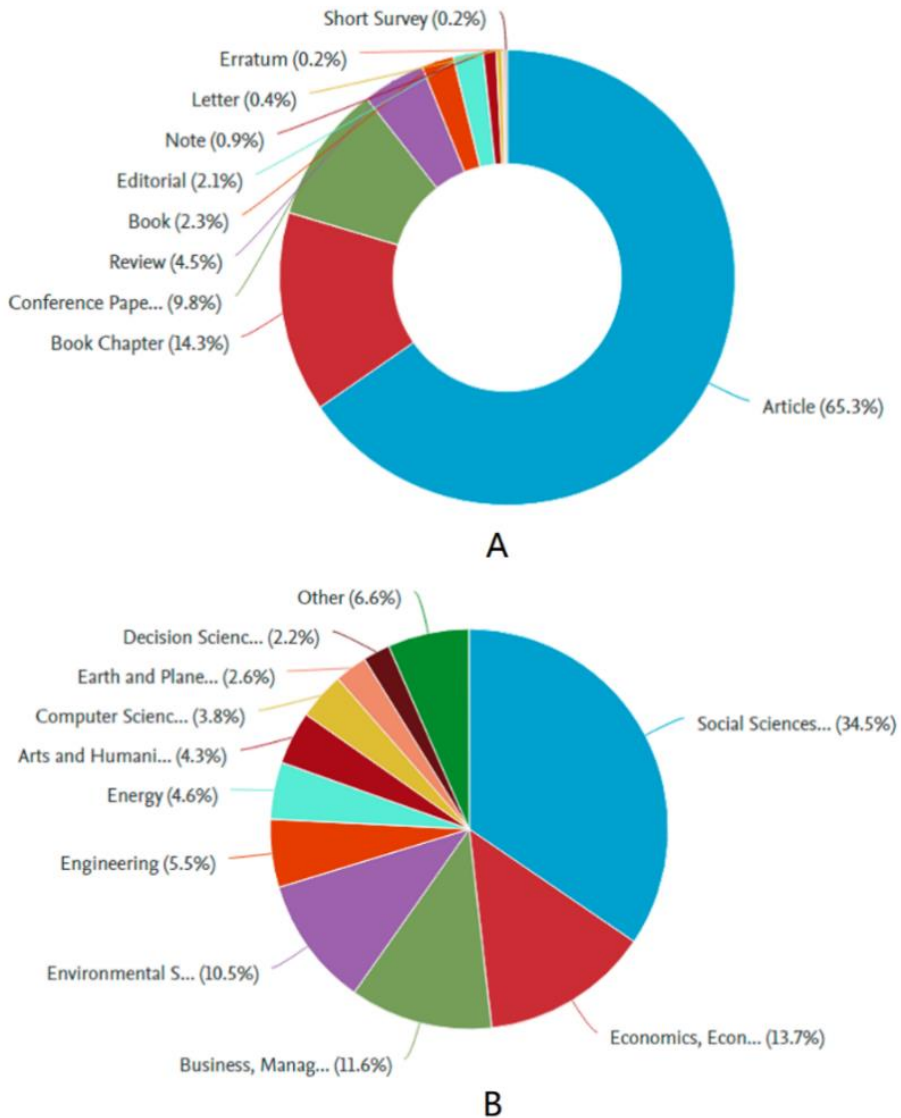


Fig. 3. Type of documents and subject area of investigation on BRI productivity.

3.8 Conceptual Framework Investigation of Keywords Plus

Fig. 4 shows the conceptual structure investigation of the 50 keyword analyses distributed into three different clusters with different colors that express common research concepts in BRI research. The analysis provides an essential part of the research topic associated with the BRI research.

People's Republic of China (L: 311, TLS: 611), following the USA (L: 130, TLS: 132), Australia (L: 87, TLS: 73), and Singapore (L: 27, TLS: 49), as shown in Fig. 4.

