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Overview of Possible Relationship Management Aspects for the Governance of CCU/S

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Abstract
Purpose – This study explores the role of relationship management in supporting the governance of Carbon Capture, Utilization, and Storage (CCU/S) technologies, which are considered vital for achieving climate goals. Despite their potential, CCU/S technologies are emerging technologies, currently at a quite low technology readiness level that face governance challenges due to technical, financial, and socio-political uncertainties. This paper addresses a research gap by investigating how relationship management can foster collaboration, reduce stakeholder risks, and facilitate coordinated implementation.
Design/methodology/approach – The study adopts an interdisciplinary literature review as its methodological approach, synthesizing approaches to relationship management that extend beyond the corporate context, offering insights relevant to CCU/S governance. The review examines key relationship management strategies, including government relations, public relations, corporate social responsibility, public-private partnerships, partner relationship management and citizen relationship management systems.
Findings – The findings reveal that successful CCU/S governance depends on fostering long-term, trust-based cooperation between public and private actors. Relationship management strategies that emphasize transparency, inclusive communication, and adaptive stakeholder coordination are especially relevant. Real-world practices, such as Norway's Longship project, illustrate the practical applicability of these concepts.
Originality – This paper is among the first to analyze relationship management through the lens of CCU/S governance, offering a conceptual foundation for future empirical research. It highlights the importance of integrating socio-political dynamics into technology governance and provides aspects to support the deployment of CCU/S technologies at the national level.

Keywords: carbon capture, utilization and storage; governance of CCU/S; relationship management

1. Introduction

Global climate change has become one of our most critical and challenging issues, with profound implications for the environment, economies, and societies worldwide (Abbass et al., 2022; Bhat & Lone, 2023; Raihan, 2023). As we continue to witness unprecedented levels of carbon dioxide concentration in the atmosphere (~423 parts per million, ppm) (NOAA, 2024), the need for sustainable, effective, and innovative solutions has never been more urgent. Addressing this global crisis requires a multifaceted approach, incorporating various strategies to adapt to diverse problems and conditions.
Among the potential solutions, carbon capture, utilization, and storage (CCU/S) technologies have emerged as promising (Ekemezie & Digitemie, 2024; Kumar et al., 2024; Roy et al., 2023). CCU/S technologies refer to a set of innovative solutions that are designed to mitigate carbon dioxide (CO_2) emissions. Capturing the carbon dioxide can happen either from the ambient air through a technology called Direct Air Capture (DAC) or from industrial point sources (pre-combustion, post-combustion, or oxy-fuel combustion) (Al-Mamoori et al., 2017; Cuéllar-Franca & Azapagic, 2015; Liu et al., 2017). Once captured, the CO_2 is separated from other gases through absorption, adsorption, or membrane separation. In the case of industrial point sources, carbon capture and separation technologies highly depend on the characteristics of flue gas. The separated CO_2 can be either utilized or stored. Carbon Capture and Utilization (CCU) technologies offer possibilities to directly use captured CO_2, e.g., in the food and beverage industry, or after chemical conversion, to produce valuable materials, e.g., synthetic fuels (e-fuels). Carbon Capture and Storage (CCS) technologies aim to store the CO_2, e.g., in geological formations, under the ocean, or through mineralization. Since in most cases, the carbon capture, utilization and storage occur

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at different locations, the CO_2 needs to be transported, usually via pipelines, ships, trucks, or rail (Wang, 2022). However, despite their potential, CCU/S technologies are still in the early stages of development and technology readiness level (TRL) and are accompanied by significant uncertainties regarding their implementation, management, and scalability (Zimmermann et al., 2022).

The nascent stage of CCU/S technologies presents a range of challenges, i.e., efficiency, scalability, and cost-effectiveness that complicate their deployment on a large scale (Al-Mamoori et al., 2017; Ekemezie & Digitemie, 2024; Rajabloo et al., 2023; Ringrose & Oldenburg, 2018). There are currently no universally accepted practices or frameworks for managing these technologies for deployment, which adds to the uncertainty surrounding their adoption. Additionally, the high costs and risks associated with CCU/S projects make it difficult for individual companies to undertake such initiatives independently, necessitating a collaborative approach among stakeholders. As traditional governance models may not be fully equipped to handle the current characteristics of CCU/S technologies, effective collaboration, driven by robust relationship management, is critical to sharing risks, costs, and uncertainties. Given the complexity of these challenges, it is not sufficient to focus solely on selecting appropriate technologies. Nations must also consider how these technologies will be introduced, managed, and integrated within existing systems.

