



Exploring the alignment and misalignment in the transition to a circular economy within private companies and public organizations

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ABSTRACT

The paper explores the alignment and misalignment of objectives within private companies and public organizations in their approach to the circular economy. While many studies have investigated the alignment within single actor types, this research reveals the dynamics of alignment when private companies and public organizations engage. Drawing upon qualitative research protocol, our study employs a circular economy financing initiative implemented in Italy as the empirical foundation for investigating these dynamics. The results highlight the positive repercussions when private companies and public organizations achieve perfect alignment, which triggers internal transformations within both entities. However, perfect alignment is seldom achieved. Our findings thus contribute to the literature by proposing actor misalignment as a potential barrier to the circular economy. This paper provides both theoretical and managerial insights into alignment dynamics within the context of the circular economy and offers a perspective on how these dynamics might evolve over time in multi-stakeholder circular economy initiatives.

1. Introduction

The linear production and consumption system is fundamentally unsustainable (Geissdoerfer et al., 2017). For a transformative change, a transition towards a Circular Economy (CE) paradigm is crucial, where waste is minimized, and materials and resources are optimally utilized, for as long as possible (Tukker, 2015). Policymakers, managers, practitioners, and academics have endorsed CE as an essential value to guide future policies (Geissdoerfer et al., 2017), and business strategies and practices (Lozano, 2018).

For the CE to be impactful, a paradigm shift in conventional processes across social strata is necessary (Merli et al., 2018). Several studies suggest that achieving a shift towards a CE requires a diverse spectrum of stakeholders (Bocken et al., 2019; Geissdoerfer et al., 2017; Lieder and Rashid, 2016; Mishra et al., 2021). Public organizations are key in sculpting an operational environment that fosters the acceleration towards a CE through cogent policies, incentives, and tools (Blomberg et al., 2023). Concurrently, private companies are instrumental in actualizing CE through the adoption of product circular design (Corsini and Frey, 2023; Setti et al., 2021), cleaner and more efficient production processes (Gusmerotti et al., 2019), and waste recycling initiatives (Di

Maio and Rem, 2015). While a shared understanding and interpretation of the CE between these two actors is vital, private companies and public organizations often perceive and navigate situations from contrasting perspectives. This discord, resulting from divergent objectives of these actors, is perceived as inherent and has been a subject of frequent scholarly attention (Jaakkola et al., 2019). In terms of resource interaction, coordination between public and private entities is often challenging due to differing objectives and contradictory perceptions (Lundberg and Andresen, 2012). Such variables can lead to either alignment or misalignment in understanding the behaviors of the key actors involved (Corsaro and Snehota, 2011). Exploring this diversity and effectively managing coordination to foster alignment rather than misalignment is essential.

Although CE research examines the complexities of relationships between private companies and public organizations (Rainville, 2021), the explicit examination of alignment and misalignment between these entities has been largely disregarded. Most studies have explored alignment and misalignment from the viewpoint of a single actor type such as companies (Besharov and Smith, 2014), neglecting interactions between multiple actor types (Skålen et al., 2015a,b). Business research increasingly emphasizes multi-stakeholder engagement as key to

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fostering CE practice adoption (Ranta et al., 2020). It is thus critical to comprehend how to catalyze coordination between varying actors to sustain this transition. Understanding how alignment and misalignment manifest between different entities and influence their behavior will aid in managing and promoting coordination.

Our research aims to elucidate the alignment and misalignment arising when private companies and public organizations coordinate together in undertaking CE projects.¹ The theoretical basis for this research lies in alignment and misalignment studies (Corsaro and Snehota, 2011; Scherpereel, 2006). A CE financing initiative, championed by the public administration in Italy, provides the empirical groundwork for this theoretical framework. Our findings underscore the beneficial outcomes when private businesses and public actors coordinate on CE projects. Alignment emerges as a catalyst for internal transformations in private companies and public organizations, leading to improved production processes and evolved mindsets. However, such alignment is challenging and emerges in limited instances. Our findings enrich the literature by proposing actor misalignment as a potential impediment to CE.

