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ORIGINAL PAPER

The Japanese Circular Economy and Sound Material-Cycle Society Policies: Discourse and Policy Analysis

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Abstract

Although the Japanese government is an early adopter of Circular Economy (CE) policies and developed the concept of the Sound Material-Cycle Society in the early 2000s, its CE policies have nonetheless been poorly researched and understood, especially in English academic literature. This article addresses this research gap by answering the following questions: What are the dominant discourses of key stakeholders in Japan regarding CE? And to what extent does the current CE policy in Japan relate to that? Methodologically, this paper conducted a discourse analysis through a mix of policy analysis, media analysis, stakeholder interviews, keyword mining, qualitative content analysis, and analysis of stakeholder presence. Results show that, while CE discourses in Japan are rather diverse, they mostly fall within the Reformist Circular Society discourse type, with some smaller Technocentric Circular Economy and Transformational Circular Society elements. Results also show that businesses and academics were over-represented in policy meetings and the media, compared to NGOs and local government actors, which are more likely to hold transformational circularity discourses. Most circularity discourses in Japan are thus focused on a growth-optimistic narrative that emphasises innovative technologies and lacks a stronger understanding of social justice and planetary boundaries. Based on these findings, this article suggests recommendations, such as revisiting Japanese ecological thinking and Buddhist philosophy, which can inspire degrowth-oriented circularity approaches, as well as encompassing more participation of neglected societal groups in the development and implementation of CE policies and practices. By highlighting the challenges in current CE discourse and implementation in Japan, this study presents implications for a more socially inclusive and ecologically sustainable path towards a circular society.

Keywords Circular Economy · Discourse analysis · Japan · Sustainability · Environmental policy · Sustainable development

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Introduction

Human use of resources has grown exponentially in the last century leading to critical problems of resource depletion, biodiversity collapse, and climate breakdown [1, 2]. The idea of a Circular Economy (CE) has been proposed by some actors as a model to address these crucial socio-ecological crises [3, 4].

The CE has quickly become a widely recognised sustainability paradigm, leading to many new public policies and business strategies on CE [5]. The mainstream vision of CE seeks to reduce pollution and resource scarcity by circulating materials within a closed-loop through various 'R strategies' such as reuse, remanufacture, recycle, and refurbish[1] [6–8]. However, the CE is still a contested concept with various contrasting and often conflicting definitions [7, 9].

Although CE is sometimes described as a new and innovative concept [6, 10], the idea has more than half a century of history [7, 11, 12]. Since the 1970s, concepts sharing the CE's core principles have appeared under various names. In other words, CE is a concept that has developed under the influence of many other concepts [13]. This makes CE an 'umbrella concept' that encompasses and unites a broad range of different ideas, all sharing the overall vision to create a sustainable societal system that operates within the biophysical limits of the Earth [14, 15].

Many academics have pointed out that the current dominant circularity discourse, which is particularly popular in business and political spheres, is a technocentric vision that is based on the premise that sustainability can be achieved through green growth [16]. Indeed, the CE is increasingly seen as a way to decouple economic growth from resource use [4, 12]. However, this discourse is problematic for three main reasons. Firstly, the scientific evidence has shown that absolute decoupling of economic growth and environmental impacts is impossible on a scale sufficient to prevent ecological collapse [17–19]. Economic growth inherently involves resource and energy consumption, and therefore, a growth-optimistic mindset runs the risk of accelerating the overshoot of planetary boundaries [1, 8, 20]. Secondly, technocentric CE visions do not fully encompass the social dimensions of sustainability, such as human well-being, social justice, and democratic governance [13, 21, 22]. Human well-being and global environmental stability are deeply interrelated, and a wholescale transformation of current provisioning and distribution systems is needed to meet the needs of humanity within the ecological limits of the biosphere [23, 24]. Lastly, the dominant technocentric CE discourse is heavily focused on actions in the lower value retention hierarchy, such as mass materials recycling, and neglects higher and more critical value retention options, such as refuse, reduce, reuse, and repair [12, 25, 26]. The predominance of this single vision of CE raises concerns that other CE visions are being suppressed and neglected in the overall societal discourse and policymaking on the topic. Identifying which CE discourses are dominant or suppressed is thus an essential step towards achieving a more inclusive debate and a transition to an inclusive, democratic, and sustainable circular future. Despite these problems, there is still a lack of CE research that fully addresses the complexity of the socio-ecological challenges we face in order to ensure a good life for all within planetary boundaries. By using the comprehensive typology of circularity discourses developed by Calisto et al. [21], we hope this research will contribute to a systemic and interdisciplinary analysis of CE understanding in Japan.

[1] This article follows the value retention hierarchy (also called 10R, 10R imperatives or simply R's) established by Reike et al. [12]: R0 Refuse, R1 Reduce, R2 Re-sell/Reuse, R3 Repair, R4 Refurbish, R5 Remanufacture, R6 Re-purpose, R7 Recycle materials, R8 Recover energy, R9 Re-mine.

Fig. 1 Research methods

The CE has been implemented in the policies of various countries and regions, such as the EU, the Netherlands, China, and France [8, 27, 28]. Japan is among the first countries to develop CE policies [29]. In 2000, Japan incorporated the concept of a Sound Material-Cycle Society (SMCS) into law with its Basic Act on Establishing a Sound Material-Cycle Society [30]. The SMCS concept is considered an early precursor of the CE concept [3], and it is defined as a society 'where the consumption of natural resources is reduced and the environmental load is minimised to the fullest extent possible' ([31], p. 1). The Basic Act on Establishing a SMCS seeks to move away from the existing linear economic system and towards a sustainable circular one by ensuring the effective implementation of the 3Rs (reduce, reuse, and recycle) as well as environmentally sound waste management practices [32]. In this respect, Japan has been one of the pioneering countries regarding CE implementation [33]. However, there is a lack of literature analysing CE policies in Japan, as most research is neither up to date nor available in English (e.g., [34–37]).

This article addresses this research gap by answering the following research questions: *What are the dominant discourses of key stakeholders in Japan regarding CE? And to what extent does the current CE policy relate to that?*

The article is structured as follows: the 'Methods' section introduces the theoretical framework and methodology; the 'Results' section presents the outcomes of our analysis; the 'Discussion' section reviews the implications and limitations of these results and proposes recommendations to address them.

Methods

This article conducts a discourse analysis through a mix of policy analysis, media analysis, stakeholder interviews, keyword mining, qualitative content analysis, and analysis of stakeholder presence.

Figure 1 presents the different steps of the research methods we used. Each step is explained in further detail in the following sub-sections.

This mix of qualitative and quantitative methods allows us to analyse the Japanese discourses and policies in a systematic manner. The theoretical framework structured the analytical lens with which we analysed our results. The policy analysis allowed us to understand current CE practices in Japan. The in-depth media analysis helped us not only find relevant discursive elements but also locate key stakeholders for the interviews. The stakeholder interviews allowed us to unpack the specific vision of CE held by different actors. The keyword mining enabled us to analyse the policies, newspaper articles, and interviews in a systematic and consistent manner. The qualitative content analysis gave further depth and nuance to this quantitative keyword mining. Finally, the analysis of stakeholder presence allowed us to situate which actors were most influential within Japanese CE discourse and policymaking. Combined, these methods provide a comprehensive understanding of the CE discourse in Japan.

Technological innovation and ecological collapse	Approach to social, economic, environmental, and political considerations	
	Holistic	**Segmented**
Optimist	**Reformist Circular Society** - **Assumptions**: reformed form of capitalism is compatible with sustainability and socio-technical innovations can enable eco-economic decoupling to prevent ecological collapse. - **Goal**: human prosperity and well-being within the biophysical boundaries of the earth. - **Means**: technological breakthroughs and social policies that benefit humanity and natural ecosystems. - **Example concepts**: natural capitalism, cradle to cradle, the performance economy, the natural step, the blue economy, regenerative design, sound material-cycle society. - **Proponents**: various international organizations, academics, large foundations, and some governments.	**Technocentric Circular Economy** - **Assumptions**: capitalism is compatible with sustainability and technological innovation can enable eco-economic decoupling to prevent ecological collapse. - **Goal**: economic prosperity and development without negative environmental externalities. - **Means**: economic innovations, new business models, and unprecedented breakthroughs in CE technologies- - **Example concepts**: industrial ecology, reverse logistics, biomimicry, industrial symbiosis, extended producer responsibility, cleaner production, bioeconomy. - **Proponents**: some academics, many corporations, various national and city governments, and international organizations.
Sceptical	**Transformational Circular Society** - **Assumptions**: capitalism is incompatible with sustainability, and socio-technical innovations cannot bring absolute eco-economic decoupling to prevent ecological collapse. - **Goals**: a world of conviviality and frugal abundance for all, while fairly distributing the biophysical resources of the earth. **Means:** complete reconfiguration of the current socio-political system and a shift away from productivist and anthropocentric worldviews. - **Example concepts**: conviviality, steady-state economics, permacircular economy, degrowth, eco-anarchism, Buddhist economics, buen vivir, ubuntu. - **Proponents**: many academics, social movements, bottom-up circular initiatives, and indigenous peoples.	**Fortress Circular Economy** - **Assumptions**: there is no alternative to capitalism and socio-technical innovation cannot bring absolute eco-economic decoupling to prevent ecological collapse. - **Goal**: maintain geostrategic resource security in global conditions where widespread resource scarcity and human overpopulation cannot provide for all. - **Means**: innovative technologies and business models combined with rationalized resource use and migration and population controls. - **Example concepts**: the tragedy of the commons, the population bomb, overshoot, disaster capitalism, capitalist catastrophism. - **Proponents**: survivalists, a few academics, some geostrategic think tanks, and state policies.

