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Review

Conceptualizing sustainability in China's belt and road initiative: A longitudinal analysis of scholarship (2013 - 2024)

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ABSTRACT

One decade after China's announcement of the Belt and Road Initiative (BRI), theoretical and practical debates linger about the environmental impacts. However, no studies have systematically analyzed how academic research conceptualizes BRI and sustainability within it. This study reviews definitional aspects and sustainability discourses concerning the BRI. Analyzing a sample of 171 peer-reviewed journal articles published between 2013 and 2024, the study uses a coding framework comprising eight categories broadly covering the sustainability building blocks of the BRI. Additionally, a comparison of academic conceptualizations and China's policy practices reveals several gaps on the topics of stakeholders, investment agencies, investment volumes, and sectors. Outdated or vague conceptualizations are found in research that examines (i) China as a unitary actor, (ii) the centrality of China-led organizations like the AIIB, and (iii) BRI investment volumes and impacts. Findings also reveal that scholarly knowledge about the BRI, a decade after the initiative's announcement, remains limited and disparate. The study's meta-framework advances the literature by providing a template for bringing sustainability studies and BRI studies together into more meaningful interface.

1. Introduction

With more attention being paid to the global dimensions of sustainability, development policy is a fruitful context for exploring the environmental consequences of economic activity. Several policy initiatives aspire to support global development through new infrastructure: the EU Global Gateway, the G7 Build Back Better World, and China's Belt and Road Initiative (BRI). Among these three, the BRI is the oldest and most discussed. A decade after the announcement of the BRI in 2013 (State Council of the People's Republic of China (PRC), 2015a), it is possible to reflect on patterns in how the initiative is conceptualized and debated across issues like aid dependency, human development, and – germane to this study – sustainability.

The BRI has been variously described, including as the 'most ambitious infrastructure projects ever conceived' (Ma, 2019), the 'largest project of the century' and a 'massive marketing campaign' (Kuo and Kommenda, 2018), and, simply, 'foreign policy' (Wade, 2016). Multiple narratives concerning the BRI have emerged across geographies and policy subfields, including the Digital Silk Road (Arcesati, 2020; Ghiasy and Krishnamurthy, 2021; The Economist, 2020), the Health Silk Road (Calabrese, 2022; Yanzhong Huang, 2022; Mardell, 2020), and the Polar Silk Road (Lanteigne, 2022; Reuters, 2018; Xinhua, 2018). Example projects are the Hambantota Port in Sri Lanka (Abi-Habib, 2018; Lu, 2018; Sautmann and Yan, 2019), the Mombasa–Nairobi Standard Gauge Railway in Kenya (Adetunji, 2022; Hu and Ong'iyo, 2020), and the Belgrade–Montenegro Motorway (Nikolic, 2021; Schmitz, 2021).

Accompanying official narratives and media coverage are controversies around BRI actions. One example concerns sustainable development, a principal BRI goal. Twenty of the world's 27 low-income countries, as well as 45 of the world's 55 low-middle income countries,

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are settings for BRI projects (Green Finance and Development Center BRI, 2022; World Bank Data, 2022). As such, many debates about BRI focus on the infrastructure–development nexus, including whether the BRI is a debt trap for poor countries (Brautigam and Rithmire, 2021; Gerstel, 2018; Tharoor, 2022; Fall, 2022), whether it is a 'beacon' to save globalization (Yongfu Huang, 2020) through positive effects on development and environment (Hussein, 2019; Patel, 2017; Swiss Chamber, 2019; UNEP, 2019), and whether it is a strategy for advancing China's geopolitical ambitions under the pretext of development cooperation (Chance, 2017; Link, 2021; Parton, 2018). The BRI has also been called 'vague' (Ang, 2019), 'ambiguous' (Cai and Wong, 2019; Shepard, 2017), and an 'enigma' (Graham, 2018; RNZ, 2019), partly due to the competing interests inherent in development. Academia has also engaged in lively debates about the BRI, in a multidisciplinary and burgeoning body of literature. By mid-2021, eight years after the initiative's announcement, more than 2300 peer-reviewed articles had examined or discussed the BRI, having increased sevenfold between 2016 and 2020. Numerous studies have also speculated how the BRI might evolve in the future (Schulhof et al., 2021; Wu et al., 2019; Ye, 2021).

This study examines a sample of 171 peer-reviewed academic articles to understand how sustainability in the BRI is conceptualized and depicted. This research contributes to the academic discourse in several ways. First, a growing body of research on BRI narratives (Dunford and Liu, 2019; Liu et al., 2018; Winter, 2020) justifies more detailed examination of related sustainability discourses and their policy implications. However, existing studies do not systematically examine a large-N representative sample of conceptualizations – a gap this study fills. Second, existing systematic literature reviews about the BRI tend to analyze research agendas and trends rather than conceptualizations. These reviews, while valuable, are also relatively narrow in their focus, including topics like supply chain management (Thürer et al., 2020a), urban planning (Zheng et al., 2021), and maritime transport (P. T. W. Lee et al., 2018). Third, the present study extends work conducted by the largest study to date – that of Cao and Alon (2020), which conducts a bibliometric analysis of research foci and identifies nine clusters of BRI research. While these clusters highlight the most salient research trends, they do not focus on conceptualizations of the BRI. To the best of our knowledge, this study offers the first comprehensive meta-analysis on conceptualizations of the BRI and BRI sustainability.

This meta-analysis of BRI conceptualizations examines how authors across multiple academic disciplines understand the BRI. Thus, the study develops a framework using the core components of BRI conceptualizations. This framework serves as an analytical lens to understand what is studied in the BRI literature, what is omitted, and how it relates to sustainability. After examining conceptualizations, the study presents a comparison between conceptualizations on one hand and data about China's overseas engagement on the other. The study concludes that, after a decade since the official announcement of the BRI and despite a burgeoning body of research, there remain gaps between how the BRI is conceptualized and what China's engagement through this policy framework entails in practice. These gaps have significant implications for understanding how the BRI impacts global sustainability, with vague or incomplete narratives potentially obscuring the ways BRI undermines environmental goals. The remainder of this article is organized as follows. Section 2 describes the methodology, Section 3 presents and discusses the results, and Section 4 analyzes the broader implications of the findings.

2. Methodology

2.1. Sampling method

This study uses qualitative content analysis and descriptive statistics to understand how academic studies conceptualize the BRI. The sampling method was a multi-stage process. First, we performed keyword searches through Web of Science and Scopus databases, using terms that would be expected in scholarship about the initiative ('BRI,' 'Belt and Road Initiative,' 'OBOR,' 'One Belt One Road,' and 'Silk Road'). The study included all peer-reviewed articles published between 2013 and 2024 containing these search terms in the title, abstract, or keywords. As this study covers conceptualizations of the BRI across academia generally, we included all disciplines in the search. Only articles written in English were examined, in order to cover international scientific literature (Di Bitetti and Ferreras, 2016). Searches produced an initial superset of 2339 articles, with the superset containing all English-language peer-reviewed articles about the BRI between 2013 and 2024 available through the chosen search engines.

In the second stage, we developed a 'high-quality' sub-sample, in order to reflect the most relevant BRI conceptualization in the discourse. First, we selected all articles of the superset that were published in influential journals – those from the top two journal quartiles (Q1 and Q2; i.e., journals in the top 50 percent of at least one subdiscipline) (SCImago, 2024) ;[1] this method allowed for a rather large ranking interval. Second, we included the most highly cited articles of the superset – those having at least 10 citations, even if published in journals with rankings below Q1 or Q2. This approach yielded a sub-sample of 1107 articles representing the most influential academic BRI literature.

Third and finally, we sought an 'approximately representative' sample (Kirchherr et al., 2023; 2017) of the 1107 articles in the sub-sample, reducing the number of papers to a manageable size to allow for manual coding while maintaining a suitable representation of the entire spectrum of articles. As such, we determined the final sample size *a priori* (Sim et al., 2018), following random sampling logic from the field of statistics (Bartlett et al., 2001; Rodríguez del Águila and González-Ramírez, 2014) – common for quantitative research (Taherdoost, 2017) but also increasingly popular in qualitative research (Boddy, 2016). After determining the sample size based on a confidence level of 95 percent and margin of error of 7 percent (values commonly used for this purpose; see Rodríguez del Águila and González-Ramírez, 2014), we drew randomly from our 'high-quality' sub-sample using a simple randomization in Excel software to avoid selection bias. After removing articles that did not contain any BRI conceptualizations and accounting for the most recently published articles at the time of analysis, the final sample included 171 academic journal articles covering the spectrum of influential and high-quality BRI scholarship.