The manuscript is structured as follows; section two examines the theory behind the analysis, pinpointing the context of the CE as significant for evaluating alignment and misalignment among private companies and public organizations. Section three outlines the methodology, including the data collection and processing. Section four reveals the findings and looks at the theoretical and managerial implications of our results. The main conclusions of the study are then provided in Section five, outlining the limitations and identifying possible future research.

2. Literature review

2.1. Alignment and misalignment in multi-stakeholder settings

In business contexts, alignment is often referred to as the strategic fit (Chorn, 1991) or the interface between two elements (Van Der Zee and De Jong, 1999). It is a continual process for many firms (Smaczny, 2001) and in various business relationships (Ingstrup et al., 2021). While alignment is a state, its antithesis, misalignment, is a multidimensional space with countless states (Scherpereel, 2006). Consequently, any discussion of alignment necessitates evaluating the degree of alignment and monitoring the dynamics of misalignment.

Most of the research focusing on alignment indicates that stakeholders of misaligned companies operate at less-than-optimal performance levels (Lefebvre, 1992). Conversely, alignment is generally favored, particularly when diverse entities engage. For instance, Cox (2004) posited that to function effectively, buyers and suppliers in a supply chain must exhibit robust alignment. Within this framework, Cox (2004) defines ‘well-aligned’ as the specific conditions in which buyers and sellers collaborate to capture value, thereby influencing the requisite degree of alignment within a partnership.

Investigations within this domain commonly concentrate on three dimensions: cognitive, goal, and practice alignment (Vikstedt and Rajala, 2023). Cognitive alignment, as detailed by Corsaro and Snehota (2011), involves the concordance of values, beliefs, and perceptions among stakeholders. This alignment can be gauged through cognitive proximity, which measures the correlation between values and beliefs that direct organizational operations, and compatibility, which evaluates the harmony among these elements. These aspects have been acknowledged as beneficial in enhancing value in scenarios involving

multiple private and public stakeholders (Nguyen et al., 2019). This alignment kindles trust, communication, and shared knowledge, thereby bolstering organizational practices.

Another significant line of inquiry primarily concerns goal alignment, addressing the coordination of stakeholders’ aims (Caldwell et al., 2017). Stakeholders frequently possess discordant objectives. For instance, organizations driven by a commercial logic (i.e. private companies) may concentrate on financial targets, while those guided by a social logic (i.e. public organizations) might focus on societal aims. Goal alignment concerns the processes where shared goals are adopted, multiple supplementary objectives are accepted, or stakeholders devise new collective goals. In contrast, goal misalignment refers to scenarios where stakeholders persist in chasing their individual objectives or when such goals are in direct conflict with each another. In this context, this alignment ascertains a common ground for potentially clashing objectives, enabling common efforts (Vikstedt and Rajala, 2023).

A third dimension analyzed in previous studies emphasizes practice alignment (Corsaro and Snehota, 2011) by exploring the interplay of processes and competencies among stakeholders. Contradictory logics can catalyze practice misalignment, resulting in stagnant organizational structures. On the other hand, harmonious logics promote synergistic value creation. The efficacy of practice alignment continues to be a matter of debate in academic circles (Skelcher and Smith, 2014).

In our exploration, we use the principles of alignment and misalignment to dissect problems and solutions postulated by Corsaro and Snehota (2011). These notions pertain to the interplay between stakeholder perceptions and conceptualizations of issues, and their understanding of potential resolutions. Viewed through the lens of cognitive alignment, this concerns an actor’s interpretation of a pivotal occurrence or an amalgamation of such occurrences, and the subsequent impact on their problem-solution terrain. The approach is detailed in Section 2.2.