Fig. 2 Circularity discourse types and their main keyword groups (adapted from [21])

Theoretical Framework

This study adopts the circularity discourse typology developed by Calisto Friant et al. [21] to reveal the distribution of CE discourses in Japan (Fig. 2). The framework is particularly relevant to this research since it is developed specifically for discourses regarding CE, and it has a diverse outlook on the topic that includes social justice and planetary boundaries. Furthermore, it has been applied in many other cases, including the EU's CE policies [38]; plastic strategies in the EU and the Netherlands [23, 39]; CE discourses in Norway, Quebec, and Australia [40–43]; and urban living labs in the City of Tampere, Finland [44]. The typology classifies CE discourses based on two criteria: first, it distinguishes between *segmented* discourses that focus on the technical elements of circularity and *holistic* discourses that include social justice and political empowerment considerations. Second,

it distinguishes between *optimistic* and *sceptical* discourses regarding the possibility of decoupling environmental degradation from economic growth fast enough to prevent socio-ecological collapse.

The combination of these two criteria results in four circularity discourse types: Reformist Circular Society, *optimist* and *holistic*; Technocentric Circular Economy, *optimist* and *segmented*; Transformational Circular Society, *sceptical* and *holistic*; and Fortress Circular Economy, *sceptical* and *segmented* discourses [21, 38]. The characteristics of each discourse type are explained in Fig. 2.

Policy Analysis

This article analyses the development of CE policy through government reports and policies in the 5 years from 2017 to 2021, when the Fourth Fundamental Plan for Establishing a SMCS came into force. Table 1 shows the examined government reports and policies related to CE (see Supplementary Material I for the full list of references for these documents).

This article also analysed official stakeholder meeting proceedings related to CE, as shown in Table 2. These proceedings are the meetings of the councils, subcommittees, and working groups under the jurisdiction of the Ministry of Environment (MoE) and the Ministry of Economy, Trade and Industry (METI). Those proceedings are added to the analysis to reveal what kind of discourses different stakeholders held during the discussions.

Media Analysis

The media analysis was conducted by searching for newspaper articles in Japan, following the method used by Lazarevic and Valve [45]. This study examined the major Japanese national newspapers, Nihon Keizai Shimbun, Mainichi Shimbun, Asahi Shimbun, Yomiuri Shimbun, and Sankei Shimbun, which cover the Japanese population in a broad manner. Newspaper articles were examined to identify stakeholders, opinions, and statements. This data was collected in a public library in Japan, which provided access to all the above-mentioned newspapers.

The newspaper articles were searched by using the five keywords related to CE: 'サーキュラーエコノミー (circular economy: notation as an English loan word)', '循環経済 or 循環型経済 (circular economy: notation as Japanese[2])', '循環型社会 (SMCS)', and '循環型 (circular model)'. The period for the search was set between 2017 and 2021 (the same time range as the policy analysis). The search area covered national newspaper editions in both their morning and evening iterations and excluded regional editions.

The results obtained through keyword searches were first reviewed to select only relevant newspaper articles on CE. This process reduced the number of newspaper articles from 563 to 186 (see Supplementary Material A with selected newspaper articles). Furthermore, the articles were subjected to more in-depth content analysis to examine how CE is discussed in the newspapers. Specifically, what R-imperatives were mentioned (e.g., R1 reduce, R2 reuse) and the number of newspaper articles related to CE through time. Stakeholder statements collected from the newspaper articles were also used as a data source for the keyword mining and the qualitative content analysis.

[2] The difference between the two is the inclusion or exclusion of one word 「型 (type)」, which is a mere difference in notation. The former「循環経済」 is used in METI's '2020 Circular Economy Vision'.

Table 1 Japanese government reports and policies related to CE analysed in this paper

Government reports and policies[1]	Year	Author(s)
Green Bond Guidelines, 2017	2017	MoE
Annual Report on the Environment, the Sound Material-Cycle Society and Biodiversity in Japan 2017	2017	MoE
The Fifth Basic Environment Plan	2018	MoE
Annual Report on the Environment, the Sound Material-Cycle Society and Biodiversity in Japan 2018	2018	MoE
The Fourth Fundamental Plan for Establishing a Sound Material-Cycle Society	2018	MoE
Annual Report on the Environment, the Sound Material-Cycle Society and Biodiversity in Japan 2019	2019	MoE
Resource Circulation Strategy for Plastics	2019	METI, MoE, and other 7 ministries*
Annual Report on the Environment, the Sound Material-Cycle Society and Biodiversity in Japan 2020	2020	MoE
Circular Economy Vision 2020	2020	METI
Green Growth Strategy Through Achieving Carbon Neutrality in 2050	2020	METI
Disclosure and Engagement Guidance to Accelerate Sustainable Finance for a Circular Economy	2021	METI and MoE
The Future of Resource Circulation Policies for Plastics	2021	MoE
Outline of the Draft Law on the Promotion of Resource Circulation for Plastics	2021	MoE
Annual Report on the Environment, the Sound Material-Cycle Society and Biodiversity in Japan 2021	2021	MoE

*The other ministries are the Consumer Affairs Agency; the Ministry of Foreign Affairs; the Ministry of Finance; the Ministry of Education; the Ministry of Health, Labour and Welfare; the Ministry of Agriculture, Forestry and Fisheries; and the Ministry of Land, Infrastructure, Transport and Tourism

Note that the English name of each document is based on the English version offered by each ministry's webpage, but some of them were translated by the author due to the lack of the official English name

Table 2 Policy meeting proceedings analysed in this paper (see Supplementary Material H for details)

Type of meeting	Key objective	Period	Number of proceedings	Ministry with jurisdiction
Waste and Recycling Subcommittee	Policy making on waste and recycling	2017–2020	4	METI
Central Environment Council	General environmental policy discussions	2017–2021	5	MoE
Circular Economy Vision Study Group	Formulate the Circular Economy Vision 2020	2018–2019	9	METI
Plastic Resource Circulation Strategy Subcommittee	Formulate the Plastic Resource Recycling Strategy	2018–2019	5	MoE
Joint meeting between the METI Study for Introducing Fee-incurring Plastic Checkout Bags Working Group and the MOE Subcommittee on the Study for Introducing Fee-incurring Plastic Checkout Bags	Discuss how to introduce fee-incurring plastic checkout bags	2019	4	METI and MoE
Joint meeting between the Resource Circulation Strategy for Plastics Working Group and the MOE Subcommittee on Plastic Resource Circulation	Discuss specific measures involving the Resource Circulation Strategy for Plastics	2020–2021	11	METI and MoE
Circular Economy and Resource Circulation for Plastics Finance Study Group	Formulate guidance for disclosure and engagement to promote sustainable finance towards a circular economy	2020–2021	5	METI

Stakeholder Analysis

The stakeholder analysis had two purposes: first, to identify the prominent stakeholders involved in CE in Japan and, second, to collect data to clarify their discourses.

The identification of stakeholders was carried out in two ways. Firstly, stakeholder groups were identified by reviewing documents regarding Japan's CE policy (documents in Tables 1 and 2). Secondly, individual stakeholders were found through the media analysis. The number of times each stakeholder is mentioned in the analysed newspaper articles and the number of statements made by each stakeholder were counted to see what stakeholders were most associated with CE in Japan (see Supplementary Material C with the list of 271 stakeholders that were mentioned in the selected newspaper articles).