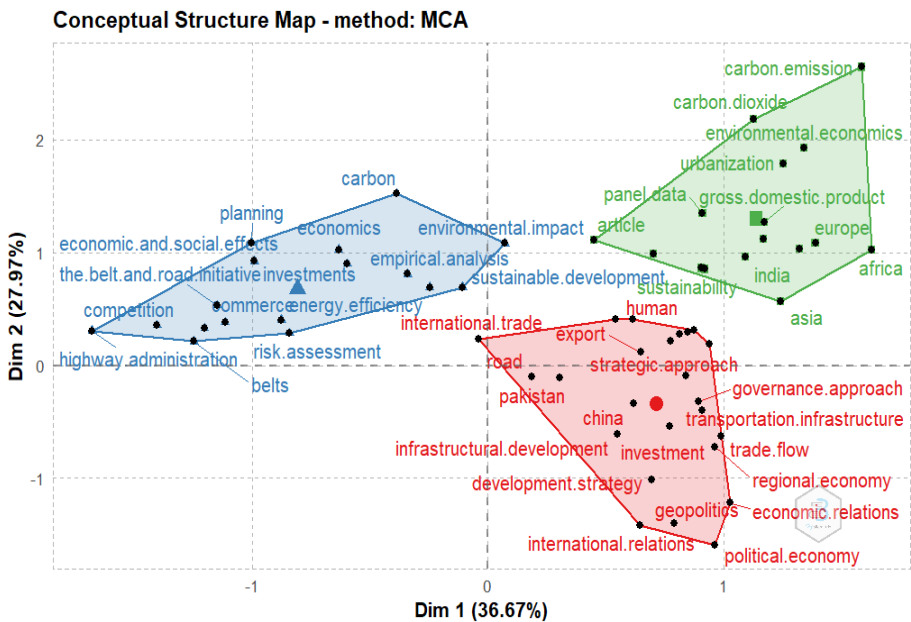


Fig. 5. Conceptual framework Investigation of keywords plus 50 Keywords are distributed in 3 clusters.

3.10 World Authors Keyword Analysis

As shown in Fig. 7, BRI is a super project in the world that the Chinese government established with the objective that China wishes to associate with the world by developing road structures. BRI is beneficial for neighbors and countries of the world as well.

The mutual author keywords with the highest frequency of appearances are CPEC (64), followed by One Belt and One Road (48), China (47), Pakistan (28), and infrastructure (12). Fig. 6 shows the Word Cloud of the author's keyword visualization analysis.



Fig. 6. Co-authorship analysis between authors (A) and countries or origin (B) BRI investigation.



Fig. 7. A World Authors Keyword visualization analysis.

4 Discussion

This current study expands on the BRI initiative's progress and achievements to create new models of increasing international collaboration between China and other countries. This research adopted a bibliometric methodology to map out the milestones and perspectives documented to aggregate the scope of the BRI projects. The Scopus database to estimate and appraise the research trends conducted in this domain. China contributed 36%, the highest of the retrieved publications; Australia, the United Kingdom, and the United States of America came next. This evidence accentuates the scholarly work conducted centered on BRI and related initiatives. The research initiatives gained prominence mainly from citation-indexed targeted foreign policies, inclusive globalization, environmental challenges, and promotion of Chinese overseas direct investments in BRI ^[23]. "Social Science" accounted for around 34.5% of all papers in the BRI, making it the most popular study domain. The word cloud study is the most frequently used term in the BRI study that has been published in the Scopus database. The most often occurring phrase in research with a BRI focus was "China," indicating that China has been given greater attention than other nations in BRI-related research. The most common uses of this term are in titles, abstracts, and keywords related to BRI ^[24]. Words related to the Belt and Road Initiative (BRI) was common in all three clusters, indicating that experts were interested in similar concepts, such as the implications for the environment, economy, and politics ^[25]. The current study offers the chance to enhance and expand BRI research. Therefore, there is an urgent need to scale up BRI-related research, particularly in Asia, Africa, and Europe, where Chinese infrastructure investments are growing. In addition, research contributions are not even distributed internationally since, except in the United States of America, Australia, the United Kingdom, and Singapore, which only managed to follow with broad management, the majority of top research and citations were mostly concentrated and from China.

5 Conclusion

The evidence of the study shows the remarkable progress of the Chinese BRI, as many states are benefiting from the projects. Subsequently, many potential concerns and regular ones have been addressed; hence the evidence is seen in the volume of publications analyzed in this research. The articles that were evaluated provide proof of impressive research efforts of BRI cut across interdisciplinary fields. However, with contributions from Social Science, Business, Management Environment, and Economics, significant intervention is still needed from other fields such as Arts/Humanities to understand local communities' response to BRI. The results delivered a reference for current and future BRI research and policymaking worldwide.

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