2.2. Coding and analysis

We took an iterative approach to developing a coding framework: (i) deductively, based on our prior knowledge, and (ii) inductively, during the coding process. The final coding framework consisted of eight categories, which we then considered to be the essential building blocks of BRI conceptualizations: concept, origin, investment volumes, sectors, stakeholders, objectives, impacts, and distribution of benefits (Table 1 presents all codes and their subcodes, coding rules, and examples). In analyzing each article, we considered all sections that explicitly mentioned the BRI, including (where applicable) visualizations, tables, and information cited from other studies.

Qualitative and manual coding were carried out through MaxQDA software. Manual coding is considered more sensitive and less mechanistic in capturing nuance than is automated coding (Jacobs and Tschötschel, 2019; Maier et al., 2018), which is used principally in topic modelling and natural language processing (e.g., linear discriminant analysis; Isoaho et al., 2021). Rather than simply identifying and counting keywords, we sought to infer meaning from the text. To

[1] To assess a journal's level of influence, we used its SCImago Journal Rank (SJR), which accounts not only for citations but also for journal size and prestige. The assessment was made for at least one subdiscipline of the journal (Kalita et al., 2018).

Table 1
Coding framework and rulebook.

Code	Subcode	Coding rule	Example
Concept		Description of or definition what the BRI is; also including use of synonyms	
	Platform		'BRI is a new platform for financial integration'
	Program(me)		'a China-proposed development programme'
	Plan		'the BRI is a gigantic investment plan'
	Other		'it is a vast mercantilist endeavour'; 'The BRI is a means to form a region'
	Network / Organization		'As OBOR is a rising regional organization'
	Policy		'China's win-win foreign policy'
	Vision		'a great vision for economic integration'
	Strategy		'a long-term national strategy'
	Initiative		'one of the most successful global trade initiatives of the 21st century'
	Project		'The BRI is a joint development project'
Origin		Description of how the BRI came to being, conceived or driven mainly from…	
	Top-down	…the national level	'Xi Jinping proposed "B&R"'
	Bottom-up / path-dependent	…the subnational level	'BRI is steered by provincial governments'
Investment volumes		The amount of investment or trade volumes or total costs	'projected at a total investment of US$8 trillion by 2049'
Investment sectors		The sector(s) of investments and projects as part of the BRI	'a series of highways, roads, railways and dams, as well as other related infrastructures'
Stakeholders and institutions		Who is or mainly which institutions are actively involved	
	Enterprises	Chinese Companies and enterprises, including state-owned enterprises	'For BRI implementation, state-owned enterprises…'
	Banks and funds	Institutions which fund BRI projects	'The major institution is the AIIB, which provides funding for BRI projects'
	Public sector / government	Government and government agencies	'The Chinese government implements BRI'
	Intergovernmental organisations	International intergovernmental and supernational organisations	'The European Union'; 'ASEAN'; 'UN'
Benefit distribution		Distribution of benefits and risks…	
	China advantage	…with China benefitting or benefitting more than BRI country(ies)	'OBOR is expected to positively benefit China in a number of ways'
	China disadvantage	…with China being impacted negatively	'China faces political and security risks in advancing the construction of the BRI'
	BRI country advantage	…with BRI country (ies) benefitting or benefitting more than China	'to help the countries along the belt achieve their vision of sustainable development'
	BRI country disadvantage	…with BRI country (ies) being impacted negatively	'a 'debt trap' designed to create debt that governments will be unable to pay back'
	Equitable	…with both China and BRI country(ies) benefitting evenly	'achieved win-win results through greater openness and cooperation'
Objectives		Discussion of objectives, purpose, aims, goals of the BRI - in the aspect of…	
	Infrastructure / connection	…(logistic) connection, connectivity, transport links	'building facilities that enable greater connectivity between countries'
	Cooperation / integration	…cooperation and integration, not defined in which area	'aims to promote cooperation between China and countries in Asia and Europe'
	Natural resources	…(access to) natural resources such as energy, water, rare earths, etc.	'gaining greater and more reliable access to resources from (and in) remote regions'
	Development	…development, not defined whether it is economic, political, social, or environment	'China's way of fulfilling international development needs'
	Economic (domestic)	…GDP/welfare, trade, investments, industries of China	'reduce overcapacity in China's steel industry'
	Economic (international)	…GDP/welfare, trade, investments, industries - of BRI countries / internationally	'to promote the economic growth of countries in the region'
	Political	…(geo)political power, international relations, political order	'to challenge the geopolitical world order'
	Social / cultural	…society, culture, communities, livelihood, education, knowledge, health, employment	'to spread culture along the Silk Road and elsewhere'
	Environment / sustainability	…sustainability, biophysical	'aims to share the concept and

(*continued on next page*)

Table 1 (*continued*)

Code	Subcode	Coding rule	Example
		environment; incl. emissions, climate change, biodiversity	practices of ecological civilization and green development'
	Military / security	…military or security or securing (national) interests	'to address a series of security challenges in both domestic and foreign policy
Impacts		Discussion of observed / projected impacts, risks and benefits of the BRI - in the aspect of…	
	Infrastructure / connection	…(logistic) connection, connectivity, transport links	'has accelerated the development of logistics networks'
	Cooperation / integration	…cooperation and integration, not defined in which area	'has promoted the cooperation of countries'
	Natural resources	…(access to) natural resources such as energy, water, rare earths, etc.	'drives demand for significant energy consumption growth in BRI countries'
	Development	…development, not defined whether it is economic, political, social, or environment	'strategy may bring huge development space'
	Economic (domestic)	…GDP/welfare, trade, investments, industries of China	'BRI has created opportunities and challenges for the development of the industry in China'
	Economic (international)	…GDP/welfare, trade, investments, industries - of BRI countries / internationally	'participating countries have witnessed economic development in recent years '
	Political	…(geo)political power, international relations, political order	'OBOR initiatives have made China the center of geopolitics in the region'
	Social / cultural	…society, culture, communities, livelihood, education, knowledge, health, employment	'threatens local livelihoods'
	Environment / sustainability	…sustainability, biophysical environment; incl. emissions, climate change, biodiversity	'posting irreversible damage on the ecological environment in future years'
	Military / security	…military or security or securing (national) interests	'risks of disruption by disaster and/or terrorism increase'

execute this strategy, similar categories of the coding framework were allowed to be coded differently depending on context. For example, the term 'energy' could be coded as 'natural resources' in the objectives category but as 'sector' in the impacts category. Similarly, the distinction between objectives and impacts (e.g., in political, social, or economic categories) and the concept of distribution of benefits could be appreciated only by considering entire paragraphs or blocks of text.

To increase the transparency and rigor of the coding framework and the reliability and consistency of manual coding, dual coding was used for 35 randomly selected articles (20 percent of the sample). For large samples, dual-coding on 10 to 25 percent of data is seen as sufficient (O'Connor and Joffe, 2020). This method entails the use of at least two coders and an *ex post* comparison (MacPhail et al., 2016; Wilson-Lopez et al., 2019). Divergent codes were reviewed among the researchers after every article was analyzed. When consensus was achieved, the initial coding rulebook was changed by either refining or adding rules. When no consensus was achieved, a third coder was consulted, as suggested by Cofie et al. (2022). When no consensus was achieved after this stage, the coding category and rule under review were deleted due to the prospect of inconsistent coding. This iterative process was used to refine the initial coding rulebook (Table 1) and to increase inter-coder reliability (ICR; degree of consensus or consistency about coded data reached by multiple coders; see Miles and Hubermann [1994]). We assigned coding agreements on exact segment comparison levels (MaxQDA, 2024) and used Cohen's Kappa, a chance-corrected coefficient, as the ICR indicator. As calculated based on common methods (Brennan and Prediger, 1981) used in MaxQDA software, the study arrived at a value of more than 0.8, which is considered 'substantial' (McHugh, 2012; Landis and Koch, 1977).[2]

Finally, we calculated the frequencies of a code based on its appearance across articles; as such, multiple mentions of the same code in one article were ignored. The sample of 171 articles was also divided into subsets according to publication year and research field. Code frequencies for five subsets were examined to determine whether these dimensions influenced how the BRI is conceptualized.

