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Exploring media representation of carbon capture and storage: an analysis of Japanese newspaper coverage in 1990-2010

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Abstract

This study explores how Japanese newspapers frame carbon capture and storage (CCS) technology. We applied frame analysis with the basic content analysis of newspapers texts. The newspaper texts are analyzed both qualitatively and quantitatively. The major newspapers in Japan portray CCS in very positive and technocratic framings. Specifically, the newspaper portrayals presuppose very optimistic technology development by trusted bureaucrats and industry experts, and promotes CCS as a promising technology fix for mitigating climate change. In other words, the discursive space of CCS newspaper coverage is filled with optimistic technocratic expectations for CCS. As a result, the potential risks of CCS such as environmental and health risks and the necessary governance structures of CCS to address such risks have been ignored, and civil society actors and the general public who have enormous interest in avoiding such risks have been marginalized in the newspaper coverage.

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Keywords: CCS; Japan; climate policy; framing; media representation

1. Introduction

This study explores how Japanese newspapers frame carbon capture and storage (CCS) technology. The media including traditional newspapers play a crucial role in contemporary techno-politics, especially in the process of social acceptance of a technology. However, while there are many studies regarding the social acceptance of CCS (for example, [1-3]), newspaper coverage on CCS has been rarely studied (but see [4]), and there is none on Japanese newspapers' coverage. Given that CCS social acceptance studies have been criticized as dealing not with public opinion as argued but with "pseudo-opinion" [5], it is of utmost importance for further understanding of the factors of CCS's social acceptance to study how newspaper coverage frame CCS and thereby inform the public.

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2. CCS in the Japanese context

Japan began developing CCS from the 1980s mainly through public-private cooperation. As a result, Japan has developed one of the most advanced CO₂ capture technologies, and implemented two CCS demonstration projects in Nagaoka and Yubari [6].

Turning to the Japanese policy context, the adoption of the Kyoto Protocol (KP) enhanced the priority of developing CCS in the Japanese climate policy framework. Accordingly, in the Kyoto Protocol Target Achievement Plan [7] that was approved by the cabinet in April, 2005, it was emphasized that CCS is a necessary technology for climate change mitigation that should be developed in the mid- to long-term period. Moreover, the Liberal Democratic Party's Fukuda administration set in 2008 the objective of developing CCS so that it can be commercialized by 2020 [8].

The most important actor in the domestic political context is the Ministry of Economy, Trade and Industry (METI) [9]. It has the whole jurisdiction of technology development and has promoted its social acceptance. In 2006, METI adopted a policy guidance for technology development and commercialization of CCS [10]. Additionally in the 2010 Basic Energy Plan, CCS was recognized as an important technology to realize low carbon society and therefore its development was emphasized as an important element of Japan's climate policy [11].

On the other hand, the Ministry of Environment (MOE) also plays an important role in the policymaking process related to CCS. MOE domesticated the decision of the 1996 London Protocol, making CO₂ disposable into the sub-seabed under certain conditions (Resolution LP.3(4) on the Amendment to Article 6 of The London Protocol) in 2007, and established a permit system for sub-seabed saline aquifer. MOE also funded the development of simulation techniques for environmental impact assessment and eligible monitoring technologies required for the permit system [9].

Overall, Ishii and Langhelle argue that the Japanese CCS policymaking system can generally be characterized as technocratic [9]. In other words, the main actors involved in the policymaking process are limited to bureaucrats, industry, and experts with little participation from the environmental NGOs and local stakeholders. For example, the aforementioned Yubari project had very little local stakeholder involvement which has been argued as a necessary condition for a successful implementation of demonstration projects. These Japanese contexts are so important that they should be kept in mind in understanding the analysis explained below.

3. Methodology

Media portrayal is crucial for public understanding of CCS technology and governance, that is, how the public and society as a whole understand the knowledge of CCS. Existing literature has noted that public knowledge of emerging technologies and policy issues is largely dependent on "media framing" [12]. In addition, in contemporary environmental politics, the media exert influence not only on public opinion but also on policy-making processes through their framing. In such processes, policymakers require concise expert knowledge of such issues in easily accessible forms enough to engage in political decision-making. In such context, media coverage, which is produced and delivered on a daily basis, becomes a significant reference for policymakers.