2.2. Alignment and misalignment in CE context

The CE offers a framework for dissecting alignment and misalignment among stakeholders, given its focus on systemic thinking (Iacovidou et al., 2021) and collective endeavors (Mishra et al., 2021). It mandates the harmonization of diverse stakeholder viewpoints to propel the shift from a linear to a circular archetype (Kaipainen et al., 2023), thereby rendering it an exemplary instrument for probing alignment and misalignment in problem perceptions and the unearthing of viable solutions. The scrutiny under the lens of a CE can diverge considerably from a generic sustainability viewpoint. Though both encompass ecological considerations, CE goes beyond mere harm mitigation, centering on the establishment of systems aimed at reducing resource consumption and waste generation (Senna et al., 2022). CE underscores the significance of reuse, refurbishment, and recycling to prolong the lifespan of products (Zink and Geyer, 2017), thereby diverting waste from landfills, while diminishing the demand for virgin raw materials, gradually transitioning toward a more restorative and regenerative paradigm (Morseletto, 2020). This systemic transition requires a cognitive alignment among multi-stakeholders, distinguishing itself from the more heterogeneous goals typical of general sustainability.

Most studies have addressed the concept of alignment and misalignment from the viewpoint of a single actor type, neglecting to incorporate the dynamic interplay among multiple actor types (Skälén et al., 2015a,b). For instance, Yamoah et al. (2022) analyzed the degree of alignment between the values and beliefs of business executives and the circularity values and objectives of their organizations. They focused on four large food enterprises in the UK and found that these misaligned internal values serve as a deterrent to the adoption of CE practices and impede stakeholder engagement for a successful transition to a CE.

Other research has examined the alignment and misalignment among various private companies within the CE. Harala (2021), for instance, examined the dynamics of ecosystems within the CE,

¹ We define the coordination between public entities and private companies, drawing upon the ‘‘Stages of Collaboration’’ proposed by Frey et al. (2006). They characterize coordination as a multifaceted act involving two or more actors who i) share information and resources, ii) engage in frequent communication, and iii) partake in collective decision-making.

encapsulating competition, and analyzed the necessary alignment to attain system-level results in the CE field. Their results underscore the need for robust alignment in technological, economic, and cognitive aspects, particularly concerning the concurrence of objectives and practices, for collaborative efforts among multiple actors to yield system-level outcomes.

To the best of our knowledge, only Ingstrup et al. (2021) have conducted an analysis of alignment and misalignment among multi-stakeholders in the context of the CE. Their research looks at the institutional perspectives of academia, industry, and government, alongside the alignment and misalignment involved in their collaboration. Anchored in a case study of a CE cluster from Finland’s Tampere Region, they underscore both the advantageous and disadvantageous facets of different institutional logics concerning alignment and misalignment. They illustrate that these two phenomena can stem from myriad sources and manifest at various levels. However, their findings are somewhat limited by the lack of an analysis of the actors’ relationships beyond the cluster. In our study, we endeavor to contribute to the findings of Ingstrup et al. (2021) by concentrating on the potential relationships beyond the bounds of a cluster. This broader focus offers a more extensive comprehension of the dynamics at play, encompassing external influences and wider system-level factors. This investigation could further reveal how interdependencies and interactions within a more expansive context might influence the alignment process, thereby deepening our understanding and bolstering the practical relevance of our results.

In our investigation, we strive to conduct an in-depth analysis of alignment and misalignment, with an emphasis on private companies and public organizations. This focus is pivotal due to the interaction between these actors that influences systemic transformations, thus promoting strategies that ease the shift from linear to CE (Velenturf and Purnell, 2021). Furthermore, by honing in on such relationships, our study provides insights into the distinctive challenges and opportunities within private and public domains, assisting in the formulation of solutions that accommodate the needs of both actors while advancing the CE. Specifically, our research endeavors to address the following research questions.

RQ1: To what extent do private companies and public organizations align when they coordinate in developing projects pertaining to the CE?

RQ2: Does alignment foster the evolution of the CE by instigating a shift in the awareness and organizational models of private companies and public organizations?

2.3. Framing CE alignment and misalignment as problems and solutions

Alignment and misalignment have been studied in relation to problems and solutions by Corsaro and Snehota (2011). Within problem-solving contexts, Scherpereel (2006) examined alignment more explicitly, developing the “decision alignment framework” to pair primal elements (decision problem characteristics) with dual elements (solution approaches). According to Scherpereel, dual elements need to align with primal elements for optimal functioning. While studying engagement failure among different stakeholders, Gray (2004), highlighted the importance of achieving some level of alignment to facilitate collective action. Coordination becomes challenging on a dyadic level if one stakeholder perceives incongruity in their understanding of a situation while the other does not. In such contexts, the literature on problem-solving within multi-actor partnerships suggests that alignment and misalignment relate to the extent of agreement between parties in interpreting problems and solutions (Ingstrup et al., 2021).