3. Results

3.1. Sample mapping

Articles published from 2016 to 2018 constitute a small majority of the sample, with the remainder published from 2019 to 2024. No articles in the sample were published from 2013 to 2015, due plausibly to the announcement of the BRI only in 2013. Numerous research fields are represented, reflecting multidisciplinary interest in the BRI. Papers from natural sciences and engineering journals constitute 48 percent of the total, with nearly equal shares of the remainder from business and economics, international relations, and social sciences (using the classifications from Scopus and Web of Science; see Fig. 1). The 171 articles appear across 101 journals, with 44 percent coming from 17 journals. The highest counts by journal are in *Sustainability* (25 articles), *Environmental Science and Pollution Research* (11), and *Journal of Cleaner Production* (8).

Articles reflect evolving conceptualizations of the BRI, while there appears to be broad terminological agreement. The terms 'Belt and Road Initiative' or 'BRI' are used in roughly 80 percent of articles in the sample. Less than one third use the now obsolete 'OBOR,' and the term 'Silk Road' is used minimally and mostly in earlier articles (2016–2018). The following subsection discusses findings for the entire sample and for the subsets of publication year. Since results across the five academic disciplines and the 101 journals were relatively stable, they are not discussed separately according to these groups

3.2. Components of BRI conceptualizations

The BRI is described using a variety of largely synonymous terms. 85 percent of articles use some form of concept to describe the BRI (Fig. 2). Overall, a broad range of concepts with similar frequency of mentions is used. The term 'initiative' is used in almost half (44 percent) of articles; example mentions are 'major initiative' (Lei, 2020) and 'world's largest

[2] Note that ICR is typically lower with a higher number of codes and only recommended for a range of 20 to 40 codes (Roberts et al., 2019; Hruschka et al., 2004). This study uses approximately 50 codes.

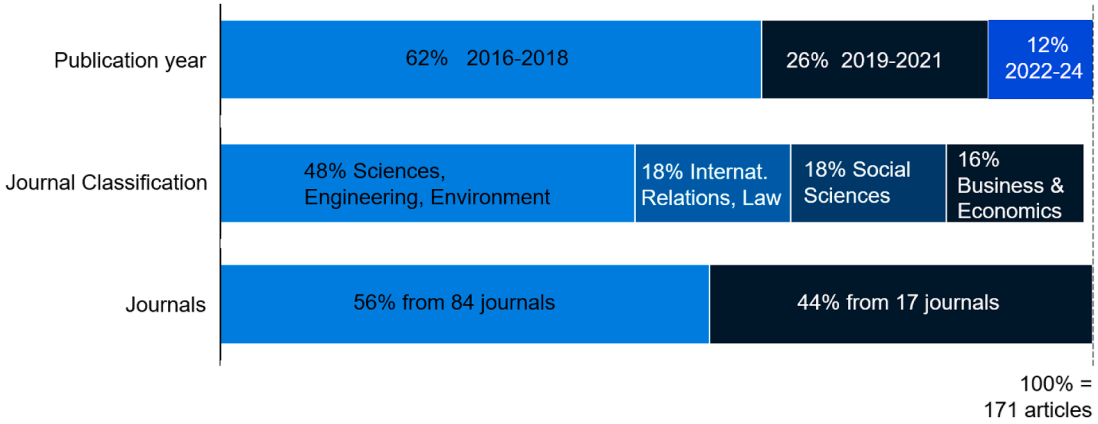

Fig. 1. Sample overview of 171 articles across subset categories.

infrastructure investment initiative' (Yin, 2019). The term 'strategy' is used in 31 percent of articles; example mentions are 'long-term development strategy' (Dimitrijević, 2017) and 'ambitious Chinese geo-economic strategy' (Li, 2020). Other terms used include, in descending order of frequency, 'project,' 'policy,' and 'plan.' Most of these terms are colloquially synonymous but with some notable semantic differences (e.g., organization versus policy). Fig. 3

3.2.1. BRI origins and main stakeholders

Most articles attribute the origins of the BRI to national level political priorities and highlight the role of China President Xi Jinping in introducing and promoting it. More than half (55 percent) of articles describe the process by which the BRI emerged, with most authors (54 percent) describing it as a top-down effort. Example mentions are depictions of the 'state-led BRI' (Liu et al., 2020), a 'Chinese government initiative' (Chhetri et al., 2018), and the 'national strategy of China' (Raimbekov et al., 2018). By contrast, only 6 percent of articles describe BRI as bottom-up or conceived and driven mainly by subnational efforts; example mentions are the BRI 'being steered by provincial government administrations' (Owen, 2021) and 'based on a gradual evolutionary approach rather than top-down planning' (Zhang et al., 2020). The remaining articles surveyed do not provide explanations about parties promoting the BRI.

The analysis identifies modest agreement across studies about the most important stakeholders of the BRI. Overall, stakeholders and institutions are mentioned in 81 percent of articles. The stakeholder group mentioned most often is public sector and government (75 percent). Articles discussing the Chinese national government constitute 53 percent of the total – mostly labeling it as 'the government' (Kwong and Wong, 2020; Ploberger, 2017; Wu et al., 2017; Zheng et al., 2020) and less often in references to specific ministries or agencies. President Xi is mentioned in 39 percent of articles, in multiple capacities; example attributions of his role in the BRI are that he 'instigated this initiative' (Rauf et al., 2020), 'first articulated China's vision for global infrastructural development' (Basu and Janiec, 2021), and 'launched the landmark BRI' (L. Wang et al., 2019). Local and provincial governments are sparsely mentioned, accounting for only 6 percent of articles; when mentioned, they are referred to as a group rather than individually.

Three-quarters of stakeholder conceptualizations do not mention companies and enterprises, which is somewhat unexpected given that the private sector plays a significant role in BRI implementation. Furthermore, even the 24 percent of articles that mention companies and enterprises scarcely reference specific companies, referring instead to private sector actors as a stakeholder group (e.g., 'Chinese enterprises'). Despite state-owned enterprises (SOEs) accounting for a bit over half (53 percent) of enterprises engaged in Chinese overseas foreign direct investment (OFDI) stock (MOFCOM, 2020), only 11 percent of articles refer to them – mainly as a group and with only several mentions of specific SOEs by name. COSCO is the SOE with the highest share of mentions within this subgroup (J. Chen et al., 2019; Kuzmicz and Pesch, 2019; Ruan et al., 2019).

3.2.2. AIIB, the NDB, and the silk road fund considered main funding agencies

The final group of stakeholders comprises banks and investors, mentions of which are included in 26 percent of articles. The Asian Infrastructure Investment Bank (AIIB), the New Development Bank (NDB), and the Silk Road Fund are recognized across these articles as the principal funding agencies of the BRI. Of articles mentioning this stakeholder group, 36 percent reference the AIIB, 22 percent the Silk Road Fund, and 9 percent the NDB. These three Chinese or Chinese-led banks and funds constitute two-thirds of all mentions in the subgroup of 44 articles that mention banks. This finding is out of proportion with the share of BRI funding (a modest 4 percent) in Chinese OFDI investments overall (He, 2020). Banks with the largest credit portfolios in BRI projects are the four largest state-owned banks (Kirchherr et al., 2018), in particular the policy banks Exim and CDB (Chen, 2021; Mohan and Tan-Mullins, 2019). Notably, while Exim Bank has provided 50 percent of energy-related OFDI finance (Sauer et al., 2022) and 26 percent of BRI funding (He, 2020), it is mentioned in only 5 percent of the subset. Both research and official statistics indicate that AIIB, NDB, and Silk Road Fund finance a relatively small share of the BRI compared to large policy-oriented and state-owned commercial banks in China.

One third of articles make no mention of individual sectors as strategic objectives of the BRI. Of those that do, infrastructure is the most frequently mentioned (Fig. 4).[3] While transport (e.g., roads, rail, and ports) is mentioned by 42 percent of articles in the subset specifying sectors, the sector accounts for only 23 percent of BRI investments (Green Finance and Development Center, 2021). A majority of BRI investments (40 percent) target the energy sector (Green Finance and Development Center, 2021), which is mentioned in only 24 percent of articles. These statistics should be interpreted with caution, as the relatively high number of mentions of transport does not necessarily imply that investment primarily targets the sector or that the various authors are suggesting such. Nevertheless, the frequency of mentions stands in stark contrast to the actual distribution of investments. Similarly, since the launch of the Digital Silk Road in 2015 (Cheney, 2019), communication and information technology have often been mentioned as BRI sectors (Benabdallah, 2019; Fung et al., 2018; Owen, 2021) but play a minor role in the investment portfolio (less than 1 percent in 2021

[3] Percentage is calculated as follows: code frequency of subcode (e.g., 'transport') is divided by the total frequency of code 'sectors' in the 111 articles that contain a sector mention. For example, of all the times 'sector' is specified (in the 111 articles that mention sectors), 42 percent refer to transport.