The concept of framing has been defined as "to select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation" [13]. In social practice, framing is used by policymakers and the public as an "interpretative shortcut" [12]. Because the public use media framing as to make sense of their knowledge toward social/political issues, and policymakers

expedite political decision-making based on such framed information by the media, the influence of media coverage on public opinion and policy-making is in how the information is framed in the media.

In this paper, so as to explore how the Japanese media represent and/or “frame” CCS technology and governance issues, we applied frame analysis with the basic content analysis of newspapers texts (for example [14]). The newspaper texts are analyzed both qualitatively and quantitatively. The unit of analysis is an individual article. In the qualitative analysis, we attempt to identify the dominant framing of CCS media representation, by paying attention to metaphors, terminologies and linguistic choice of words regarding CCS. In the quantitative analysis, we pay closer attention to overall evaluation of CCS, topics and themes regarding CCS technology and policy, and quotations of actors. Concretely, our analysis focused on mainly the four main aspects of Japanese newspaper coverage on CCS:

- 1) Dominant framing of CCS
- 2) Overall evaluation towards CCS:
positive, balanced, negative or neutral (just mentioned).
- 3) Policy/Technological issues of CCS:
CO₂ leakage, cost, energy penalty, liability, monitoring, risk assessment, public acceptance
- 4) Quotation of news source/actors

Frames may co-exist and/or compete with each other. For example, the competing framings of CCS as a “bridging” technology for buying time for revolutionary new renewable energy technologies [15] and as having clouding-out effect disrupting the development of renewable energy technologies [1], may co-exist in a single newspaper article. Another example of competing frames include those that CCS makes it possible to reduce CO₂ emissions without any changes in the fossil fuel system [15] and that CCS induces carbon “lock-in” [1].

4. Data

This study analyzed two decades (1990-2010) of coverage of CCS in Japanese newspapers. The data set consisted of newspaper articles from the three most widely circulated national newspapers, the so-called “Big Three”: *Asahi Shimbun*, *Yomiuri Shimbun*, and *Mainichi Shimbun*. Their ideological standpoints are, broadly speaking, perceived as respectively liberal, conservative, and center-left [16]. We confine our analysis to those newspapers for two reasons. First, in the Japanese media system, the “Big Three” have enormous influence on the coverage of other media outlets such as regional newspapers and TV broadcasts [17; 18]. Second, in the public deliberation of science and technology issues including climate change, the newspaper is one of the Japanese public’s major information sources.[†] The newspapers’ textual data was collected from each newspaper’s online databases, searching for articles containing the word “CCS” or other related wordings. Articles regarding glossaries, obituaries, book reviews, advertisements, event announcements, chronology, regional news, and those not related to CCS were excluded. The total number of analyzed articles was 327: *Asahi* (112), *Yomiuri* (105), and *Mainichi* (110).[‡]

5. Results

5.1. Dominant framing of CCS

Initially, the framings of *responsibility* and *technocracy* can be identified as major framings in all

[†] A public opinion poll conducted by the Cabinet Office indicates that newspaper is the second-most-accessed information source of science and technology issues after TV programs [19].

[‡] This paragraph is a modified version of a paragraph in Asayama and Ishii [20].

analyzed newspapers. The former implies a storyline that the government and industry should develop CCS because they have the *responsibility* of reducing CO₂ emissions. The latter implies that the best way to mitigate climate change is to make experts and bureaucratic elites develop revolutionary new technologies, which reflects high level of technological optimism. These framings highlight the necessity and high hopes for CCS development, but on the other hand, downplay or even ignore the environmental and health risks of CCS.

With the adoption of the KP, the necessity of reducing CO₂ emissions became politically visible. Hereafter, the *promising technology* frame that emphasizes the alleged huge storage potential of CCS became increasingly visible along with the two frames explained above. It has the same characteristic of downplaying the environmental and health risks of CCS.

Another frame that became frequently visible after the adoption of the KP is the *fossil fuel regime compatibility* frame which portrays CCS as a positive technology fix by implying that CCS enables CO₂ emissions reduction without significantly changing the current fossil fuel economy. It even sometimes depicts CCS as a booster of economic development.

Regarding the comparison of the three analyzed newspapers, there was not so much difference among them. This implies that the difference in ideological stance and general policy preference among the analyzed newspapers does not matter so much in the framing of CCS; they all dominantly framed CCS as a positive and promising technology for mitigating climate change.