Corsaro and Snehota (2011) called these interpretations as problems and solution spaces. Adopting the framework proposed by Corsaro and Snehota (2011), in our context the coordination between public and private actors might evolve as follows: the public organization works

towards finding a solution for the private company, fostering solutions through facilitation or authority. Concurrently, these public organizations gain a deeper understanding of the CE transition process and chart a course for other regional private companies to emulate. Within this context, public organizations endeavor to enhance societal impacts.

Alignment within problem and solution spaces is thus instrumental for coordination in CE implementation as it accentuates the interdependent nature of problem comprehension and solution generation. This understanding facilitates meaningful engagement and effective coordination between private companies and public organizations, fosters shared interpretations of challenges and solutions, and subsequently navigates the complex transition to CE (Rödl et al., 2022). In addition, such alignment bolsters societal impacts by empowering public organizations to tailor solutions for private companies, steering regional businesses towards sustainable development, while concurrently demystifying the process of initiating similar transformations in other corporations.

Following this premise, Table 1 illustrates these spaces adapted to our context of investigation: in the private company’s space, the company’s perspective of the problem’s characteristics and its interpretation of the public organization’s solution are included. Conversely, the public organization’s space includes its perception of the private company’s problem and its vision of the solution.

In the framework developed by Corsaro and Snehota (2011), the private company’s perceived problem (see Q1 in Table 1) concerns its understanding of a particular situation, including its intended outcomes (Nowell, 2008). The elements forming the problem space for transitioning from linear to CE practices in businesses are outlined in Table 2. More specifically, in our context, the perceived problem may relate to the overarching view and comprehension of the CE, given its broad conceptual foundation. The expansive and inclusive definitions of the CE might explain why a unanimous definition eludes experts (Kirchherr et al., 2017); private companies might have a precise understanding of the CE’s significance. Another aspect of the perceived problem in our investigation are the perceived obstacles in implementing CE actions and strategies (Grafström and Aasma, 2021). As in other decision alignment scenarios, the private company may have a clear conception of the problem and can identify various solutions offering the best fit, but its preferences may either be poorly defined or misplaced. Q2 in Table 1 represents the public organization’s perception of the private company’s problems. As Langdridge et al. (2007) suggest, the public organization’s understanding of the private company’s problem is vital as it influences the decision to offer a specific solution. Discrepancies between the two actors’ perceptions of an issue could arise due to individual differences in interpreting the problem.

Table 1 also illustrates the solution perceived as being suitable by the public organization (Q3). These solution elements comprise the resource bundle that the public organization aims to offer the private company (Baraldi and Strömsten, 2009). In our investigation, the solution elements for transitioning from linear to CE practices in businesses (Table 2) could be the measures public organizations provide to support the transition towards the CE (Klein et al., 2020). These measures are, of course, based on an understanding of the company’s needs for continuous improvements in circularity (Bianchini et al., 2019). The public organization’s solution is influenced by their interpretation of the situation and the resources they deem suitable for the solution.

Table 1
Private company and public organization problem and solution spaces.

	Private company	Public organization
Problem	(Q1) Private company problem as perceived by the private company itself.	(Q2) Private company problem as perceived by the public organization.
Solution	(Q4) Solution perceived by the private company.	(Q3) Solution perceived by the public organization itself.

Table 2
Items that compose the problems/solutions space in moving from linear to a CE.

Items that compose the problem space in moving from linear to CE	Items that compose the solution space in moving from linear to CE
Elements considered in defining the meaning of CE	Tools and instruments to support the transition towards the CE
Barriers faced in the implementation of the CE	Companies needs for the continuation of the circularity improvement process

Lastly, [Table 1](#) also includes the private company's perceived solution (Q4), reflecting the private company's evaluation of the possible solutions. As different actors interpret situations uniquely, several alternative solutions may be viable ([Czarniawska, 2004](#)). A gap in the private company's problem perception might emerge if the company considers the solution provided to be ineffective.