The concept of sustainable development, which emphasizes the need to innovate in ways that benefit society and the environment, is particularly relevant here. For CCU/S technologies to contribute meaningfully to global climate goals, they must be implemented in a manner that aligns with sustainable development principles. In addition to its environmental aspects, sustainability has profound socio-economic implications, as it fosters long-term economic resilience, drives innovation, creates green jobs, and promotes social equity (Elkington, 1997; Simonis, 2017). Similarly, sustainable practices enhance corporate competitiveness and societal welfare by driving innovation and equitable growth (Dyllick & Hockerts, 2002).

While the need for innovative solutions is clear, identifying and implementing the appropriate methods to facilitate the deployment of CCU/S technologies remains a significant challenge. The objective of this study is not to propose a definitive solution to the problem but rather to explore the pathways. Specifically, it aims to answer the research question of what kind of relationship management strategies can be identified that could promote the governance of CCU/S and the successful implementation of these technologies. In order to provide answers, this study employs a literature review methodology to synthesize existing research on relationship management strategies that can be relevant to the national governance of CCU/S technologies. Given the interdisciplinary nature of CCU/S deployment – spanning technological, economic, and policy dimensions – a literature-based approach enables the integration of insights from multiple fields. Through a comprehensive literature review, the study seeks to fill a research gap by identifying and compiling a collection of relationship management practices that could assist in navigating the complexities associated with the national-level implementation of CCU/S technologies – a perspective not yet thoroughly explored in the literature. During the literature review, it became evident that there is a lack of studies directly addressing the governance of CCU/S technologies in a manner that could serve as a foundational reference for future efforts. Therefore, this research draws upon studies from other fields.

In the present study, after the introduction part, the relationship management practices will be collected as a result of the literature review, and then the conclusions will be presented.

2. Methodology: literature review

The research methodology adopted for this study centers on an extensive literature review based on secondary data available primarily in the Google Scholar database, as it provides the possibility to perform broader research on the national-level governance of CCU/S. The limitations of the literature review methodology in this study stem from its reliance on existing research rather than empirical data collection, as there is a lack of primary data collection on national-level CCU/S governance. Given that CCU/S

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technologies are an emerging field, research on their national-level governance, particularly through the lens of relationship management, is limited. Thus, the findings are constrained by the availability and scope of published studies. While this study synthesizes interdisciplinary insights, it cannot assess the practical feasibility or effectiveness of the identified strategies in specific policy or business contexts, as it does not involve direct stakeholder engagement.

The methodological approach was based on the fact that relationship management research can be phenomenon-oriented rather than tool-oriented. This approach represents a transition from traditional views that place organizations at the centre of business activities. Instead, relationship management, as explored in this study, adopts a network-based perspective, where the relationships between entities, rather than the entities themselves, are considered the fundamental building blocks of the environment. This shift in focus from organizations to relationships allows for a more nuanced understanding of how various stakeholders interact.

A significant reference point for this study was the book of Håkansson and Snehota (1995), whose research introduced a network-based framework for analysing global business relationships. Their study challenged conventional business management theories by emphasizing the importance of ongoing interactions between buyers and sellers in business-to-business (B2B) markets (Håkansson & Snehota, 1995). Håkansson and Snehota's interaction model proposed that the identities of business actors are not static but are shaped and continuously redefined by the specific relationships in which they engage. This implies that businesses can develop and maintain multiple identities, each tied to different relationships within their network. This foundational framework provided valuable insights into how relationships, rather than individual organizations, drive business dynamics, offering a critical lens.

The literature review, therefore, was not limited to corporate relationship management practices but extended to include broader perspectives essential for researching the complexities of CCU/S governance on a national level. These aspects emphasize the importance of cooperation, communication, and trust-building among stakeholders, which are crucial for the successful implementation and long-term sustainability of CCU/S technologies. By offering a framework for fostering cohesion and aligning the interests of diverse stakeholders, they can lay the groundwork for effective governance of these emerging technologies, which are vital for addressing the global challenge of climate change.