As a result of the literature review and policy analysis, the following six stakeholder groups were identified: (1) national government institutions, (2) local government institutions[3], (3) business organisations, (4) NGOs and (5) academic and research institutes. Within these stakeholder groups, specific actors were identified through the analysis.

Stakeholder Interviews

Based on the identification of the key stakeholder groups, stakeholder interviews were conducted to uncover their discourses. Twenty-three people were interviewed, two from the national government, two from local governments, twelve from business organisations, three from NGOs, and four from academic and research institutes (see Table 3 and Fig. 3). Interviewees were selected based on the identified stakeholders of the policy and media analysis as well as referrals proposed by interviewees.

The interviews were conducted online in a semi-structured manner following an interview guide (Supplementary Material D). The recorded interviews were then summarised and transcribed. Later, the interviewees checked the content of the transcripts, and corrections were made where necessary. The derived transcripts were used as data for content analysis and keyword mining.

Keyword Mining

Keyword mining consists in counting the number of keywords in a set of documents to reveal their position on key topics. This article used the keyword mining method developed by Calisto Friant et al. [38] in their research of EU CE policies. The data source for the keyword mining was collected from Japanese government reports and policies, policy meeting proceedings, stakeholder statements in the media, and stakeholder interview transcripts (Table 4). To identify which discourse belongs to each of the four discourse categories, namely *sceptical* vs. *optimist* and *segmented* vs. *holistic*, this research uses the keyword list developed by Calisto Friant et al. [38]. Furthermore, the keywords were scrutinised for relevance in the Japanese context and edited accordingly (for the full list of keywords see Supplementary Material F).

The keyword mining and coding procedures were conducted using the NVivo 20 program. First all files were searched with the above-mentioned keyword lists corresponding to each discursive category (*sceptical optimist segmented* and *holistic*). Next a careful

[3] In this paper, 'local government institutions' refers to any local government at the prefectural or municipal level.

Table 3 List of interviewees

Stakeholder Group	No.	Affiliation of Stakeholders	Position of the interviewee
National Government	[1]	Ministry of Environment*	Specialist
	[2]	Ministry of Economy, Trade and Industry*	Assistant section chief
Local governments	[3]	Local government (prefecture)	Section manager
	[4]	Local government (town)	Mayor
Business Organisations	[5]	Company (waste management and recycling)	CEO
	[6]	Company (waste management and recycling)	Senior executive manager
	[7]	Company (consulting and catering)	CEO
	[8]	Company (resource recovery platform services)*	CEO
	[9]	Company (consulting and catering)	CEO
	[10]	Company (consulting and catering)	CEO
	[11]	Company (resource circularity platform services)	General manager
	[12]	Company (media)	Director
	[13]	Corporate alliance (use and production of plastics)	Technical general manager
	[14]	Company (electrical manufacture)	Project leader
	[15]	Company (consultancy)	CEO
NGOs	[16]	NGOs (environmental protection)	Campaigner
	[17]	NGOs (environmental protection)*	Manager
	[18]	NGOs (promotion of zero-waste)	Representative
Academic and research Institutes	[19]	Environmental research institute	Senior visiting researcher
	[20]	Environmental research institute	Researcher
	[21]	University	Associate professor (Technology management for innovation)
	[22]	University	Professor (Environmental and energy research)

Stakeholders identified as key stakeholders through the media analysis are marked with an asterisk symbol '*'

Fig. 3 Proportion of stakeholders in the interviews

analysis of each result was carried out to examine the context of each keyword and ensure it is in line with its respective discourse type

After the data collection, the circularity discourse typology developed by Calisto Friant et al. [21] was used to analyse how the resulting discourses are distributed. Specifically, the total number of keywords in each discourse type was derived for each of the two axes of *sceptical/optimist* and *segmented/holistic*. This allowed a close examination of which discourse type is quantitatively most prevalent in the language used by each stakeholder group.

Qualitative Content Analysis

The qualitative content analysis carries out an in-depth exploration of the discourse of each stakeholder group. The results are derived from a qualitative analysis of statements in the media (Japanese newspaper articles, see the 'Media Analysis' section), and the twenty-three interview transcripts (see Table 3). These are data sources in which the speakers and respective stakeholder gourps are clearly identified. In addition to this, 14 government reports were also analysed as a source of data on the Japanese government's discourse on the topic (see Table 1).

Analysis of Stakeholder Presence

To examine the relative prevalence and power of each stakeholder group in the Japanese CE discursive scene, we looked at the participant lists of the 43 reviewed policy meetings and the stakeholders whose statements are most cited in the 186 reviewed newspaper articles. This allowed us to determine which stakeholders had a greater presence in the Japanese CE debate.

Table 4 Data sources for keyword mining

Type of data source	# Docs	No.	Stakeholders	Document	Period
Policy meetings	43	[1]	Ministry of Economy, Trade and Industry (METI)	Minutes of Waste and Recycling Subcommittee (1-4)	2017–2020
		[2]	Ministry of Environment (MoE)	Minutes of Central Environment Council (1-5)	2017–2021
		[3]	METI	Summary of proceedings of Circular Economy Vision Study Group (1-9)	2018–2019
		[4]	MoE	Minutes of Plastic Resource Circulation Strategy Subcommittee (1-5)	2018–2019
		[5]	METI and MoE	Minutes of Joint meeting between the METI Study for Introducing Fee-incurring Plastic Checkout Bags Working Group and the MOE Subcommittee on the Study for Introducing Fee-incurring Plastic Checkout Bags (1-4)	2019
		[6]	METI and MoE	Minutes of Joint meeting between the Resource Circulation Strategy for Plastics Working Group and the MOE Subcommittee on Plastic Resource Circulation (1-11)	2020–2021
		[7]	METI	Summary of proceedings of Circular Economy and Resource Circulation for Plastics Finance Study Group (1-5)	2020–2021
Government reports and policies		[8]	MoE	Green Bond Guidelines 2017	2017
	14	[9]	MoE	Annual Report on the Environment, the Sound Material-Cycle Society and Biodiversity in Japan 2017***	2017
		[10]	MoE	The Fifth Basic Environment Plan*	2018
		[11]	MoE	Annual Report on the Environment, the Sound Material-Cycle Society and Biodiversity in Japan 2018***	2018
		[12]	MoE	The Forth Fundamental Plan for Establishing a Sound Material-Cycle Society	2018
		[13]	MoE	Annual Report on the Environment, the Sound Material-Cycle Society and Biodiversity in Japan 2019***	2019
		[14]	METI, MoE + 7 ministries	Plastics Material Cycle Strategy	2019
		[15]	MoE	Annual Report on the Environment, the Sound Material-Cycle Society and Biodiversity in Japan 2020***	2020
		[16]	METI	Circular Economy Vision 2020	2020

Table 4 (continued)

Type of data source	# Docs	No.	Stakeholders	Document	Period
		[17]	METI	Green Growth Strategy Through Achieving Carbon Neutrality in 2050	2020
		[18]	MoE and METI	Disclosure and Engagement Guidance to Accelerate Sustainable Finance for a Circular Economy	2021
		[19]	MoE and METI	The Future of Plastic Resource Recycling Measures	2021
		[20]	MoE	Draft Law on the Promotion of Resource Recycling for Plastics	2021
		[21]	MoE	Annual Report on the Environment, the Sound Material-Cycle Society and Biodiversity in Japan 2021***	2021
Interview transcripts	22	[22]	Various	Interview transcripts (see Supplementary Material E for a summary)	2022
Statements in the media	45**	[23]	Various	Statements (see Supplementary Material B)	2017–2022

*In an interview with an academic institute, two people were interviewed at the same time, so the number of transcript files is twenty-two, but the total number of interviewees is twenty-three. **'Statements in the media' was listed in one document and imported as one file to NVivo 20. ***Annual reports and the fifth basic environment plan contain a wide range of environmental policies, but this study only analysed those related to CE

Results

Policy Analysis

The Japanese SMCS plan is led by the Ministry of Environment (MoE), and it aims to resolve key socio-ecological issues in Japan and globally by taking an integrated approach that includes the three pillars of sustainability (environmental, economic, and social). The core of the Fundamental Plan for Establishing a Sound Material-Cycle Society has always aimed to create a resource-productive SMCS that moves away from mass production and consumption-oriented technologies, systems, and institutions [46]. It seeks to strengthen international partnerships to overcome social issues related to CE, and it aims to break Japan's economic stagnation and achieve medium- to long-term economic growth [46]. Furthermore, the plan promotes the participation of a range of actors such as 'citizens, the state, local governments, NPOs,[4] NGOs, business operators' as necessary to address environmental, economic, and social considerations in an integrated manner ([31], p. 15).