[Table 2](#) summarizes the elements that form the problem/solution space for transitioning from a linear to a CE as discussed above. The items that constitute the problem space in transitioning from a linear to a CE, and the items that constitute the solution space in this transition, have subcategories. These were identified after conducting an in-depth literature review on problems and solutions encountered in implementing CE initiatives involving both private companies and public organizations. For example, among the subcategories related to the "Elements considered in defining the meaning of CE", we found in literature that the definition of CE is associated with the development of new business models ([De Jesus and Mendonça, 2018](#)), or in other instances, it is associated with efficiency and optimization in production processes ([Geissdoerfer et al., 2017](#)). These were some of the subcategories in the "Elements considered in defining the CE". A comprehensive list of subcategories is shown in [Table 3](#).

Building upon the theoretical framework proposed by [Corsaro and Snehota \(2011\)](#), four states of alignment or misalignment are possible based on the extent of overlap between the problem/solution spaces of private companies and public organizations, as well as the dimensions that comprise them. All the different alignment and misalignment configurations between the two actors are illustrated in [Fig. 1](#).

3. Materials and methods

This paper adopts an exploratory case study methodology to explore the alignment and misalignment ensuing when private companies and public organizations coordinates. Case studies represent a qualitative design wherein the researcher delves deeply into a, event, activity, process, or one or more individuals. A case is constrained by time and activity, and researchers accumulate meticulous information utilizing a variety of data collection procedures over an extended period of time ([Creswell, 2014](#)).

Drawing upon previous scholarly discourse ([Easton, 1995](#)), we make the assumption that a case study serves as an apt vehicle for examining alignment and misalignment between private companies and public organizations when those actors coordinate in the development of the CE, due to its inherent capacity to scrutinize a societal phenomenon intrinsically entwined with its milieu. We also propose that sub-cases may facilitate a more comprehensive exploration, thereby strengthening the verification of outcomes and better identifying the congruities and incongruities. Consequently, the nature of our study is that of an embedded single case study punctuated by twelve sub-cases ([Yin, 2003](#)). This selection of a dozen sub-cases is strategic; it affords both a profound within-case examination and a cross-case scrutiny, empowering us to recognize commonalities and disparities amongst cases.

3.1. Case study presentation and sub-case selection

The case study encompasses a collective of private companies and public organizations from Lombardy, in northern Italy. Lombardy

represents a dynamic epicenter of entrepreneurial endeavors ([Corsini et al., 2022](#)), which could potentially provide interesting insights into how private companies and public organizations implement a CE.

The enterprises participating in this study won a funding tender from the local government of Lombardy in 2021. This financial impetus was designed to catalyze CE initiatives within the business landscape. The allocation of this funding tender did not discriminate based on sector or size; the sole stipulation being that the organization's headquarters were within Lombardy's boundaries. Companies aspiring to apply for this funding were required to submit a project, subject to evaluation by experts who chose the best project proposals from an impressive collection of roughly one hundred submissions. The successful enterprises were then tasked with executing the proposed project activities within the timeframe spanning from June 2021 to December 2022. Funded projects had to be executed by private companies in close coordination with public organizations, aimed at better comprehending the CE transition process and structuring a path for other regional businesses to follow, while also establishing circular supply chains in the region. In this context, public organizations aimed to improve societal resource efficiency and sustainable material usage by implementing CE activities at an industrial scale. In fact, some projects aimed to initiate an industrial symbiosis, by achieving economic and environmental sustainability. Other projects aimed to develop innovative sustainable solutions for using recycled materials in packaging or applying innovative solutions for waste reuse.

We included twelve companies from the pool of financed projects in our research sample. The companies were chosen to reflect a breadth of sectoral diversity and projects, thereby ensuring a comprehensive study of the myriad facets of CE implementation within Lombardy. The sample comprised twelve SMEs operating in the textile, mining, IT, and other sectors.