2.1 International Marketing and Purchasing Interaction Model

The International Marketing and Purchasing (IMP) Group, composed of researchers from various European countries, developed a pioneering interaction model in the 1980s (Håkansson & Snehota, 1995). Their work focused on analyzing the complexities of business-to-business (B2B) interactions, particularly in international markets, where fewer buyers and sellers, larger transactions, and extended decision-making processes prevail. The IMP model was revolutionary because it shifted the emphasis from isolated transactions to long-term relationships, recognizing that industrial exchanges are embedded in networks where past interactions shape future ones. The IMP interaction model introduced a framework that identified four key elements crucial to understanding buyer-seller relationships in industrial markets: the interacting parties, the atmosphere of the relationship, the environmental context, and the exchange process (Håkansson & Snehota, 1995). This concise framework captures industrial relationships' economic, social, and informational aspects. The environmental context includes the market conditions and external factors influencing the relationship. Finally, the exchange process encompasses all interactions, from negotiating terms to delivering goods and services.

One notable contribution of the IMP model is recognizing that business relationships evolve through repeated interactions. For instance, Metcalf et al. (1992) showed that effective information exchange and interpersonal contacts foster a cooperative atmosphere, encouraging mutual adaptation between buyers and sellers. Furthermore, as industrial markets are inherently unpredictable, the model underscores the need to understand interaction processes and contextual factors, a point expanded by Rocca et al. (2016). The IMP

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model has also shown its adaptability over the years. With the advent of digital communication, researchers like Sood and Pattinson (2012) have extended the model to include social media interactions, ensuring its relevance in the modern business landscape (Sood & Pattinson, 2012). This extension demonstrates the robustness of the model in analyzing business relationships, even as interaction mediums evolve.
In summary, the IMP interaction model offers a comprehensive framework for analyzing industrial markets by focusing on long-term relationships rather than isolated transactions. Its emphasis on the complexity and unpredictability of these relationships makes it a valuable tool for understanding how businesses operate within broader networks, particularly in an international context. This model's detailed consideration of how contextual factors and relationship evolution impact business interactions informs the development of governance strategies in CCU/S deployments.

2.2 Government Relations

Government Relations (GR) is an emerging and increasingly important area within the broader field of relationship management research, focusing on the complex interactions between government entities and various stakeholders. Unlike traditional public relations, public affairs, or lobbying, GR is specifically concerned with establishing and nurturing effective, long-term relationships between interest groups and government bodies across all levels of governance. These relationships aim to achieve mutually beneficial and socially valuable outcomes (Reiterovych, 2019).
Despite its growing relevance, GR remains under-theorized and lacks a universally accepted definition, distinguishing it from other related disciplines (Dong et al., 2023). This emerging field is characterized by strategically using creative ideas and persuasive communication to foster collaboration with government agencies. GR employs formal and informal communication channels and diverse audience engagement techniques (Rusmana et al., 2024) to navigate the layered interactions among governments, corporations, non-governmental organizations, and the public.
GR serves as a critical link between government institutions and citizens, leveraging a range of mechanisms and tools, including both traditional and digital media, to facilitate effective communication (Neeley & Stewart, 2021). This field also contributes to reducing organizational risks and ensuring sustainable development by aligning the interest of an organization with the government authorities' interests. Key GR tools include lobbying, public relations (PR), corporate social responsibility (CSR), and public-private partnerships (PPP). For instance, PR influences government decision-making by harnessing public opinion, while PPPs improve infrastructure and stimulate economic growth, as seen in contexts such as Russia (Reiterovych, 2019).
As an independent area of communication management, GR coordinates and aligns the interests of various stakeholders with those of governmental authorities. However, the field's conceptual maturity is still developing, with significant gaps in our understanding of GR strategies' adoption, implementation, and efficiency. Moreover, there is a need for further research on how GR can be integrated across different levels of government to enhance its effectiveness and impact (Freitas et al., 2021).
In conclusion, while Government Relations is a field with immense potential, it requires further theoretical and empirical development to fully realize its role in shaping effective government-citizen interactions and supporting sustainable organizational practices. GR strategies are directly relevant to CCU/S governance, where establishing strong, sustained collaborations among governments, industry, and civil society is critical for overcoming the complex regulatory and implementation challenges inherent in CCU/S projects.