Japan has made progress in the effective use of resources by promoting and implementing the SMCS Plan and the 3Rs. In fact, Japan's three material flow indicators and targets, i.e., resource productivity, cyclical use rate at outlet and inlet, and final disposal amount,[5] have improved significantly in the past 20 years [47]. However, all three indicators have remained flat in the last decade, with improvements reaching a standstill. For instance, cyclical use rate at outlet and inlet have remained at 44% and 15% respectively since 2010 [47]. As a comparison, these same figures are at 55% and 12.9% respectively in Germany and 52% and 20% in France [48]. Furthermore, the recycling rate in Japan is only around 20% (compared to 67.7% in Germany, and 41% in France), and nearly 80% of waste is incinerated [49, 50]. Incineration has been widely practiced in Japan since the 1960s, as there are more than a thousand plants [51], a rather exceptional number compared to other similar countries [52]. While the Japanese government is promoting energy recovery (R8), only about a third of the incineration facilities currently generate electricity from waste [47]. Moreover, Japan's plastic waste exports to non-OECD countries in 2021 were the highest in the world at 560,730 tonnes. Therefore, much of the plastic waste generated in Japan is either incinerated or exported non-OECD countries that often lack adequate waste treatment technology and facilities; this thereby constitutes a human and environmental health hazard [53, 54].

While the MoE updated the Fundamental Plan in 2018, the Ministry of Economy, Trade and Industry (METI) reviewed the existing resource recycling policy, and it published the 'Circular Economy Vision 2020' [55]. The Vision underlines the necessity of Japan's transition to CE and suggests the direction to follow to tackle the increasing urgency of domestic and international environmental issues [55]. The EU's many policies on CE from 2015 to 2020 were a major influence on establishing the Japanese CE Vision 2020 [55, 56]. In the Vision, the METI emphasises that global environmental issues are not a crisis but an opportunity for industrial development and growth [55]. The METI argues that through CE, it is possible to strengthen the competitiveness of Japanese industry and

[4] 'NPOs' stands for 'Non-Profit Organisations' and is regarded as the same as NGOs.

[5] Resource productivity is calculated by GDP divided by input of natural resources. Cyclical use rate at outlet means percentage of all wastes that are recycled or recovered (this is called the 'recycling rate of all waste excluding major mineral waste' by Eurostat). Note that this is different from a 'recycling rate', which is calculated by dividing the 'municipal waste that is recycled' by 'the volume of total municipal waste disposed' [51]. Cyclical use rate at inlet means percentage of resources that come from recovered sources (this is called the 'circular material use rate' by Eurostat). Final disposal amount means volume of wastes sent to landfill.

realise a virtuous circle between environmental protection and economic growth [55]. The suggested measures include shifting to business models with high 'circularity', improving the 'resource efficiency' of business activities, and promoting voluntary circular business initiatives by companies with minimal regulatory measures.

It is important to note that METI's CE Vision is interpreted differently from the SMCS concept created by the MoE. The METI's CE emphasises economic aspects and entails a broader spectrum of actors and value chains. The METI defines the CE as 'as an economic policy that generates maximum added value through the efficient use of resources' [56, 57]. The METI's CE vision thus focuses on technological solutions and industrial and economic growth. This contrasts starkly with the SMCS discourse of the MoE, which has stronger ecological and social dimension.

Media Analysis

Regarding the 10Rs, results show that 'Recycle materials (R7)' is the most frequently mentioned value retention option for CE in newspapers (Fig. 4). The top three value retention options coincide with the 3Rs policy of 'Reduce (R1)', 'Reuse (R2)', and 'Recycle (R7)' that Japan has been promoting with the SMCS for the past 20 years. This suggests a high level of awareness of these three options in Japan. Prominent among newspaper articles mentioning 'Recycle materials' are those introducing methods for extracting polyester from old clothes to produce recycled fibre (e.g., [15], [52], [90], [167] in Supplementary Material B) and for recycling plastic bottles (e.g., [18], [46], [137], [161] in Supplementary Material B).

The number of newspaper articles on CE has increased significantly from 2017 to 2021, showing the rising attention given to the concept of CE in the Japanese media (Fig. 5).

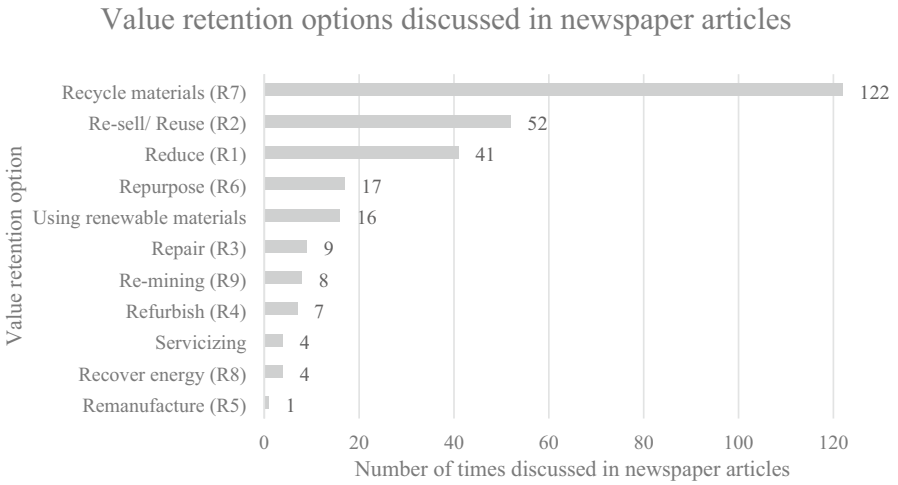
Stakeholder Analysis

Media analysis results found 271 different stakeholders which are involved in CE discourses in Japan (Supplementary Material C). Table 5 shows a list of organisations mentioned at least five times in the reviewed newspaper articles. Those stakeholders thus play a central role in the Japanese CE discursive field.

The most mentioned stakeholder is the European Union (EU). It is noteworthy that the foreign intergovernmental organisation is the most prominent actor, ahead of the Japanese national government. The EU was often mentioned to cite its development of CE policy and specific approaches such as the reuse, recyclability, repairability, and upgradeability of products (e.g., [64], [87], [131], [136], [156] in Supplementary Material A). The MoE and the Japanese government occupy the second and third places. Most of the other stakeholders are business organisations (70% of the stakeholders). This means that the business sector is a major player in the CE discourse in Japan. While the presence of national government and business institutions is prominent, the presence of NGOs and local governments is relatively weak. Furthermore, it is worth noting that one of the most mentioned stakeholders in the NGO group is the Ellen McArthur Foundation, a foreign organisation with no operations in Japan.

Stakeholder Interviews

We interviewed twenty-three people, including two from the national government, two from local governments, twelve from business organisations, three from NGOs, and four



Note: Where multiple options were presented in a single newspaper article, each option was counted.

Fig. 4 Value retention options for CE discussed in newspaper articles ($n = 187$)

from academic and research institutes (see Table 3 and Supplementary Material E for further details on interviewees' responses). The interview transcripts were used as the data source for the keyword mining and qualitative content analysis. In this section, the most salient aspects of the interview results are highlighted.

As a premise, selected interviewees were actively engaged in CE through policy, advocacy, business, or academic research. The interviews revealed, however, that the stakeholders do not have a unified vision of CE and SMCS.

For instance, more than 70% of respondents believed that CE and SMCS were very different concepts. A respondent explained that 'CE is more focused on reduce and reuse and emphasises the economic aspects such as job creation and transformation of business model', while SMCS is a 'narrower concept than CE that remains within the scope of waste management and 3Rs (especially recycling), which have developed based on extending the life of the landfills'. On the other hand, some respondents believed the SMCS is a 'broader concept than CE in that it includes not only economy but the society that circulates things in people's lifestyle without wasting them' ([6] and [7] in Supplementary Material E). It is, therefore, evident that there is no unified understanding of the concepts of SMCS and CE among selected stakeholders.

Regarding stakeholder inclusion, many interviewees mentioned that citizens, NGOs, and other actors should be more effectively involved in CE governance in Japan ([13.2] in Supplementary Material E). On the other hand, 'national government' and 'business organisations' were more frequently cited as powerful actors and responsible parties in the transition to CE than citizens and NGOs ([14.2] in Supplementary Material E). This may be attributed to the frequent claims by interviewees that the national government should introduce new CE regulations and policies, such as financial support and incentives, and that companies should integrate the CE concept into their business models ([3], [5], [12.2], and [14.1] in Supplementary Material E).