Concurrently, we selected the public organizations from Lombardy corresponding to each chosen company, thus forming twelve dyads. The selection of public institutions to pair with the private companies hinged on the following criteria: each dyad is made up of a private company and a public organization sharing identical local area borders, that is, the same province.

[Appendix A](#) shows the twelve dyads, outlining the constituent private company and public organization within each pairing; in [Appendix A](#) we assigned a code number from 1 to 12 to each dyad.

Our assumption is that the robustness of our sampling process gains additional strength from the inherent depth and diversity of the selected dyads. These dyads not only encapsulate the geographical and sectoral panorama of Lombardy but also highlight the variety of endeavors of these entities towards the implementation of the CE, thus rendering our study a comprehensive mosaic of scenarios. In more detail, the twelve chosen dyads potentially represent distinct sub-cases for examining alignment and misalignment between businesses and governments as they coordinate to expedite the implementation of CE initiatives.

3.2. Data collection

The data aggregation comprised secondary data sources, semi-structured dialogues, and site visits. To triangulate our findings, we employed a variety of sources and cross-verification measures ([Eisenhardt, 1989](#); [Yin, 2003](#)). The primary methods of data collection comprised.

- Direct observation during meetings;
- Data generated within the project scope, such as research reports, questionnaires, documents produced by both private companies and public organizations, among others;
- Interviews with private companies and public organizations.

Table 3
Adopted criteria to identify the alignment status in each dyad.

Categories	Items that compose the problem and solution dimensions	Sub-categories that compose the problem and solution space	Criteria to assign the alignment level			
			Complete alignment	Moderate misalignment	Significant misalignment	Complex misalignment
Problems	Elements considered in defining the meaning of CE	CE as an approach to reducing environmental impacts and waste (Geissdoerfer et al., 2017) New business model for eco innovation (De Jesus and Mendonça, 2018) Eco-design (Civancik-Uslu, et al., 2019) Efficiency and optimization in production processes (Geissdoerfer et al., 2017) Industrial symbiosis and waste recovery (Korhonen et al., 2018b)	Private companies and public organizations are aligned on all five subcategories	Private companies and public organizations are aligned on four out of the five subcategories.	Private companies and public organizations are aligned on two or three of the five subcategories.	Private companies and public organizations are aligned solely on one, or none, of the subcategories.
	Barriers faced in the implementation of the CE	Market dynamics, internal costs, and economic viability deficits (Kirchherr et al., 2018) Mindset and awareness (De Jesus and Mendonça, 2018) Quality of circular products (Su et al., 2020) Absence of policies fostering a CE transition (Pheifer, 2017 ; Rizos et al., 2015) Technological deficits and the need for appropriate technologies to facilitate CE implementation (Pheifer, 2017)	Private companies and public organizations are aligned on all five subcategories	Private companies and public organizations are aligned on four out of the five subcategories.	Private companies and public organizations are aligned on two or three of the five subcategories.	Private companies and public organizations are aligned solely on one, or none, of the subcategories.
Solution	Tools and instruments to support the transition towards the CE	Instruments for supporting the interpretation of administrative regulations (Sani et al., 2021) Tools for cultivating skills, knowledge, and awareness (De los Rios and Charnley, 2017) Technological tools and instruments (Sani et al., 2021) Apparatus for the dissemination of CE best practices (Laurenti et al., 2018) Mechanisms for endorsing a collaborative ethos (Perrini and Tencati, 2006) Instruments to facilitate research and innovation (Corvellec et al., 2022) Mechanisms to secure economic and financial support (Corvellec et al., 2022)	Private companies and public organizations are aligned on all seven subcategories	Private companies and public organizations are aligned on five or six out of the seven subcategories.	Private companies and public organizations are aligned in three or four out of the seven subcategories.	Private companies and public organizations are aligned on two, or fewer, subcategories.
	Companies needs for the continuation of the circularity improvement process	Increasing knowledge of Life Cycle Assessment (LCA) and environmental labels (Del Borghi, 2013) Cultivation of clusters and networks (Perrini and Tencati, 2006) Establishment of innovation hubs (Pieroni et al., 2019) Fiscal incentives and economic funds (Henriques et al., 2022) Policy instruments and novel, simplified administrative rules (Gregson et al., 2015)	Private companies and public organizations are aligned on all six subcategories	Private companies and public organizations are aligned on four or five out of the seven subcategories.	Private companies and public organizations are aligned in two or three out of the seven subcategories.	Private companies and public organizations are aligned solely on one, or none, of the subcategories.