2.2.1 Public Relations

Public Relations (PR) has become an increasingly vital tool in Government Relations (GR), particularly as public pressure and media campaigns grow in importance. This trend is especially evident among "outsider" groups, such as environmental organizations and animal protection societies, that often struggle to access

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decision-making entities. These groups frequently turn to mass media and special events targeting external audiences to exert influence (Lipina et al., 2017).

In the contemporary landscape, it is clear that influencing government decisions is nearly impossible without garnering public support. Effective PR work can shape public opinion, which is critical in political decision-making. The significance of PR is further underscored by the fact that no politician aiming for re-election can afford to ignore the impact of a well-executed PR campaign on any given issue (Halff & Gregory, 2015).

Looking ahead, the future of GR will likely place even greater emphasis on PR, particularly in ideological support and crisis communication. GR specialists must manage these aspects effectively to guide public discourse and respond to media-driven challenges. The capacity of PR to transform issues into perceived societal threats underscores its indispensable role in political strategy. In the context of CCU/S governance, effective PR strategies are crucial for cultivating public support, mitigating skepticism, and aligning stakeholder interests, thereby facilitating the adoption and scaling of CCU/S technologies.

2.2.2 Corporate Social Responsibility

Corporate Social Responsibility (CSR) represents a form of corporate self-regulation where companies voluntarily take responsibility for their actions, aiming to positively influence government and society, beyond what is legally required. The primary objective of CSR is for companies to consider public interest in their decision-making processes, thereby contributing to the resolution of social problems.

Globally, CSR has been recognized as a vital component of corporate strategy, with its roots tracing back to the late 1960s. This period marked the rise of transnational corporations and the formalization of CSR concepts, heavily influenced by Freeman's seminal work, Strategic Management: A Stakeholder Approach (1984). Proponents of CSR argue that it ensures long-term profitability by fostering goodwill and sustainable business practices. At the same time, critics suggest it can distract from a company's economic functions, sometimes serving as a facade for regulatory compliance (Havlicek et al., 2013).

For instance, in Russia, CSR often takes on a unique form characterized by "self-imposed compulsory" contributions to the authorities, shaped by informal and sometimes covert interactions. Instead of addressing social issues, this model tends to reinforce the status quo. This approach diverges from the more idealistic implementations of CSR seen internationally, where the focus is on genuinely improving social welfare and fostering innovation through the harmonious relations between government, business, and civil society institutions.

Russian companies increasingly seek expert guidance to develop effective CSR strategies by analyzing competitors' initiatives, global best practices, and market opportunities. These efforts aim to align corporate actions with societal expectations while also serving as a negotiation tool with authorities, highlighting the complex interplay between corporate self-regulation and state influence (Dzhukha et al., 2017; Jha & Cox, 2015).

In summary, CSR is not just a PR tool but a vital aspect of modern corporate strategy that, when implemented effectively, can lead to sustainable business success and meaningful social impact. In the context of CCU/S governance, CSR can foster industry-government collaboration, promote responsible innovation, and ensure that corporate sustainability efforts align with climate and environmental policies. Effective CSR strategies can enhance public trust in CCU/S initiatives, facilitating regulatory support and societal acceptance.

2.2.3 Public-Private Partnership

Public-Private Partnership (PPP) is a strategic collaboration between government entities and the private sector to achieve socially beneficial goals in a mutually advantageous manner (Laode Nusriadi et al., 2023). Originating in the United Kingdom during the early 1990s under the Private Finance Initiative (PFI), PPPs have since evolved into a crucial tool for addressing a wide range of public needs through shared financial risks and rewards between the state and private enterprises.

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ISSN: 3058-1079 (Online)

Initially implemented through individual agreements, PPPs were systematized with the launch of the PFI program in 1992, encouraging private sector participation by distributing risks and ensuring cost-effective, high-quality project delivery. The model gained traction globally, with countries like Australia and Canada developing their systematic PPP programs, supported by institutions such as the Canadian Council for Public-Private Partnerships (CCPPP) and the European PPP Expertise Centre (EPEC).