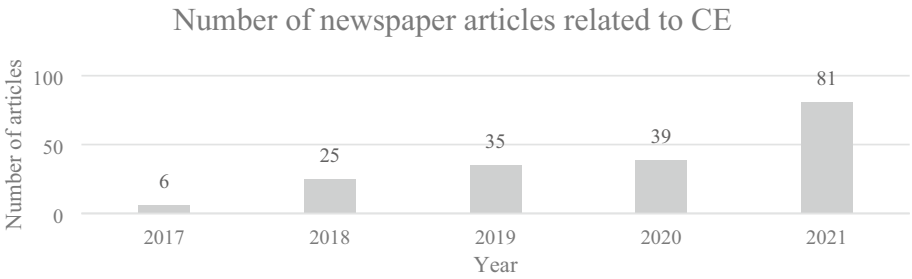


Fig. 5 Number of newspaper articles related to CE ($n = 187$)

Keyword Mining

This section presents the results of the keyword mining carried out on the following documents: (1) policy meeting proceedings, (2) government reports and policies, (3) interview transcripts, and (4) statements in the media.

Sceptical vs. Optimist

In all data sources, *optimist* keywords outnumber *sceptical* keywords, by over two-thirds (see Fig. 6 and Table A in Supplementary Material G for details). This tendency is especially noticeable in statements in the media since most newspaper articles tend to report favourably and positively on new initiatives on CE (see Supplementary Material B).

In the *sceptical* category, words such as 'risk*', 'disasters', and 'crisis' are most frequently mentioned (see Table 6). These keywords are often used when talking of risks of future resource constraints and natural disasters such as intensifying typhoons and floods. These kinds of statements commonly point to a sense of crisis, which is used to justify the need for a CE transition.

In the optimist category, keywords such as 'technolog*', 'value', and 'innovation' frequently appear (see Table 6), which indicates many positive discourses regarding value creation through efficient technologies and innovative circular business models. Specifically, statements that encourage the development and use of CE-related technologies are often detected, such as 'developing chemical recycling technologies' and 'making the most of innovative digital technologies' ([6] and [18] in Table 4).

Segmented vs. Holistic

There is a higher proportion of *holistic* compared to *segmented* keywords (see Fig. 7 and Table B in Supplementary Material G for details). Yet, this varies depending on the source we examine; for statements in the media, the number of *segmented* keywords exceeded *holistic* ones, while government reports and policies presented more *holistic* keywords.

The three most mentioned segmented keywords are 'recycling', '3Rs', and 'reus*' (see Table 7). These are keywords relate to the promotion of the 3Rs (reduce, reuse, and recycle), which is the cornerstone of Japan's SMCS policy. Among them, 'recycling' is particularly frequent. Although the government recognises the need to go beyond recycling and incineration, the results suggest that there is still a focus on recycling and energy recovery.

Table 5 Key stakeholders in CE discourses in Japan

Organisations	Category	Type	# Mentioned in newspaper articles	# Statements in newspaper articles
European Union	International organisation	Nation community	21	1
MoE	Central government	Ministry	16	
Japanese government	Central government	Government	14	1
Takashimaya	Business	Retailer	11	2
G20	International organisation	International summit meeting	10	
JEPLAN	Business organisation	Recycler	9	3
Ryohin Keikaku	Business organisation	Manufacturer and retailer	8	
AEON	Business organisation	Manufacturer and retailer	7	1
Seven & i Holdings	Business organisation	Manufacturer and retailer	7	1
Fast retailing	Business organisation	Manufacturer and retailer	7	
Mitsubishi Chemical Holdings	Business organisation	Chemical manufacturer	7	
Kao	Business organisation	Consumer goods manufacturer	7	
Ellen McArthur Foundation	NGOs	Foundation	6	
Suntory Holdings	Business organisation	Beverage manufacture	6	
METI	Central government	Ministry	6	
WWF	NGOs	Environmental conservation	5	
Accenture	Business organisation	Consultancy	5	
TerraCycle	Business organisation	Resource recovery platform services	5	
Mercari	Business organisation	IT	5	
Unilever	Business organisation	Consumer goods manufacturer	5	1
Kamikatsu-cho	Local government	Town	5	1

The stakeholders listed above are the ones which are mentioned at least five times in selected newspapers. When the same stakeholder was mentioned more than once in the same newspaper article, it was counted once

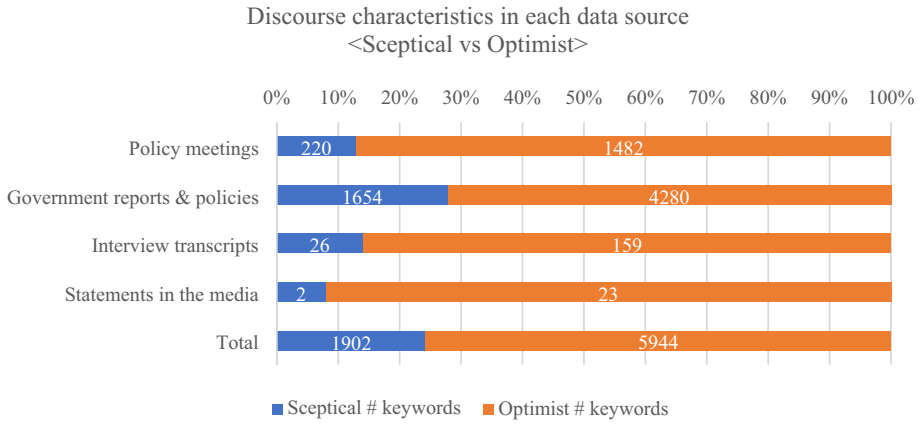


Fig. 6 Proportion of sceptical and optimist keywords by data source

In the *holistic* category, 'localiz*', 'solidar*', and 'collaboration OR collaborate*' are mentioned frequently (see Table 7). Particularly, noteworthy are expressions such as 'in order to create a recycling-oriented society, various actors, including the national government, local authorities, citizens, NGOs and businesses, need to play their respective roles' (in government reports and policies [12] in Table 4). This and other related statements are *holistic* in that they encourage the social participation of diverse stakeholders in the transition to CE, but they do not express the full transformational potential that CE can encompass. Indeed, keywords related to social justice and redistribution are hardly mentioned, such as 'gender (9 result)', 'democrat* (9 result)', 'redistribut* (0 result)', and other related terms. Thus, most '*holistic'* keywords concern governance and stakeholder collaboration rather than radical social transformation and redistribution of resources and wealth.

As a result of the above keyword mining, it can be concluded that Japanese CE discourses are highly *optimist* and moderately *holistic*, which places them in the 'Reformist Circular Society' discourse type.

Qualitative Content Analysis of Results by Stakeholder Group

This section examines the qualitative content analysis of the statements in the media, interview transcripts, and government reports to get a more detailed perspective on the discourse of each stakeholder group.

National Government

In the discourse of the national government, *optimist* visions dominate with many statements on 'technology' and 'innovation' such as 'We will spread our technology... throughout the world... as a source of new growth, such as economic growth and job creation ([14] in Table 4)'. These claims can be read as the Japanese government's assertion that it aims to solve environmental problems with its 'excellent environmental and recycling technologies ([19] in Table 4)' and to export these technologies to the rest of the world to achieve economic growth. There is also a positive affirmation of technological development and innovation, with particular reference to biogas, waste-to-energy, and digital technologies ([16], [17] in Table 4).

Table 6 Prominent keywords list <sceptical vs. optimist>

Area	Top 5 keywords (translated in English)	Count	Total keyword count
Sceptical			
Sceptical (keywords related to planetary boundaries and collapse)	Risk*	628	1902
	Disasters	611	
	Crisis	187	
	Extinct*	64	
	Overconsum*	51	
Optimist			
Optimist (keywords related to technology, growth, and innovation)	Technolog*	1323	5944
	Value	818	
	Innovation	646	
	Efficien*	624	
	Business	620	

Full keywords list and count are shown in Supplementary Material F. The asterisk symbol '*' after a word is a symbol used to include derivatives in search results (e.g., searching a keyword 'technolog*' can include 'technology', 'technologies', 'technological')

Regarding *holistic* discourses, statements on collaboration and cooperation are frequently used to stress the importance of stakeholder inclusiveness.

Therefore, the national discourse type is closest to a Technocentric Circular Economy discourse with a strong focus on economic growth and technological innovation to improve resource efficiency while at the same time having some holistic elements related to a Reformist Circular Society discourse type.