Code	Subcode	Articles including codes, in % of samples				Percentage points (ppt.)		
			Subsets					
		Sample of 171 articles	2016-18	2019-21	2022-24	Δ 2016-18 and 2019-21	Δ 2019-21 and 2022-24	Δ 2016-18 and 2022-24
Concept		**85**	91	82	90	9	-8	1
	Platform	**7**	9	6	5	3	1	4
	Program(me)	**9**	16	8	5	8	3	11
	Plan	**13**	7	19	0	-12	19	7
	Network / Organization	**11**	9	11	5	-2	6	4
	Policy	**17**	29	15	0	14	15	29
	Vision	**9**	11	8	5	4	3	6
	Strategy	**31**	38	31	15	7	16	23
	Initiative	**44**	56	43	35	13	8	21
	Project	**30**	24	25	65	0	-41	-41
	Other	**33**	38	27	45	11	-18	-7
						0	0	0
Origin		**55**	56	52	70	4	-18	-14
	Bottom-up / path-dependent	**6**	9	6	0	3	6	9
	Top-down	**54**	53	51	70	2	-19	-17
						0	0	0
Investment volumes		**35**	31	32	55	-1	-23	-24
						0	0	0
Investment sectors		**65**	67	63	70	4	-7	-3
	Other	**33**	36	31	35	5	-4	1
	Energy	**30**	27	31	35	-4	-4	-8
	Transport	**53**	56	51	60	5	-9	-4
Stakeholders and institutions		**81**	82	77	95	5	-18	-13
						0	0	0
Banks and funds		**26**	31	26	15	6	11	16
	Chinese state-owned banks	**8**	11	7	5	5	2	6
	Chinese-led multilateral banks	**22**	31	22	0	9	22	31
	Other Chinese funds	**17**	27	14	10	13	4	17
	Traditional multilateral banks	**4**	2	4	5	-2	-1	-3
						0	0	0
Enterprises		**24**	20	26	25	-6	1	-5
	Chinese enterprises	**16**	11	18	20	-7	-2	-9
	Chinese state-owned enterprises	**11**	4	15	0	-11	15	4
	Other enterprise (non-Chinese)	**5**	4	6	5	-1	1	-1
Public sector and goverment		**75**	78	69	95	9	-26	-17
	Chinese national level	**53**	49	46	95	3	-49	-46
	Xi Jinping	**39**	49	37	35	12	2	14
	Chinese provincial / local level	**6**	2	8	5	-6	3	-3
Intergovernmental organisations		**18**	27	17	0	10	17	27
Objectives		**91**	89	93	85	-5	8	4
	Infrastructure / logistic connectior	**70**	69	71	65	-2	6	4
	Cooperation / integration	**27**	22	26	40	-3	-15	-18
	Natural resources	**10**	7	10	15	-4	-5	-8
	Development	**19**	27	18	5	9	13	22
	Economic (domestic)	**23**	36	22	5	14	17	31
	Economic (international)	**68**	67	70	60	-3	10	7
	Political	**46**	56	43	45	13	-3	11
	Social / cultural	**36**	36	35	40	1	-5	-4
	Environment / sustainability	**18**	16	15	35	1	-20	-19
	Military / security	**19**	27	15	15	12	0	12
Impacts		**81**	69	85	85	-16	0	-16
	Infrastructure / logistic connectior	**27**	22	27	35	-5	-8	-13
	Cooperation / integration	**5**	2	7	0	-4	7	2
	Natural resources	**13**	7	14	20	-8	-6	-13
	Development	**7**	7	7	5	0	2	2
	Economic (domestic)	**24**	27	26	10	1	16	17
	Economic (international)	**58**	47	62	60	-16	2	-13
	Political	**27**	29	30	5	-1	25	24
	Social / cultural	**25**	13	31	20	-18	11	-7
	Environment / sustainability	**30**	13	32	50	-19	-18	-37
	Military / security	**11**	9	13	0	-4	13	9
Distribution of benefits		**68**	67	73	50	-6	23	17
	China advantage	**30**	33	29	25	4	4	8
	China disadvantage	**5**	0	9	0	-9	9	0
	BRI country advantage	**38**	33	42	30	-9	12	3
	BRI country disadvantage	**15**	18	13	10	5	3	8
	Equitable	**33**	38	35	15	3	20	23

Fig. 2. Overview of findings.

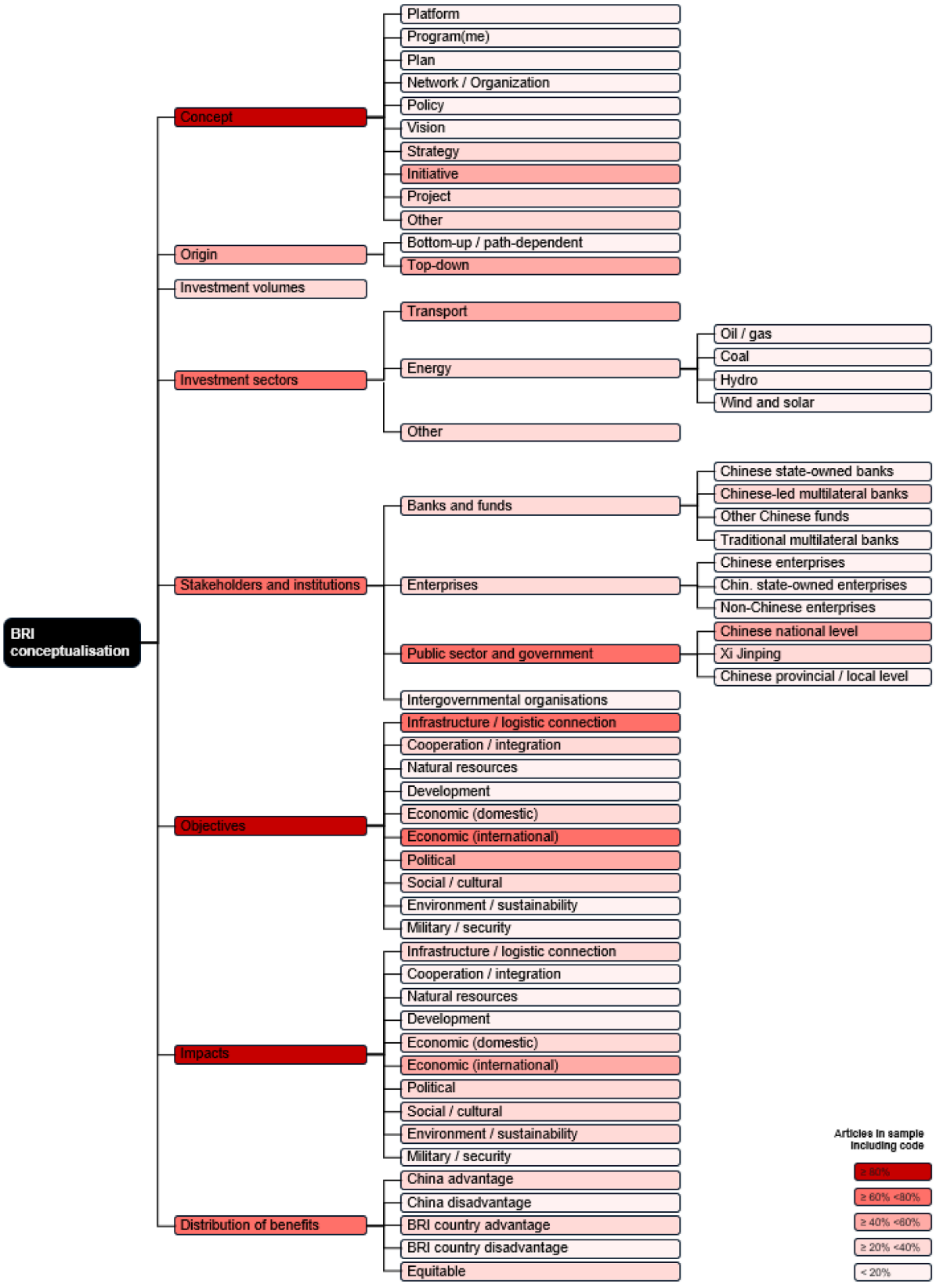

Fig. 3. Code frequencies in percentage of articles in entire sample containing code.

[Green Finance and Development Center, 2021]).