In Russia, PPP legislation was established in 2013, setting the groundwork for collaborations emphasizing a strong public or social focus, equal partnership between the government and businesses, and shared financial responsibilities (Vertakova & Plotnikov, 2013). Effective PPPs define clear roles and align the interests of both sectors, ensuring joint accountability for project outcomes.

PPP initiatives can take various forms beyond traditional public-private enterprises, including government contracts, leasing agreements, concessions, and public venture funds. Globally, these partnerships are frequently employed in sectors such as road construction and public utilities, where long-term investments and shared responsibilities are crucial.

From a Government Relations (GR) perspective, PPPs involve a multi-stage communication process that begins with initial discussions between the state and private sector on addressing a particular issue (GRECO, 2015). This dialogue often expands to include broader societal input, ensuring the solutions are effective and socially responsible. A typical PPP arrangement might involve a private consortium, comprising banks, construction firms, and service providers, contracted to develop a public facility, such as a hospital, with the government leasing and operating the site to deliver public services.

However, challenges remain, particularly when the returns for private investors exceed the bond rates of the government, placing disproportionate risk on the public sector. In response, another model of PPP, known as Public-Private Community Partnership (PPCP), is gaining attention (Alexander et al., 1998), shifting the focus from profit as the primary goal to a broader emphasis on community benefit and social responsibility.

In summary, PPPs represent a critical intersection of Corporate Social Responsibility (CSR) and Government Relations (GR), enabling both sectors to work together to achieve long-term social and economic benefits. By sharing risks, rewards, and responsibilities, these partnerships help to address complex public challenges in a sustainable and socially responsible manner. In the context of CCU/S governance, PPPs can drive project investment by aligning public sustainability goals with private sector innovation. By facilitating risk-sharing and long-term policy stability, PPPs can enhance the feasibility and scalability of CCU/S initiatives, ensuring their integration into national and regional climate strategies.

2.3 Partner Relationship Management

Partner Relationship Management (PRM) systems are designed to enhance the interactions between suppliers and their partners, aiming to build stronger relationships and improve overall performance (Jarratt, 2004; Park et al., 2015). However, the effectiveness of these systems is complex and influenced by various factors, particularly the relationship and fulfillment capabilities of the PRM systems.

The relationship capability of PRM systems – referring to the system's ability to foster strong, trusting relationships between suppliers and partners – positively impacts trust. When suppliers effectively use PRM systems to build relationships, partners are more likely to trust them, which is crucial for long-term collaboration.

On the other hand, the fulfilment capability of PRM systems, which refers to the ability to meet partner expectations regarding product delivery and service performance, has a more nuanced impact. Interestingly, the fulfilment capability alone tends to have a negative relationship with partner commitment. This is because partners might feel restricted or overly dependent on the supplier, leading to a sense of being "locked in," which can diminish their commitment to the relationship. However, this negative effect can be mitigated if the supplier provides strong service support and fulfillment capability. When partners perceive that the supplier is committed to supporting them, the negative impact on commitment can be

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avoided, though not completely reversed. Moreover, while the fulfilment capability can contribute to customer satisfaction, this benefit is not straightforward. This is only evident when the fulfillment capability is complemented by robust service support. Without such support, the fulfilment capability may fail to meet expectations, leading to dissatisfaction and potentially harming the partnership. Thus, suppliers should be cautious about relying solely on PRM systems to replace more traditional, and often more expensive, forms of service support.

Overall, the results suggest that suppliers should prioritize the development of the relationship capability in their PRM systems before focusing on the fulfillment capability. Building a strong foundation of trust and commitment through relationship capability creates a buffer of goodwill to support the later implementation of fulfilment capabilities. Without this foundation, investments in fulfillment capabilities may yield minimal or even negative returns, potentially leading to the premature abandonment of PRM systems.