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Table 3 (continued)

Categories	Items that compose the problem and solution dimensions	Sub-categories that compose the problem and solution space	Criteria to assign the alignment level			
			Complete alignment	Moderate misalignment	Significant misalignment	Complex misalignment
		Training initiatives (Bugallo-Rodríguez and Vega-Marcote, 2020)				

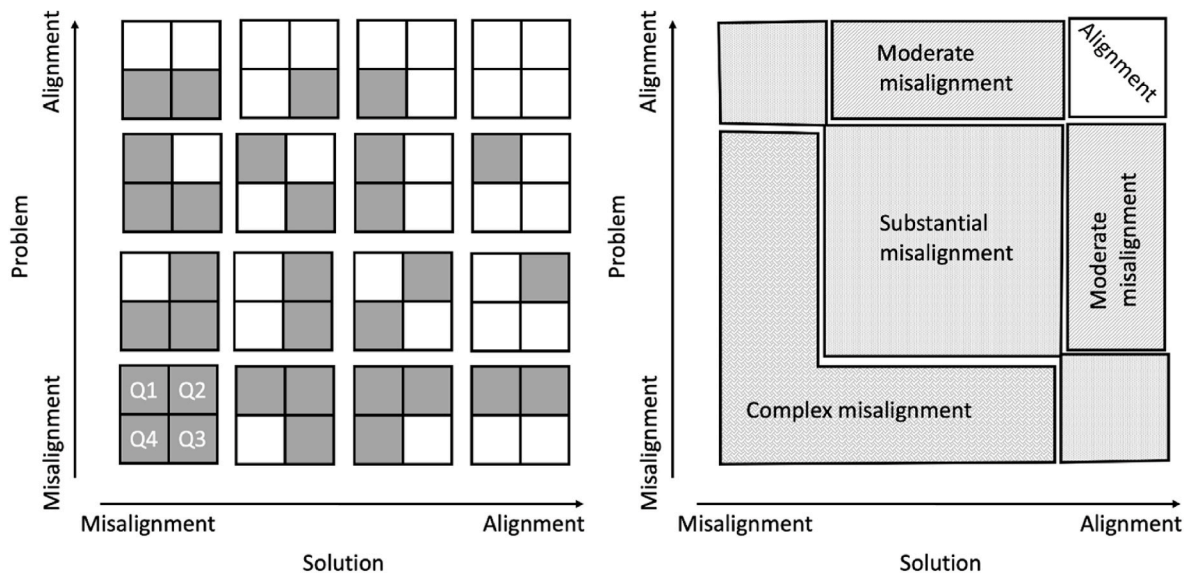


Fig. 1. Alignment and misalignment configurations between two actors.

3.2.1. Direct observations during meetings

Sixteen online meetings were held with private companies and public organizations, spanning from October 2021 to December 2022. The settings for observational data acquisition, involving all the study team contributors listed as authors, were as follows: (i) technical project discussions and corporate training initiatives; (ii) coordination meetings, uniting researchers, corporations, and public institutions; and (iii) public events, where the investigative team were invited to participate alongside private companies and public organizations.

3.2.2. Data generated within the project scope

Concerning the data generated within the project scope, the process was executed from October 2021 until July 2022. For private companies, information was primarily gathered through desktop research, utilizing diverse resources both directly and tangentially affiliated with the company. These encompassed the company’s online presence, financial and sustainability disclosures, technical dossiers, and a host of information about the company harvested from the web. Prior access to this information was imperative for preparing an “identification portfolio” for each case and procuring additional documentation from the companies if necessary.

For information on the public organizations involved, historical activities, funding projects relating to CE, and prior interactions with other stakeholders (universities, labs, consultancy firms) aiding businesses in integrating CE strategies were compiled from web searches.