In further analyzing the 52 BRI conceptualizations that specify energy investments, the most frequently mentioned sectors are electricity unspecified (53 percent) and oil or gas (26 percent). Coal accounts for only 5 percent of energy sectors mentioned (Fig. 5).[4] Out of 171 articles, four mention coal power in relation to the BRI, even as coal is the energy sector receiving most Chinese OFDI overall (55 percent; Sauer et al., 2022). Estimates of the share of coal-fired power plants in energy BRI investments between 2013 and 2020 range from 15 to 47 percent (Nedopil Wang, 2021); as such, coal is either the largest or second-largest sector (after hydropower) for energy investments (Nedopil Wang, 2021). Taken together, existing data and the findings of this research suggest that coal power receives less attention in the BRI literature than would be expected given its role in BRI practice. This relatively modest focus risks drawing attention away from an element of the BRI that significantly impacts global sustainability.

3.2.3. *Research reflects variations in investment volumes*

Investment volumes and total costs, for both past and planned projects, are mentioned by 35 percent of articles. This finding is unexpected given the rather substantial claims about investment volumes made in some scholarly descriptions of the BRI: example mentions are the 'world's largest infrastructure investment initiative' (Yin, 2019) and 'significantly bigger than the Marshall Plan' (Fung et al., 2018). Across articles mentioning investment, there is wide variation in investment volume. Given the focus of articles on differing time periods and aspects of BRI, comparison is difficult. However, most (28) of this subset of articles offer no clarification about the nature of investments being estimated. Additionally, the timeframes are also vague or unspecified, it is unclear which sectors and BRI countries are included, and it is unclear whether the FDI estimates count the value of all assets (stock measurement) or the value of transactions (flow measurement).

The variation in estimates is notable, ranging from USD 100 billion to USD 900 trillion; the highest estimate is 9000 times higher than the lowest estimate (Fig. 6). Unsurprisingly, estimates of past investments do not vary as widely, ranging from USD 14 billion to 19 billion per year between 2013 and 2020. It is unclear why many articles did not use this more certain historical data to calibrate current estimates or to estimate future levels of investment. While it might be difficult to estimate BRI investments in the absence of an official list of projects, comparing estimates with available Chinese OFDI data would have been possible.

3.2.4. *BRI objectives are more frequently mentioned than BRI impacts*

There exists an evident preference in the articles to focus on BRI objectives rather than impacts (Fig. 7). This preference is particularly observable in studies of projects related to infrastructure, development, and cooperation (listed three to five times more often as objectives than as impacts). By contrast, the only categories for which impacts are measured more than objectives are environment/sustainability (12 percentage points higher), natural resources (3 percentage points higher), and domestic economic objectives (1 percentage point higher).

The most frequently mentioned BRI objectives are infrastructure/logistic connections (70 percent) and international economic objectives (68 percent). The former describe BRI goals as, for example, 'improving the connectivity infrastructure construction' (Jin, 2018), 'infrastructure (…) aimed at linking Europe and East Africa with Asia' (Turschwell et al., 2020), and 'infrastructure investment linking countries' (Ehizuelen, 2017). The latter relate largely to economic growth (Akbar et al., 2021; Huo and Yip, 2019; H. Wu et al., 2020), prosperity (Dagtas, 2019; Layton, 2020), and trade (Li et al., 2019; Wang, 2019; Yalew and Changgang, 2020). Both objectives are typically mentioned as the core of BRI conceptualizations and closely follow the officially stated objectives of 'facilities connectivity (…) and unimpeded trade' (State Council of the People's Republic of China (PRC), 2015b).

In addition to economic objectives, articles also refer to political objectives and geopolitics as drivers of the BRI. Overall, 46 percent of BRI conceptualizations mention political objectives. The most frequently referenced political objectives do not relate to official BRI communication but to geopolitical issues (Beeson, 2018); example mentions are 'reshape the international order' (Wang, 2019), BRI as 'a shift (…) to Chinese-style globalization' (Callahan, 2016), and 'an important step on the road to reclaiming China's historical global position' (Yu, 2017). Lesser mentioned political objectives include 'policy coordination' (Callahan, 2016; Fierke and Antonio-Alfonso, 2018; Jin, 2018; Yalew and Changgang, 2020), which is closely aligned with official BRI goals (State Council of the People's Republic of China (PRC), 2015b), and strengthening China's soft power and international image (Benabdallah, 2019; Lin and Ai, 2020; van Noort and Colley, 2021). These objectives are typically evaluated from a critical distance by the author or negatively connotated.

Social and cultural goals are referenced in 36 percent of conceptualizations and typically refer to more positively connotated objectives like 'people-to-people bonds' (Fierke and Antonio-Alfonso, 2018; Jin, 2018; Yin, 2019), which correspond to one of the five official goals (State Council of the People's Republic of China (PRC), 2015b), and fighting poverty (Rauf et al., 2018; Wu and Zhong, 2020). One quarter of conceptualizations reference domestic economic goals – the only category of objectives that explicitly refers to domestic rather than international drivers of the BRI. Example goals are to 'revive China's slowing domestic economy' (Yu, 2017), to internationalize the Chinese currency (Thürer et al., 2020b), and to reduce overcapacity in production (Chang et al., 2021; Lee et al., 2016; Yalew and Changgang, 2020; Zhai, 2018a). Natural resources, environment/sustainability, development and military/security are the least-mentioned categories of objectives.

By far the most frequently mentioned impacts are international economic impacts, which refer principally to trade and economic growth (Sun et al., 2019; Yang et al., 2020; Yu, 2017; Zheng et al., 2020). In comparison to lofty and somewhat unspecified economic objectives, economic impacts are operationalized in more detail. Examples are clothing exports of BRI countries (Ho et al., 2020), productivity in BRI countries (Wu et al., 2020; Yang et al., 2019), agricultural growth (Sher et al., 2019), and logistics efficiency (Zheng et al., 2020). Listed economic impacts also include the debt risk of BRI countries (Cheng, 2020; Enderwick, 2018; Golubchikov et al., 2020; Hussain et al., 2020; Layton, 2020; Li, 2020; Selmier, 2018; Shahriar et al., 2020; Sidle, 2020).

Domestic economic, political, social/cultural, environmental/sustainability, and infrastructure (logistic) connectivity impacts have a similar number of mentions. Environmental impacts are mostly negative and focus on risks, with the exception of several articles mentioning sustainable development (Yanying Huang, 2019; Lin et al., 2020; Liu et al., 2020; Pan et al., 2020; Rauf et al., 2020; Sher et al., 2019; Zhao et al., 2020). These articles contain language that is positive but also lacking indicators and descriptions. Cooperation/integration, development, military/security, and natural resources receive scarce mentions.

3.2.5. *Benefit distribution described mostly as equitable or favoring BRI countries over China*

Benefit distribution refers to both objectives and impacts between China and BRI countries. Although 68 percent of authors describe any sort of benefit distribution in their conceptualization, this review finds scholarly disagreement about whether China or the host country benefits from BRI projects. Thirty-eight percent of authors claim that BRI host countries benefit; example mentions are 'increased accessibility to public goods' (Pan et al., 2020), 'China's successful development model'

[4] As an illustration of calculations in Fig. 5, 26 percent 'oil or gas' = the code frequency of the subcode 'oil or gas' divided by total frequency of code 'energy' in the 52 articles that contain this code. In other words, of all the times 'energy' is mentioned (in the 52 articles that mention sectors), 26 percent refer to 'oil or gas.'