In conclusion, PRM systems can be powerful tools for managing supplier-partner relationships. However, their success depends on carefully balancing relationship and fulfillment capabilities, supported by appropriate service mechanisms and thoughtfully designed certification programs. By understanding these dynamics, suppliers can better manage their relationships with partners, ultimately enhancing partner commitment and customer satisfaction. In the context of CCU/S governance, effective PRM strategies can help align industrial partnerships by fostering trust and collaboration between private sector actors, suppliers, and policymakers. PRM systems could enhance the operational feasibility of CCU/S initiatives, ensuring that technological solutions are integrated smoothly into broader sustainability frameworks.

2.4 Citizen Relationship Management Systems

Citizen Relationship Management (CiRM) systems, an adaptation of Customer Relationship Management (CRM) from the private sector, have become pivotal in enhancing government-citizen interactions. These systems are crucial for improving citizen engagement and service delivery, particularly as governments seek to integrate advanced technologies into public administration. The successful implementation of CiRM systems in cities such as Miami, Dubai, and Boston highlights their effectiveness in streamlining citizen information processing and request management (Andrade & Camacho, 2014).

CiRM systems leverage Information and Communication Technologies (ICTs) to support e-government initiatives, enabling multi-channel communication platforms that facilitate rapid and efficient responses to citizen inquiries and requests (Larrosa et al., 2016). This approach enhances service delivery and strengthens democratic governance by promoting transparency and accountability. Latin American governments, for instance, have experimented with ICTs to advance democratic governance and improve citizen engagement (Welp & Breuer, 2014).

CiRM systems go beyond traditional service management, with Huebner (2015) identifying four types: generic (basic interaction management), e-government (digital service integration), democratic (citizen participation), and strategic (alignment with long-term policies) (Huebner, 2015). Their implementation is shaped by top-down national policies, which set broad frameworks, and bottom-up administrative choices, where agencies select specific tools, such as user surveys, based on their needs. While national policies govern areas like HR and finance, service quality management remains more decentralized.

Despite the growing adoption of CiRM systems, many governments face challenges in their effective implementation. Andrade and Camacho (2014) note that while some governments have successfully established efficient CiRM frameworks, others struggle with the process. Developing effective national technology strategies requires more than just identifying critical technologies; it demands systematic planning and execution (Gerdsri & Kocaoglu, 2010). Governments worldwide are crucial in supporting research and development activities to enhance national competitiveness and improve public services.

Benchmarking against successful implementations and developing theoretical models are essential for guiding the implementation of CiRM systems. These models help address the determinants influencing the

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implementation process and provide frameworks for overcoming common obstacles (Andrade & Camacho, 2014; Rojas & Palma, 2014). Despite the progress, the benefits of CiRM in fostering e-participation for urban governance remain limited, highlighting the need for continued innovation and adaptation.

In summary, Citizen Relationship Management systems represent a significant advancement in public administration, offering governments a structured approach to managing citizen interactions and improving service delivery. Its evolution underscores the importance of integrating ICTs into government operations and addressing the challenges associated with their implementation. As governments continue to refine these systems, the lessons learned from successful implementations will serve as valuable benchmarks for future efforts. Given the complexities of CCU/S governance, CiRM systems could facilitate public consultations, disseminate climate-related information, and manage stakeholder expectations.

3. Conclusion

This paper examined several relationship management strategies with special attention to the national-level governance of Carbon Capture Utilization and Storage (CCU/S) technologies. The main purpose of the study was to explore and identify how relationship management can facilitate stakeholder collaboration, communication, and trust-building in CCU/S governance. Given the technological and economic uncertainties associated with CCU/S, effective governance frameworks must align interests and foster cooperation across diverse stakeholders, including governments, businesses, and the public. Stakeholder cooperation is necessary and inevitable in implementing CCU/S projects, as the specialties of these technologies require broader collaboration rather than in traditional governance models, especially those of a top-down structure. Relationship management can provide a framework for fostering stakeholder cohesion, as it can help manage and align their interests. By enabling structured engagement and risk-sharing mechanisms, these strategies can provide a foundation for the successful deployment and large-scale adoption of CCU/S technologies. The summary of the researched relationship management types, including the main characteristics and conclusions, is presented in Table 1.