Local Governments

Local government discourses are often *optimist* and *holistic*. Holistic statements related to coordination, such as 'cooperation and collaboration between actors and stakeholder participation' ([4] in Table 3), were common. Some critical comments by local governments are particularly insightful such as 'the social structure of mass consumption itself must be changed' ([12] in Supplementary Material B) and 'a recycling-oriented society cannot be achieved without changing the system on a global scale' ([27] in Supplementary Material B). These remarks refer to a comprehensive and transformational change that goes way beyond simply promoting cooperation and eco-innovation to improve resource efficiency.

All in all, the discourse type of local governments is closest to the Reformist Circular Society discourse type but also has some characteristics of Transformational Circular Society discourses as it includes a systemic critique of present consumption-oriented societies.

Business Organisations

Within business organisations, most stakeholders hold *optimist* and *holistic* views. Particularly, prominent is the *optimistic* vision that global environmental and social

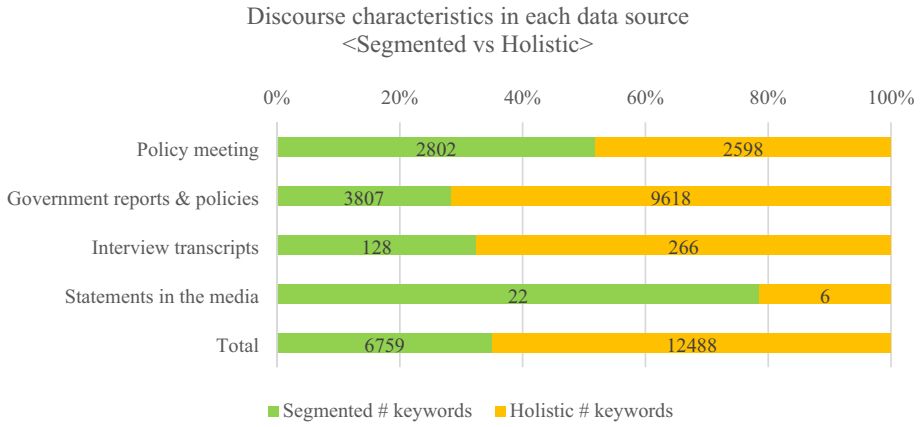


Fig. 7 Proportion of segmented and holistic keywords by data source

Table 7 Prominent keywords list <Segmented vs. Holistic>

Area	Top 5 keywords (translated in English)	Count	Total keyword count
Segmented			
Segmented (keywords related to resource efficiency)	Recycling	2960	6759
	3Rs	793	
	Reus*	475	
	Incinerat*	383	
	'Energy recovery'	300	
Holistic			
Holistic (keywords related to social justice, democratic participation, and cultural change)	Localiz*	3138	12,488
	Solidar*	1698	
	Collaboration OR Collaborate*	1329	
	Discuss*	903	
	Health*	819	

Full keywords list and numbers are shown in Supplementary Material F

problems can be solved by reforming the capitalist system rather than transitioning to a new system altogether. Moreover, it is also claimed that by developing and introducing circular business models, it is possible to create 'an ideal society where economic and environmental sustainability are both attained' ([5] in Table 3). However, responses vary widely depending on the interviewee's industry and personal perspective. Some emphasise a shift to CE through leasing, servicizing, and other circular businesses, while others argue that circularity should be achieved at the local and individual level, with an emphasis on inclusiveness. Specifically, several statements support the idea that various stakeholders should be involved in CE discussions and implementation.

Overall, the result suggests that the discourse type of business organisations is closest to the Reformist Circular Society discourses type and includes elements of Technocentric Circular Economy discourses.

NGOs

Stakeholders from NGOs made more *sceptical* statements compared to other stakeholder groups. They represent a sense of urgency regarding 'shortages', 'crises', and 'planetary boundaries' ([16], [17] in Table 3). Transformational statements on 'climate justice' and 'equity' are often mentioned, as well as democratic partnerships and collaborations between business, government, NGOs, and citizens. Furthermore, it should be noted that many interviewees argued that higher value retention options such as reduce, reuse, and repair should be promoted, and lower value retention options such as recycle should not be relied upon ([23] in Supplementary Material B, [16], [17], [18] in Table 3).

The above results show that NGOs have a more *sceptical* and *holistic* viewpoint than other stakeholder groups while at the same time emphasising the implementation of higher value retention options. Therefore, it can be concluded that the NGOs' discourses span two broad discourse types: Transformational and Reformist Circular Society.

Academic and Research Institutes

In the discourses made by academic and research institutes, *optimist* and *holistic* statements were more predominant than *sceptical* and *segmented* ones. Their *optimist* discourse is exemplified in statements that place much hope on technological innovation, like 'business models should be transformed through innovation and incentives to maximise resource value' ([22] in Table 3). Holistic statements within academics include calls for stakeholder coordination and collaboration, such as 'changing citizens' attitudes and lifestyles' and 'promoting participation, discussion and dialogue among various stakeholders' ([19], [21] in Table 4). This trend is similar to the results of the national government. While there are references to the promotion of 'R2-Reuse', which is a relatively high value retention option, there were nonetheless more references to the promotion of lower value retention options (e.g., R7-Recycle) than higher ones. This differs from the results for NGOs.

All in all, the discourse of academic and research institutes from our data set is highly *optimistic*, and their discourse type is thereby closest to Technocentric Circular Economy discourses while at the same time holding some characteristics of Reformist Circular Society discourses. However, it should be noted that the statements from academics we found for this research were mostly from scholars in the fields of economics, business management, and engineering, with few statements from academics in the areas of ecology or social sciences. Scholars in natural science were indeed much more prominent in the Japanese media statements compared to social science scholars. This bias may thus affect the discourse type for this entire category, which might not reflect the views of academics in Japan in general but rather the views of the academics that are most likely to be consulted by Japanese newspapers.

Analysis of Stakeholder Presence

The results shown in Fig. 8 reveal that there are two predominant stakeholder groups which appear more often both in policy meetings and in the media: business organisations and academic and research institutes (see Table C in Supplementary Material G for details). Conversely, local governments and NGOs have a low presence. The presence of national government stakeholders is not included in the results, as their presence was not included in the attendee lists of the reviewed policy meetings.

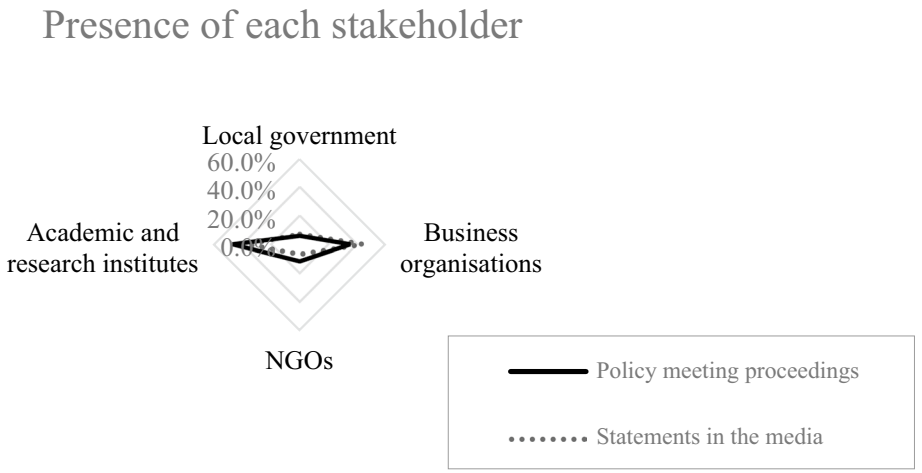


Fig. 8 Presence of each stakeholder group in policy meeting proceedings and statements in the media

The bias for business and research organisations in policy meetings contrasts with the government's claims for collaboration and participation. The government states that 'care should be taken to ensure that the opinions, knowledge and experience represented by the members are fair and balanced in light of the purpose and objectives of the establishment of the relevant council' [58]. Furthermore, the MoE underlines the importance of the involvement of various stakeholders. However, the figures show that, in practice, the voices of business organisations and academic and research institutes are more likely to be heard than those of local governments and NGOs. Additionally, a close examination of the academics in policy meetings reveals that the majority of academics are in the fields of economics, business management, and engineering. Academics in the humanities and social sciences were in fact three times less represented than those in the above-mentioned fields. This bias could explain the lack of consideration for social justice and systemic transformation in the Japanese CE discourse and its emphasis on economic development and technological innovation.