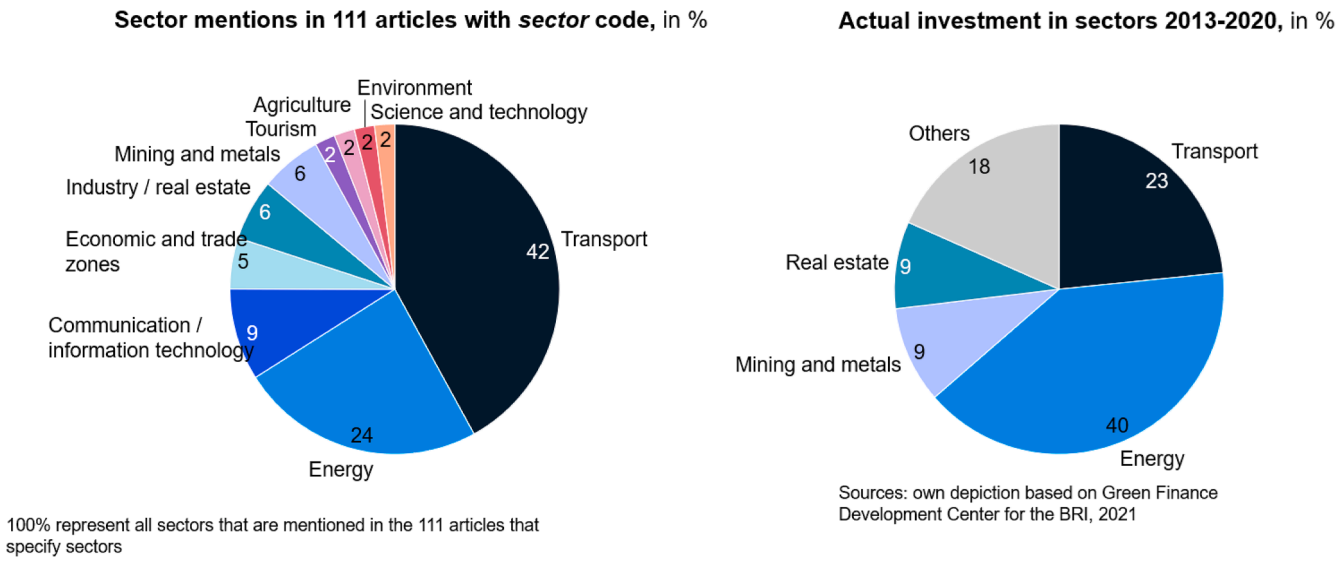

Fig. 4. BRI investment sectors (comparison of subset mentions with investment volumes).

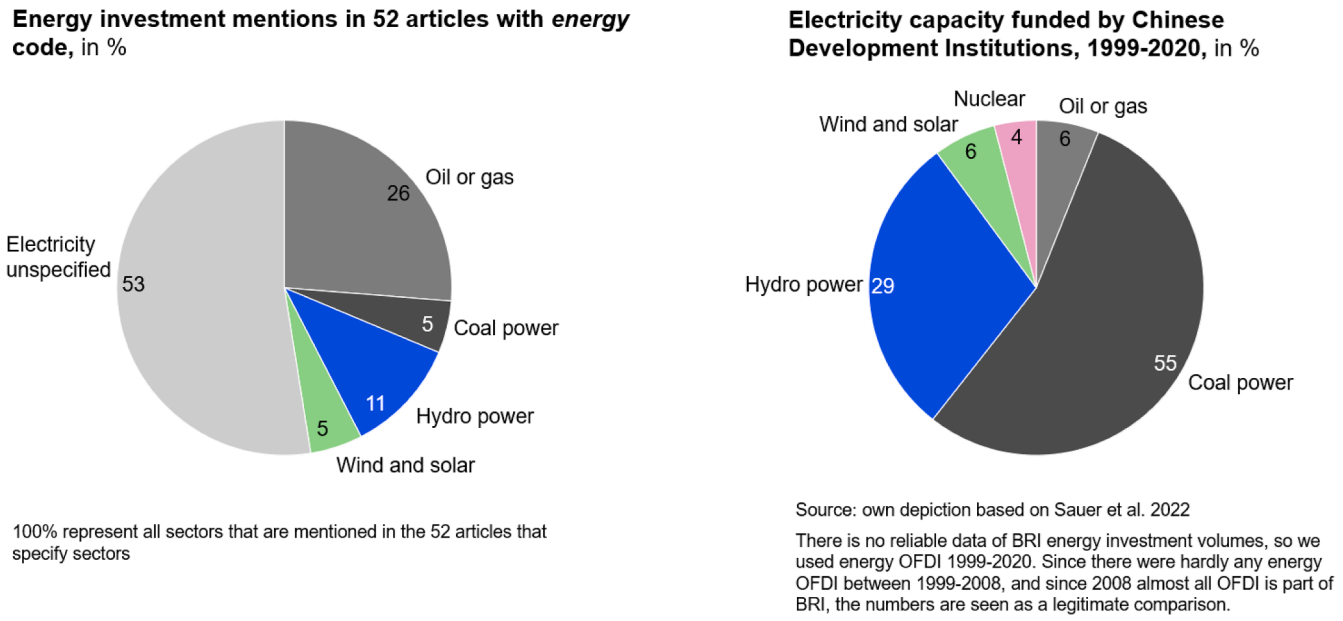

Fig. 5. Energy investments in BRI (comparison of subset mentions with investment volumes).

(Li et al., 2018), and 'an opportunity to revitalize economies' (Nazarko et al., 2017). A slightly lower share of authors (30 percent) describes China as benefitting from the BRI; example mentions are economic benefits (Benabdallah, 2019; Rauf et al., 2020; Shah, 2018; F. Wang et al., 2019), boosting foreign trade (Chen et al., 2019), the transition to a new economy (Zhai, 2018b), increased (geo)political influence (Basu and Janiec, 2021; Beeson, 2018; Cruz and Castro, 2020; Enderwick, 2018; Guo and Wang, 2021; Mayer, 2018; Yu, 2017), and military (Hooijmaaijers, 2021) or global hegemony (Basu and Janiec, 2021; He, 2018; Pardesi, 2022).

One third of authors describe an equitable distribution of benefits, but the nature of benefits is rarely or vaguely described. The emphasis tends to be on the distribution itself rather than details about the benefit; example mentions are 'win-win' (de Boer et al., 2021; Ehizuelen, 2017; Grant, 2020; D. C. K. Ho et al., 2020; Li et al., 2020) and 'mutual benefit' (Davis et al., 2020; Dimitrijević, 2017; Li, 2020; van Noort and Colley, 2021; Yalew and Changgang, 2020). Such conceptualizations reflect, whether intentionally or otherwise, the official definition of the BRI as a 'win-win economic cooperation' (State Council of the People's Republic of China (PRC), 2015b).

4. Discussion

Six principal implications arise from this study. First, a majority of the study's 171 articles fails to fully consider domestic drivers and institutional dynamics in China but rather see the country as a monolith (Jones and Zeng, 2019; Skidmore, 2021). However, analytically reducing China to a top-down state and 'unitary actor' (Hale et al., 2020) potentially overestimates its governance capacity (Jones, 2020), particularly on environmental and economic matters. This mischaracterization has been analyzed and criticized (Tan-Mullins, 2017), including separately from the BRI (P. Ho, 2021; Howell, 2006). These findings show that the literature largely accepts this oversimplification or disseminates it, potentially weakening arguments that more research is needed conceptualization and governance regarding BRI sustainability. Additionally, by emphasizing President Xi's role in driving the BRI,

scholarship tends to 'personalize' the initiative. The recently resurgent trend of viewing the Chinese president as a singular leader in such policy efforts has an extended history (Ang, 2020; Lee, 2018; Luqiu, 2016) and is said to be manifest through the increasing centralization of power (Ang, 2022; Lynch, 2021; Wang and Shi, 2022). More nuanced understandings about the governance aspects of BRI would help the literature advance more profitably in examining how the rest of the world – both global institutions and individual nations – perceive and engage with BRI projects. Practical lessons from these findings include a revealed scope for engaging BRI sustainability on multiple governance fronts – across jurisdictions and agencies – and for recognizing its interconnected engagement of policy domains (a particularly salient issue as the global sustainability discourse becomes increasingly multifaceted; Luederitz et al., 2019). Governments should identify and exploit opportunities for multi-lateral action that arise from BRI projects, including those related not only to sustainability but also to local economic and social development; these opportunities can be pursued in ways that preserve local and national sovereignty in BRI countries, including those that observe pluralistic and participatory forms of governance.

Second, BRI conceptualizations fail to systematically mention financial institutions having the most significant role in funding the BRI (i.e., Exim, CDB, and other state-owned banks). Rather, they often focus on the AIIB, NDB, and Silk Road Fund, which are geopolitically significant for other reasons but play a minor role in BRI investment. One explanation is that these institutions have been relatively recently founded (2014, 2013, and 2014, respectively) and have thus drawn attention in media for their apparent boldness in offering alternatives to Bretton Woods institutions like the World Bank (Ella, 2020; Stephen and Skidmore, 2019; Wang, 2018). The AIIB, in particular, is viewed in a political context due to its multilateral structure (Bennon and Fukuyama, 2022; Callaghan and Hubbard, 2016), while also having more transparent safeguards that are frequently discussed in the context of the BRI's environmental impacts (Shao et al., 2021; Vazquez and Chin, 2019). The practical implication is that efforts by the international community to engage with or influence BRI initiatives should take a broader view of the governing institutional ecology, including domestic agencies that may not interface directly with global governance institutions but whose actions shape BRI policy efforts. The role of such institutions should become clearer as governments and decisionmakers adopt a more holistic view of BRI projects and their impacts, from sustainability to economic and social development. Recognizing BRI projects for their broad ramifications highlights the need for a wider scope of stakeholder engagement purposes, both in defining and monitoring conditions and in managing them.