Table 1. Summary of Researched Relationship Management Types

Relationship Management Type	Main Characteristics	Conclusions
International Marketing and Purchasing (IMP) Interaction Model	- Successful public-private interactions depend on communication and trust. - Emphasizes ongoing dialogue and collaboration.	- Optimizes interactions between governments and private entities. - Guides effective public-private partnerships.
Government Relations (GR)	- Focuses on long-term, mutually beneficial stakeholder relationships. - Employs creative and persuasive communication.	- Critical for navigating public policy and regulatory environments. - Needs more theoretical development.
Public Relations (PR)	- Uses public pressure and media to influence decisions. - Essential for outsider groups to gain access to decision-making processes.	- Indispensable for political influence. - Crucial for crisis communication and ideological framing.
Corporate Social Responsibility (CSR)	- Enhances trust and corporate reputation. - Sometimes driven by informal, status quo-preserving motives.	- Fosters positive social impact. - Should genuinely address social problems.
Partner Relationship Management (PRM)	- Relationship capability builds trust.	- Prioritize relationship capabilities.

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	- Fulfillment capability alone may reduce commitment.	- Support fulfillment with strong service mechanisms.
Citizen Relationship Management (CiRM)	- Improves citizen engagement and service delivery. - Facilitates democratic participation.	- Supports transparency and accountability. - Needs more theoretical development.

Source: Compiled and adapted by the author from the reviewed literature, including but not limited to works by Alexander et al. (1998), Andrade & Camacho (2014), Dong et al. (2023), Dzhukha et al. (2017), Freitas et al. (2021), Gerdsri & Kocaoglu (2010), Håkansson & Snehota (1995), Halff & Gregory (2015), Havlicek et al. (2013), Jarratt (2004), Jha & Cox (2015), La Rocca & Snehota (2016), Laode Nusriadi et al. (2023), Larrosa et al. (2016), Lipina et al. (2017), Metcalf et al. (1992), Neeley & Stewart (2021), Rojas & Palma (2014), Rusmana et al. (2024), Sood & Pattinson (2012), Vertakova & Plotnikov (2013), and Welp & Breuer (2014).

The present study primarily provided a collection of possible relationship management tools applicable to the governance of CCU/S. However, more future research is needed on their practical implementation to validate these strategies in real-world contexts. Empirical studies should assess their practical implementation and effectiveness in overcoming governance barriers.

Real-world examples of successful collaboration in large-scale CCU/S projects support the practical relevance of the study. The Northern Lights Project in Norway (Northern Lights, n.d.) is a good example of a successful industrial partnership between Equinor, Shell, and TotalEnergies, with support from the Norwegian government, being one of the first international CCU/S initiatives in the world. The project's success highlights the critical role of relationship management in coordinating government incentives, facilitating collaboration between industrial players, and ensuring public acceptance. Similarly, the Aramis CCS Project (ARAMIS, n.d.) in the Netherlands underscores the importance of government support and regulation in relationship management for CCU/S projects. Backed by the Dutch government, the Aramis project is a large-scale CCUS infrastructure initiative, collaborating with TotalEnergies, Shell, Energie Beheer Nederland (EBN), and Gasunie. This project demonstrates how public-private sector collaboration, transparent relationship management strategies, and long-term regulatory stability are essential for successfully implementing CCU/S technologies. The cooperative efforts between the public and private sectors in the Aramis project exemplify how strong governance frameworks can support the broader deployment of CCU/S initiatives.

Specific recommendations for key stakeholders should also be considered to enhance the practical applicability of this research. Governments should focus on creating regulatory frameworks that facilitate public-private partnerships, reduce investment risks, and incentivize collaboration in CCU/S initiatives. Private entities and industrial stakeholders should develop cooperative agreements and industry consortia to share knowledge, infrastructure, and financial burdens. Research institutions should continue investigating best practices for stakeholder engagement and contribute to designing adaptive governance models that reflect the evolving nature of CCU/S technologies.

Ultimately, while this study provides a theoretical foundation for understanding the role of relationship management in CCU/S governance, further interdisciplinary and empirical research is necessary to bridge the gap between conceptual strategies and practical implementation. Strengthening collaboration mechanisms, integrating real-world case studies, and refining governance models will be critical for effectively deploying CCU/S in the global climate strategy.

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