Discussion

This section is divided into two sub-sections; the first discusses this research's policy implications and the second its methodological implications.

Policy Implications

In this section, the results are examined in relation to the theoretical framework. Furthermore, the implications gained from the results are discussed. Finally, inherent challenges related to the Japanese circularity discourses are pointed out, and recommendations are presented to address them.

Conceptual Differences Regarding Circularity in Japan

A central question that emerges from the results is to what extent the Japanese SMCS concept diverges from the CE and its related policies. In fact, the two are not fundamentally dissimilar. An interviewee from the MoE stated that 'the two (SMCS and CE) are used in parallel. In other words, we should continue to aim for a SMCS as well as a CE in addition'. Some of the other interviewees also stated that there is no difference between SMCS and CE (see Supplementary Material E). Meanwhile, many of them stated that the two are different, and they do not necessarily agree on the difference, with some stating that SMCS is more holistic and others claiming that CE is more holistic (see Supplementary Material E). This indicates that there is no unified vision of SMCS and CE, yet each concept seems to have slightly different focus areas in their approach to circularity. Moreover, in the view of the MoE and the METI, it is recognised that the two concepts are not in conflict with each other and should be promoted in parallel, although there is a difference in that the MoE's vision of SMCS includes more social and ecological aspects, while the METI's vision of CE emphasises economic elements. An interviewee from a local government pointed out that 'there have been many different words used for the concept of circularity, but maybe we keep discussing the same topic'. This is similar to the assertion by Reike et al. [12] that CE is not a brand-new concept but a refurbished version of past ones.

Calisto Friant et al. [21] categorised Japan's SMCS in the Reformist Circular Society discourse type, which attempts to reform the current capitalist system to reduce both social and environmental harms while increasing economic growth and economic competitiveness. In light of the results of this study, this classification appears appropriate since Japan's CE discourses, as a whole, fall under the category of Reformist Circular Society. On the other hand, this article's results found a low presence of Transformational Circular Society discourses calling for a fundamental change in our socio-economic system. This result contrasts with traditional Japanese value systems, a mixture of Buddhism, Shintoism, and other indigenous beliefs, which values a simple and frugal lifestyle in harmony with nature [59, 60]. For instance, Obata [61] points out that the Japanese Buddhist culture emphasises regenerative systems and respects natural cycles. In addition, Wuyts and Marjanović [62] advocate that Japan's unique concept of circulation, which is rooted in the local context, can be a potential alternative to ecomodernist and technocratic CE approaches. We can also draw inspiration for alternative approaches to CE from Japanese traditional custom and knowledge, such as 'satoyama', a concept that refers to traditional Japanese rural landscapes typically surrounded by forests and mountain villages, where nature and humans can co-exist in harmony thanks to a regenerative and sustainable cyclical use of local biological resources [62, 63]. It is also worth noting that eco-socialist and degrowth thinking has seen a recent upsurge in the Japanese public debate, especially with the publication of [64] bestseller 'Capital in the Anthropocene' [64]. Moreover, the results of the stakeholder interviews show that not only NGOs but also businesses voiced the need to break away from a mass consumption society and advocated for re-localisation and systemic socio-cultural and economic change (see Supplementary Material E for details). However, our results show that these alternative approaches to circularity are hardly reflected in the Japanese government's CE policies, discourse, and practices.

Actual CE Practices and Policies in Japan

According to the METI, CE is defined as 'economic and social activities that maximise added value by reducing resource inputs and consumption, while making effective use of stock, and by providing services in all economic activities' [55]. Despite this perception, this research found that the national government still focuses on technocentric options such as recycling, waste-to-energy infrastructure, and developing alternative materials such as biobased plastics. All the key indicators and targets used by the Japanese government are focused on resource efficiency, and none of them seeks to reduce overall material and ecological footprints or address key social aspects of CE (see the 'Policy Analysis' section). In this regard, current CE practices and policies in Japan would fall in the Technocentric Circular Economy type as they are *optimist* on the possibility that technology can solve the socio-ecological crisis and *segmented* as they do not include elements related to social justice and democratic participation. The problem with this approach is that it can prevent higher value retention options such as refuse, reduce, and reuse, which are more ecologically sustainable. Indeed, Japan seems to maximise waste-to-energy with its large number of existing incineration plants. Yet, research has pointed out that excess incineration capacity can suppress recycling rates [65].

Our results also found that the Japanese CE discourse and policies gave very little attention to local governments which often had more transformative views implying radical social change. The tendency for local governments to have a more holistic discourse is consistent with the finding of Herrador et al. [49] that local governments are taking inclusive approaches to CE, although there is diversity across regions. NGOs also lack access to policymaking circles, although they might advocate higher value retention options and emphasise the importance of more transformational measures. The significance of NGO participation in policymaking has been discussed in Japan [66], and throughout this study, the importance of 'participation of all stakeholders, including NGOs' was often asserted by the national government and other stakeholder groups (see the 'Policy Implications' section). However, it has been pointed out that environmental NGOs in Japan have a weak position in the policymaking arena and have not been able to establish an equal relationship with the government [67, 68]. In fact, an interviewed NGO staff stated that 'I recognise that there is a difficulty for the NGOs' voice to be reflected'. The results of this study support this statement, indicating that the presence of NGOs in the political arena is extremely low (see the 'Analysis of Stakeholder Presence' section).

Overall, the results show that *optimist* and *holistic* discourses are prevalent, and thus, the Reformist Circular Society discourse type seems to dominate societal discussions on CE in Japan. However, as discussed above, Japan's actual CE policies seem to focus more on recycling and energy recovery, which corresponds to the end-of-pipe value retention options of Technocentric Circular Economy discourse type [21]. Although 'reduce' and 'reuse' are deeply embedded as concepts due to the long-term promotion of the 3Rs in Japanese policies, these value retention options are not well implemented. There thus seems to be somewhat of a discrepancy between CE discourses and practices in Japan, similar to the one that academics have witnessed in the case of the EU (see [38, 39]).

To explain this discursive dichotomy between words and actions, it is important to highlight that business organisations are over-represented in policymaking arenas and media statements on CE (see the 'Analysis of Stakeholder Presence' section). Their discourse type has been associated with growth optimism both in our results and in previous research on

private and public approaches to CE [23, 39, 41]. The disproportionate presence of some stakeholders indicates a lack of diversity in the debate on CE in Japan. This hinders not only the scientific quality and diversity of debates but also the democratic nature of decisions, as the broad range of social approaches to the topic is not effectively included. The lobbying of large corporations and business alliances might thus promote a certain vision of CE focused on recycling, and waste-to-energy technologies, which seek to increase economic growth and fails to address to the inherent drivers of overconsumption and overproduction. For instance, industrial associations such as the Japan Chemical Industry Association and the Japan Business Federation participated as committee members in policy meetings on CE. From the high economic growth of the post-war period to the present, they have maintained a support system for the conservative government, with favourable organisational structures and direct interventions in politics [69]. One can assume that these industries have a strong influence on CE discourses and policies and promote a technocentric business-as-usual narrative, where CE practices are only adopted in so far as they do not fundamentally reduce unsustainable consumption and production trends.

Furthermore, it is worth noting that there is a divergence between the approaches of the two main government ministries in charge of the topic: the MoE and the METI. There is a greater emphasis on promoting economic growth through CE under the METI's initiative than the more holistic SMCS approach promoted by the MoE. The increased focus on the CE concept after 2019 and the growing presence of the METI in CE policymaking imply that the government is focusing more on technocentric and economic-centric approaches.

Moreover, we also evidenced a lack of consideration for transformative social justice and political issues in the Japanese discourse. Indeed, when social aspects were included, they did so in a reformist manner, focusing on general statements of stakeholder inclusiveness rather than greater redistribution of wealth and resources and a wholescale democratisation of society. There was thus a minimal discussion regarding who controls CE technologies and patents, who benefits and is affected by CE policies, and who decides on the shape and form of the CE transition. By failing to acknowledge these critical social issues, these discourses could replicate current patterns of class, racial, income, gender, and ethnic inequalities both locally and globally [13, 21, 22]. They could thus exacerbate neocolonial patterns whereby resources are accumulated by a few people, while the rest of the world remains in poverty [1].

Recommendations

This section closes with three recommendations for improving Japanese CE discourses and policies. First, CE debates ought to be made more inclusive and democratic, and social justice aspects should be better addressed in CE policies and practices. Currently, NGOs and local governments, which tend to hold more transformative perspectives, are not sufficiently included in policymaking. Their participation should be encouraged, for example, by setting quotas for NGOs and local governments attendees in policy meetings and establishing citizen assemblies of randomly selected citizens to democratically discuss and decide on future CE policies [70, 71].