Third, studies often place insufficient emphasis on the energy sector, which is the most significant sector regarding BRI investment volumes. Funding of coal-fired power plants is scarcely mentioned in the literature, despite being the largest electric power sector accounted for by Chinese OFDI (Z. G. Li et al., 2020b) and a common topic of media scrutiny and academic scholarship concerning the sustainability aspects of the BRI. The environmental impacts of coal-fired power plants are well documented, both in general (IEA, 2021; van Soest et al., 2017; van Vuuren et al., 2012) and in the context of Chinese overseas investments (Gallagher et al., 2018; Hannam et al., 2016; Kong and Gallagher, 2021; G. Li et al., 2020a). However, articles about Chinese OFDI in coal-fired power plants are not studies about BRI specifically, and therefore they do not appear in this sample. Possible explanations for the lack of connection between these two issues are the lack of an official BRI project list (Coenen et al., 2022; Liu et al., 2020) and the approach of many studies to examine only official communications about BRI (which typically make few statements about coal power). The practical implication is that conclusions and policy decisions made by the international community and national governments on the basis of existing knowledge about the share of coal power in BRI projects should be cautious given the evolving state of scholarly understandings. A thorough understanding about the direction of global sustainability *vis a vis* energy production is not possible without better understandings about the coal's role in current and anticipated BRI projects. As this role becomes more apparent, governments are able to make a stronger case to constituents and stakeholders about the urgency of energy transition.

Fourth, mention of stakeholder engagement in the BRI literature highlights the issue of imbalanced power dynamics. Development and implementation of BRI projects is executed primarily through a governance template defined in the Chinese state, with major participants being government and multi-national enterprises in the context of uncertain and evolving geopolitical dynamics (see Schulhof et al., 2022; Li et al., 2021; Jones, 2020; Zeng, 2019). There appears to be less

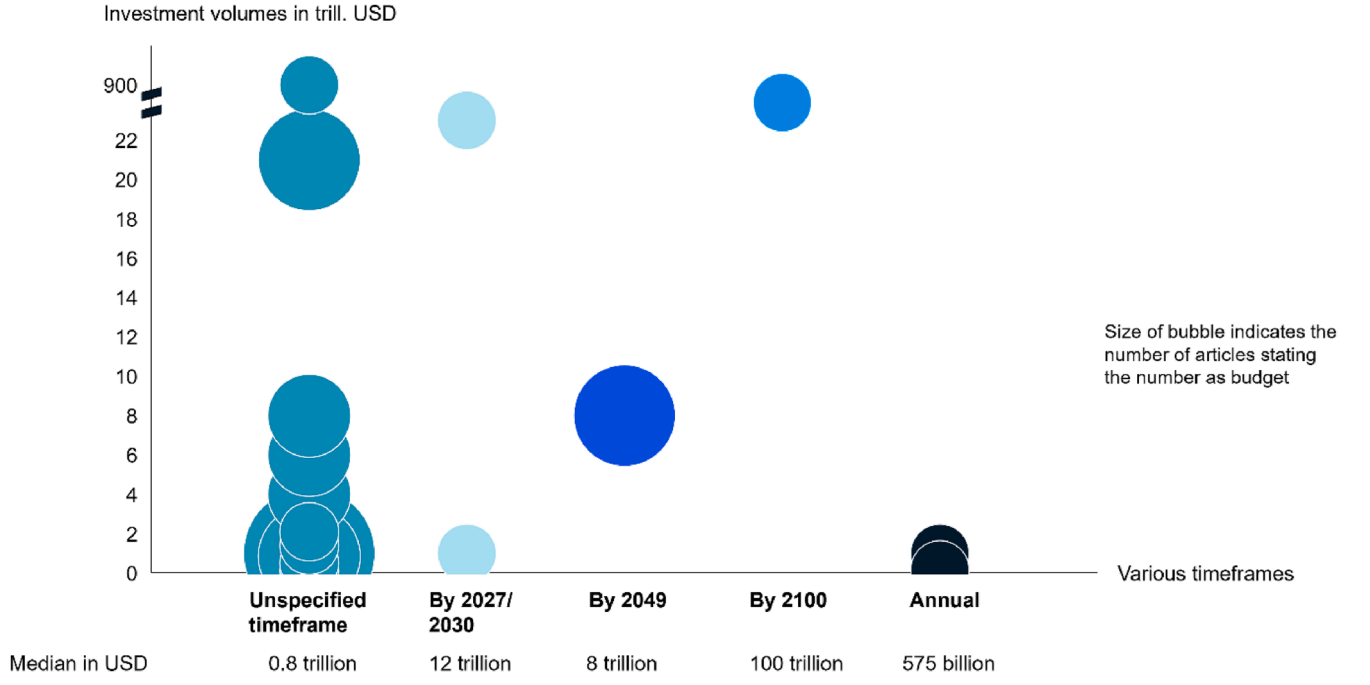

Fig. 6. Investment volumes by corresponding timeframes.

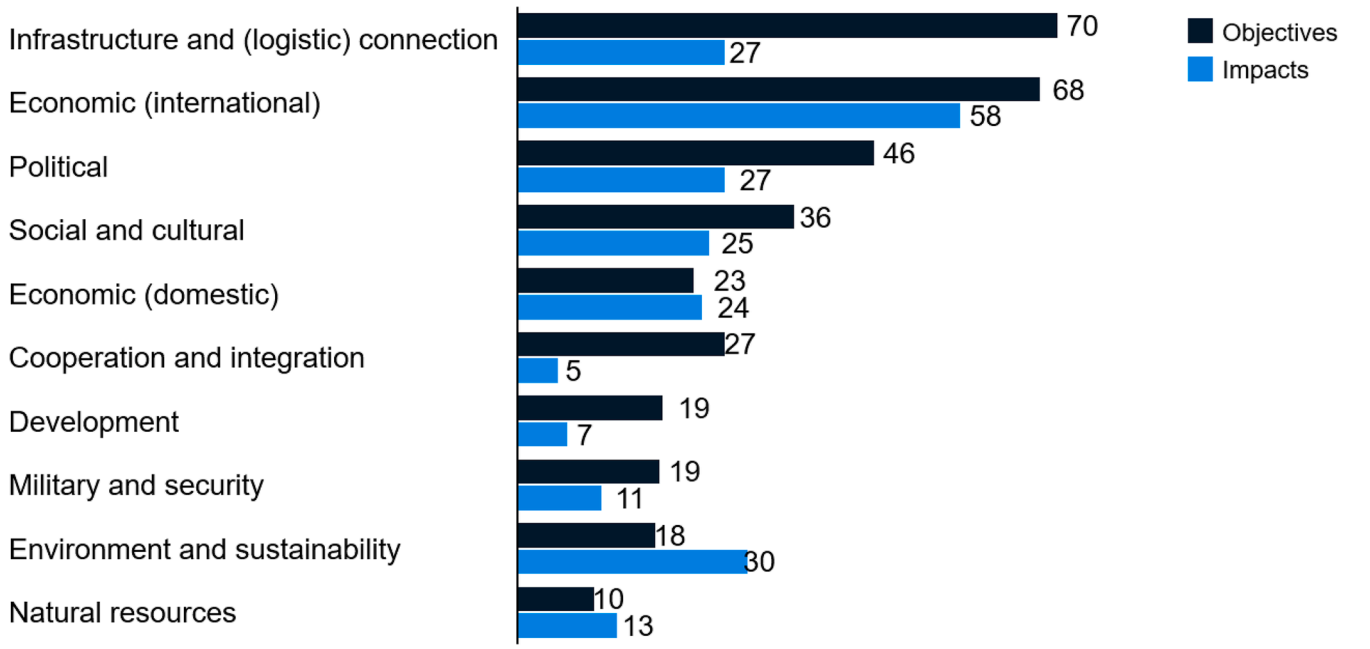

Fig. 7. Comparison of objectives and impacts.

engagement – in practical and research – with non-state and non-corporate stakeholders, including citizens and the groups that represent their interests. In some cases, stakeholder perceptions about BRI projects have been positive (i.e., opportunities emphasized over challenges), with air quality and water consumption identified as principal issues in one study of Pakistan (Yanying Huang et al., 2017). At the same time, the institutions playing the most influential role in carrying out BRI projects – the Chinese state, its banks, and ancillary institutions (e.g., the AIIB) – have been cited for engaging insufficiently or minimally with local stakeholders (Friends of the Earth, 2017). Under governance structures of this type, feedback mechanisms involving non-state and non-financial stakeholders are not used in robust and systematic ways, even when stipulated by development institutions (e.g., AIIB); further, weak institutions allow many engagement and project evaluation procedures to be bypassed (Russel and Berger, 2019). The consequences of insufficient stakeholder engagement include lost legitimacy of projects (Sternberg et al., 2017), as exemplified in a study about government communication and transparency in China's high-speed railway development (Guo et al., 2017). While the breadth and variety of BRI projects do not reflect a uniform pattern in stakeholder engagement (Zhang and Yao, 2023), the adoption of participatory governance has generally been advocated in the literature (Galukande-Kiganda and Mzini, 2019). According to Li et al. (2021; p. 847), "BRI must realize a consistent set of meaningful and legitimate values for Chinese and host country stakeholders and invite their participation."