5.2. Overall evaluation towards CCS

We classified Japanese newspaper's overall attitude toward CCS of each article into "positive" if the majority of statements were positive regarding CCS technological development and governance, "negative" if the majority of statements were negative, "balance" if both positive and negative statements were observed and fairly equal space given to both statements, and "just mentioned" if no significant statements were observed.

As shown in Fig. 1, positive portrayal of CCS is dominant in all the analyzed newspapers with 60 percent of all the articles are classified into "positive." On the other hand, negative reference to CCS was only 2% of the total analyzed articles.

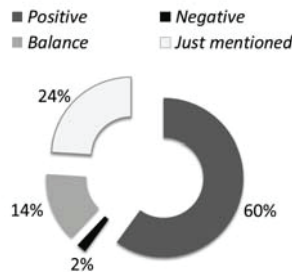


Fig. 1. The percentage of newspaper articles' overall attitudes towards CCS in all the analyzed newspaper articles (1990-2010)

5.3. Policy/Technological issues of CCS

The issues of CCS mentioned in Japanese newspapers are basically classified into technological issues and those related to policy. The technological issues are "leakage risk" of CO₂ from storage site, "cost" of CCS technological development and deployment, and "energy penalty" of CCS installation to power plants. The policy issues are "monitoring" of CO₂ behaviour in storage site, "liability" if CO₂ leakage and

consequential environmental and health damage has occurred, “risk assessment” of CO₂ storage, and “public acceptance” of CCS technology itself and policy initiative.

As shown in Table 1, technological issues are not frequently mentioned in Japanese newspapers; however, in a relative sense, “leakage risk” and “cost” are more frequently mentioned than “energy penalty”. Essentially, in portrayal of “leakage risk” issues, about a half of articles that mentioned leakage risk of CO₂ represented those risks are largely negligible and/or minimal (“Zero/minimal”) by referring to the evaluation in the scientific reports, for example, from the International Energy Agency (IEA) and the Intergovernmental Panel on Climate Change (IPCC) and to the experimental data from CCS demonstration projects such as the Nagaoka project. Therefore, we can argue that risks and uncertainties of CO₂ leakage had been never highlighted in Japanese newspapers.

Table 1. The percentage of articles mentioning technological issues of CCS

Technological issues of CCS		Article percentage	
Leakage risk	Zero/minimal	14%	6%
	Uncertain		9%
Cost		11%	
Energy penalty		3%	

As shown in Table 2, policy issues of CCS are not frequently mentioned in Japanese newspapers as same as technological issues. Those issues such as “monitoring” and “risk assessment” are slightly more mentioned than other issues, which might be because of their relevance to CO₂ “leakage risk”. “Liability” and “public acceptance” issues in CCS governance are largely neglected in Japanese newspapers.

Table 2. The percentage of articles mentioning policy issues of CCS

Policy issues of CCS		Article percentage	
Monitoring		7%	
Liability		3%	
Risk Assessment		9%	
Public acceptance		2%	

5.4. Quotation of news source/actors

The analyzed newspapers selectively represent policymaking elites such as the government bureaucrats, industrial groups and academic/research communities as news sources as shown in Table 3. Especially, METI among the government bureaucrats might play a significant role in articulating for the media. On contrary, the Environmental NGOs and citizens are largely marginalized.

Table 3. The percentage of news sources/actors quoted in each article

News sources/actors		Article percentage	
Government bureaucrats	MOE	29%	8%
	METI		21%
	Others		2%
Politicians/Political parties		13%	
Corporations/Industries		26%	
Academics/Researchers		28%	
Environmental NGOs		2%	
Citizens/Local communities		1%	

6. Conclusion

The major newspapers in Japan portray CCS in very positive and technocratic framings as analyzed above. Specifically, the newspaper portrayals presuppose very optimistic technology development by the trusted bureaucrats and industry experts, and promotes CCS as a promising technology fix for mitigating climate change. In other words, the discursive space of CCS newspaper coverage is filled with optimistic technocratic expectations for CCS. As a result, the potential risks of CCS such as the environmental and health risks and the necessary governance structures of CCS to address such risks have been ignored, and civil society actors and the general public who have enormous interest in avoiding such risks have been marginalized in the Japanese newspaper coverage. This may constitute a “governance risk” which may cause backlash against CCS once the bureaucrats, experts and CCS technology itself lose their trust from the public through possible technological failures.

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