Second, the focus on decoupling economic growth from environmental degradation should be changed to a focus on decoupling well-being from material consumption. Indeed, decoupling environmental degradation from economic growth on any relevant scale to prevent the present socio-ecologically crisis is impossible [17–19]. Instead, sufficiency and degrowth-oriented circularity approaches should be included to build a more scientifically valid, socially relevant, and politically legitimate path to a circular society [72–74]. These

policies could decouple well-being from material consumption by fostering more convivial, slower, and ecologically harmonious forms of life and creating systemic structures that do not push for endless consumerism and growth [75, 76]. In this regard, Japan could draw inspiration from its long-standing Buddhist traditions and its history of holistic ecological thinking [77]. The idea of regenerative circles and local livelihoods in harmony with nature is indeed an integral part of many Japanese traditions and could be the basis for circularity policies that reduce overconsumption, overproduction, and ecological impacts, while improving human well-being [61]. Research has found that principles of simplicity, altruism, and collective aspirations have become more prevalent in Japan, especially among younger people of the so-called satori generation (*enlightened/awakened generation*) [78]. In fact, despite seeing decreasing incomes and GDP since 1995, Japanese people have reported increased levels of happiness and life satisfaction as well as a move away from individualistic and consumeristic aspirations and towards more collective and non-material aspirations [78]. These conditions could allow national and local governments in Japan to democratically develop and implement degrowth-oriented circularity policies that foster harmonious relationships and socio-ecological well-being. Such policies could include supporting egenerative organic agriculture; fostering community-based renewable energy production; reducing working hours; establishing universal public services (including healthcare, education, transport, affordable housing); progressive taxation to reduce inequalities and the overconsumption of the rich; promoting a culture and education of solidarity, sufficiency, and socio-ecological harmony; and democratising work relations and political institutions [76].

In addition to this, more support is needed for companies, cooperatives and NGOs pursuing transformative approaches to circularity, especially those in the social and solidarity economy, which provide community-based CE activities that reinforce social relations and conserve vital resources such as tool-sharing libraries, repair cafés, and urban agriculture and composting initiatives [79–82].

Finally, policymakers and businesses should aim at realising higher value retention options such as refuse (R0), reduce (R1), reuse (R2), and repair (R3). At present, policies and practices rely heavily on technologies such as incineration and recycling (R7-8), yet reliance on these measures will not lead to an effective circulation and conservation of limited resources [83–86].

Methodological Implications

By using four different data sources—policy meetings, government reports and policies, stakeholder interview transcripts, and statements in the media—this study succeeded in highlighting key aspects of the CE discursive landscape in Japan. The typology of circularity discourses from Calisto et al. [21] contributed to organising the debate and providing valuable insights and recommendations. It also allowed us to compare our results with other studies which used the same typology in other policy contexts.

On the other hand, the methodology has several limitations. Firstly, although this study deals with Japanese CE discourse in general, it does not analyse the actual implementation of CE policies and their socio-ecological outcomes. Secondly, this paper's definition of local government is very broad and includes prefectural and municipal governments. Thus, interviewees and statements classified as 'local government' include officials and politicians from different municipalities and prefectures. There may be significant differences in CE policy and discourse among these actors, which our methods are not well suited to differentiate.

Thirdly, focusing on dominant actors that appeared in newspaper articles and policy documents might have influenced the outcomes of our research. Previous research has found that these dominant actors tend to focus on technical CE solutions that do not fully encompass socio-ecological aspects such as social justice and planetary boundaries [41, 70, 73, 87]. Future studies should attempt to include less powerful actors, especially those in civil society and local governments.

Finally, the distribution of stakeholders in the interviews could be more balanced to reflect the diversity in values within the stakeholder groups. For example, there were fewer NGO participants compared to other sectors due to the complexity of finding sufficient interview subjects in NGOs, as comparatively few NGOs work on CE in Japan. It is also worth mentioning that we struggled to find participants from large companies as well as academics in the fields of social sciences. We were thus only able to interview academics in the fields of economics and business management. Moreover, we have a larger proportion of interviewees from small- and medium-sized enterprises than larger companies. To reduce the impact of the above lack of diversity in stakeholder groups on our result, we used a combination of qualitative and quantitative methods and a diverse set of data sources, including public policy documents, newspaper articles, policy meeting proceedings, and interview transcripts. Nonetheless, further research on the topic should be undertaken to validate our findings.

Future research could analyse the distribution of circularity discourses in Japanese society through further interviews, keyword mining, and content analysis, as well as other methods such as participatory workshops and surveys. This could allow for a more precise mapping of different circularity approaches in each stakeholder group and in each province and municipality. Research analysing the implementation and outcomes of Japanese CE policies would also be highly relevant to better understand the specific CE actions that are being implemented and examine their socio-ecological impacts. Furthermore, analysing specific laws, policies, strategies, and ordinances in different ministries and local governments would be valuable to evidence their respective approach to circularity and their socio-ecological implications.

Conclusion

In answering its main research questions, this article found that the CE discursive landscape in Japan is rather diverse and depends on each analysed stakeholder group. However, the dominant CE discourse overall was the Reformist Circular Society discourse type, with some smaller Technocentric Circular Economy and Transformational Circular Society elements. Japanese circularity discourses were thus generally highly *optimist* regarding economic growth and decoupling and moderately *holistic* in their inclusion of social justice and participatory elements.

Regarding the Japanese government's discourse specifically, we found a stark difference between the CE visions of different ministries. While the METI's CE vision focused on technological innovations, industry competitiveness, and economic growth, the MoE's SMCS discourse had stronger ecological and social elements. Nonetheless, our results show that current CE policies and implementation practices by the national government in Japan seem to focus on recycling and energy recovery technologies and economic growth and innovation. There is thus a dichotomy between discourses and actions in Japan, with

a discourse mainly in the Reformist Circular Society discourse type, while practices are closer to the Technocentric Circular Economy vision.

From the analysis of policy meetings, it is also demonstrated that business organisations and academic and research institutes have a more significant presence and voice in policy-making and thus might have a more substantial influence on CE policy formation. On the other hand, NGOs and local governments had a low presence in policy meetings. This article thus evidences a lack of democratic pluralism, inclusiveness, and diversity in CE discussions in Japan. We suggest that this lack of diversity limits the debate to a mainstream growth-based circularity approach that fails to address key socio-ecological issues. Indeed, a growth-centric discourse and implementation of CE can end up replicating current patterns of environmental injustice, exploitation, and neo-colonialism and can lead to circular policies that only benefit a handful of powerful industrial actors. Moreover, growth optimist approaches lack scientific validity because they rely on the decoupling of economic growth from environmental degradation, despite decades of scientific evidence showing that this decoupling is neither happening nor likely to ever occur on a relevant scale to prevent climate breakdown and biodiversity collapse [17, 19].

This research contributes to the knowledge gap in English-language literature on the current CE debate and practice in Japan. It analyses the still little-known CE definitions, interpretations, and discourses in Japan, including the Japan's SMCS concept. While results point out that the Japanese CE discourses and practices remain overly focused on economic growth and technological innovation, there are also hints of more transformational circularity approaches among some stakeholders in Japan. For instance, we found transformative approaches to societal change among local governments that sought to address resource overproduction and overconsumption and Japanese NGOs that reiterated the importance of climate justice and planetary boundaries and promoted lower value retention options such as reduce, reuse, and repair. Nevertheless, more socially and environmentally radical circularity visions are generally lacking in the discussion on CE in Japan, and this follows a similar trend with how CE has been discussed and implemented in Europe, Canada, and Australia [38, 41, 43]. If technocentric CE policies remain unchallenged, they will fail to address the socio-ecological crisis of our times and do little to reduce resource scarcity, social inequality, biodiversity collapse, and climate breakdown. Democratic governance processes that better include local governments and NGOs, which are currently underrepresented in Japanese CE policymaking and media spheres, could help incorporate their more transformational perspectives and contribute to creating an equitable and sustainable circular society. More inclusiveness and democratic participation could also bring about key contributions to the CE debate from Japanese traditional knowledge and Buddhist philosophy, such as the concept of harmony with nature and local-based circularity, which are in stark contrast with the dominant ecomodernist approach to the topic [59–62]. Further research on CE discourses and policies in Japan and other contexts is much needed to keep unpacking the limitations of current CE policies and propose more democratic, socially inclusive, and scientifically valid paths to a circular society.

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Declarations

Competing Interests The authors declare no competing interests.

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