Fifth, while this study's observations yielded results that were largely consistent over the designated timeframe, there are some signs that conceptualizations become more differentiated towards the later part of the timeframe, particularly in their depiction of institutions and stakeholders. There also appears to be increasing focus on impacts. These developments suggest that a more diverse and nuanced conceptualization of the BRI may be emerging. Additionally, the normative image of the BRI appears to have improved slightly over time, with BRI conceptualizations including fewer negatively connotated objectives and discussions about benefit distribution describing the BRI as more benevolent. In light of Covid-19-related issues (Gries and Turcsányi, 2021) and recent tensions in US–China relations, these dynamics may differ in studies that go beyond the initial timeframe of this study. From a practical perspective, the literature has suggested that the negotiated construction of social meaning in the definition of policy problems and solutions is increasingly contested – particularly with rising political instability and antipathy towards knowledge and technocratic elites (Head, 2023; Boossabong and Chamchong, 2021; Fischer, 2021). While there are no direct and simple ways of engaging with or managing this phenomenon, governments should continue the toilsome and gritty work of strengthening their relationships with the communities they represent and better institutionalizing feedback in ways that protect it from being preempted or erased by technocratic or elite capture of decisionmaking.

Finally, it is noteworthy that despite BRI's potentially positive economic outcomes in participating countries, there remain critiques of the BRI from both academic and practitioner perspectives; these include environmental impacts, social impacts on local populations, governance transparency, and financial risks. Concerns have been raised that the BRI may have substantial permanent environmental impacts around the world, particularly in Southeast Asian and Sub-Saharan African countries (resulting in particular from infrastructure projects; Ascensão et al., 2018). The World Wildlife Fund (WWF) warns that economic corridors in these countries can geographically overlap with natural habitats and protected areas (Li and Shvarts, 2017). Protected natural areas are also at risk of losing their legal protection, leading to further degradation (Ascensão et al., 2018). Such degradation often disproportionately affects low-income and marginalized communities, with such impacts working against any economic benefits of the BRI in the long run (Ascensão et al., 2018) and lack of transparency exacerbating the problem (University of Cambridge Institute for Sustainability Leadership (CISL), 2022). Regarding social issues, the BRI has been discussed as a possible threat to labor security. For example, privatization of ports in Greece and Sri Lanka resulted job losses among local residents, lower wages, and weakened labor rights (University of Cambridge Institute for Sustainability Leadership (CISL), 2022). At a broader economic level, the BRI has been criticized for being a potential financial burden on participating countries, as costly infrastructure development is often financed by public debt (World Bank, 2019). The practical implication is that national and local governments must adopt evaluative criteria for prospective BRI projects that balance economic gains with social and environmental concerns. While the allure of inward investment is strong, a broader and longer-term evaluative horizon elevates the policy salience of non-financial issues. In countries with robust accountability

mechanisms, the interests of a broad variety of stakeholders, including underrepresented groups and communities, may be expected to influence political decisionmaking. Nevertheless, such mechanisms are underdeveloped in many countries receiving BRI investment. For these countries, effectively balancing external economic opportunities with internal political and humanitarian imperatives is a delicate but crucial task.

5. Conclusion

This article has presented the results of a meta-analysis of BRI definitional and sustainability conceptualizations in the academic literature, based on a sample of 171 international peer-reviewed journal articles. Despite growing scholarly efforts to understand the BRI, this analysis identified significant gaps between academic conceptualizations and China's overseas engagement under its BRI policy framework, including sustainability. These gaps include how the discourse presents stakeholders, investment agencies, financing, and project sectors. Scholarly conceptualizations of the BRI also typically reflect an image of China as a monolithic or unitary actor (Jones and Zeng, 2019; Skidmore, 2021), the salience of China-led organizations like the AIIB, and vague notions about financing volumes and impacts. These findings show that, even more than a decade after the announcement of the BRI, scholarly knowledge about the impact of the announcement remains limited. While individual studies about the BRI can offer useful insights, the corpus of scholarship overall provides a somewhat distorted and unresolved picture. The implication of this phenomenon is that gaps between reality and scholarly conceptualizations lead to the construction of BRI imaginaries that may become fossilized or canonical over time, undermining the effectiveness of policy efforts, collaborations, and adjustments by external parties.

A methodological contribution of this research is the introduction of a framework to conceptualize major international development policy initiatives such as the BRI. The framework is structured around the categories of concept, origin, stakeholders, investment sectors and volumes, principal institutions, objectives, impacts, and distribution of benefits. The categories for sectors, stakeholders, and investment volumes tend to be more objective and can be analyzed robustly by scholarship given the available data. By contrast, the categories for objectives, projected impacts, and distribution of benefits tend to be more subjective or political, explaining in part why there are more differences between claims and practice in these categories over time. Plausibly, over time the categories for impacts and benefits distribution may turn from subjective to objective as impacts are better able to be measured longer-term and more research becomes available.

In closing, there are several opportunities for further research. First, although the sample of articles was approximately representative for the population of more than 2300, a larger sample might have yielded more robust and credible results. Drawing on a larger sample was not feasible for complex manual coding, but points towards the possibility of further research. Second, researchers can apply this BRI framework to a higher level. While the study does not intend to propose a consensus definition of BRI, the framework provides core conceptual elements that can be used in such a definition (even as indicators for the framework's subsets can only approximate the variables they stand for). Application of the framework to a higher level also comports with trends in the sustainability discourse and practice more generally, including a more integrated perspective across policy domains. Third, additional research is needed to understand changes in China's overseas engagement that result from the BRI as a new policy framework, rather than taking the existence of the BRI for granted or assuming it to be a secondary or ancillary concern. By examining policy changes that emerge directly from the BRI, research could provide more nuanced insights about what the BRI is and may become. This type of research may be particularly important in the Chinese context, as emergent policy concepts are often loosely defined at first. Fourth, research should compare how BRI sustainability is treated across disciplines explored in this study. While there is no basis to speculate here what they may be, notable differences are possible among natural sciences, international relations, social sciences, and business and economics and the issue should be explored in a dedicated study. Fifth, researchers should explore more generally how national discourses about new policy concepts and initiatives arise and coalesce, merge into existing policy frameworks, and materialize through implementation. The BRI is a rare case opportunity to examine how the ambitions of a large sovereign global actor are understood in scholarly narratives. Sixth, individual components of the framework could be used to compare the BRI with other emerging initiatives supported by global institutions and regional bodies. At a practical level, understanding the interactions – complementarities and contradictions – between the BRI and other sustainability frameworks can help policymakers better anticipate the impacts of new policies. Finally, future research should examine in more detail the sustainability impacts of BRI on local communities and stakeholders in host countries, particularly through fieldwork and qualitative or in-depth case-based analysis. It is important in advancing studies of BRI to ground theoretical claims and practical recommendations in observed realities.

CRediT authorship contribution statement

Vera Schulhof: Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Kris Hartley:** Writing – review & editing, Visualization, Formal analysis. **Wiebke Rabe:** Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Genia Kostka:** Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Julian Kirchherr:** Methodology, Investigation, Formal analysis, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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Appendix: Sample of articles

Abbas, H., Zhao, L., Gong, X., Jiang, M., & Faiz, N. (2022). Environmental effects on perishable product quality and trading under OBOR supply chain different route scenarios. *Environmental Science and Pollution Research, 29*(45), 68,016–68,034.

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Akbar, M. W., Yuelan, P., Maqbool, A., Zia, Z., & Saeed, M. (2021). The nexus of sectoral-based CO2 emissions and fiscal policy instruments in the light of Belt and Road Initiative. Environmental Science and

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