The second phase of data collection, conducted from August to October 2022, focused on an evaluation of project outcomes. We gathered data from the twelve private companies to benchmark their environmental performance between 2020 (baseline), prior to the regional initiative, and 2022, when the grant-recipients had concluded their projects. We sent a questionnaire to these companies, comprised of seven CE indicators based on the work of Saidani et al. (2019). These indicators, for example, pertained to the substitution of virgin raw

materials with renewable ones, energy and water consumption, and waste production.² These indicators were introduced to the companies in a meeting to ensure the accurate completion of the questionnaire. The firms provided data for each CE indicator, thereby revealing baseline performances and performances post-project execution. This questionnaire subsequently enabled us to gauge the effect of alignment or misalignment with public organizations within private companies.

3.2.3. Interviews

Interviews with private companies and public organizations took place from April to July 2022. Based on literature on CE coordination (Grafström and Aasma, 2021), as well as alignment and misalignment (Ingstrup et al., 2021; Corsaro and Snehota, 2011), a semi-structured protocol for the interviews was devised. This protocol was divided into five sections; the first focusing on general organizational particulars (such as name, locale, sector, etc.), and the remaining sections on the dimensions framing the problem and its solution. The protocol incorporated open-ended questions on all subcategories used for evaluating the alignment level (refer Table 3), facilitating the collection and comparison of perspectives held by companies and public administrations regarding CE-related matters. These subcategories, as presented above, were discerned following a meticulous literature review of prior research on CE. In finer detail, the literature analysis enabled the

² The seven indicators used to evaluate CE performance were: i) Volume of secondary raw materials employed as an alternative to virgin materials, ii) Quantity of renewable materials employed as an alternative to virgin materials, iii) Energy consumption per unit of output, iv) Water consumption per unit of output, v) Volume of by-products generated, vi) Amount of waste relegated to landfills, vii) Quantity of waste dispatched for material recovery. These indicators were measured prior to the project’s commencement and upon its conclusion.

identification of several subcategories associated with: the interpretation of CE, barriers encountered during CE implementation, tools and strategies that support the shift towards CE, and the companies' requirements for perpetuating the process of circularity enhancement. These subcategories served to assess alignment and misalignment between private companies and public organizations.

Following the protocol developed, two researchers conducted the interviews with private companies and public administrations. All interviews were face-to-face, and conducted in Italian from April to July 2022. They were also recorded and transcribed verbatim. A total of nineteen interviews were conducted (twelve with private companies and seven with public organizations), each lasting between 50 and 60 min. This resulted in approximately 200 pages of transcripts. Any materials mentioned in the interviews that we felt might be useful were then requested directly. A case study report was compiled following a pre-defined format and sent to each firm for transparency purposes (Bansal and Corley, 2011; Gioia et al., 2013). In total, twelve case studies related to twelve dyads were analyzed.

3.3. Data analysis

The data analysis consisted of two main phases. The initial phase involved the designation of alignment levels by coding interviews, while the subsequent phase was aimed at gauging the impact of alignment and misalignment within private companies and public organizations.

3.3.1. Assessment of alignment level in dyads

Assessing alignment and misalignment with qualitative data, such as case studies, can be challenging (Henneberg et al., 2010; Johnsen and Ford, 2008). To avoid an exclusively qualitative approach, analyzing the data collected from the interviews involved using a thematic qualitative text analysis (QTA) method (Schulz, 2012; Kuckartz, 2013). The transcripts of all interviews were systematically evaluated, structuring the content into categories and subcategories. This involved assigning 'codes' or 'labels' to sections of the data, namely sentences or phrases providing relevant information on one or more key research question(s). This coding was applied to each transcript following a two-step iterative process.

In the first step, holistic coding was applied to the entire text, assigning a code to each sentence or section of the transcript. This yielded approximately 150 codes. These codes were then grouped into two main categories (problems and solutions) and corresponding subcategories to form a category tree or 'code system'.

In the second step, the code system and its content were continuously refined, grouping related codes together under the same theme and eliminating irrelevant, or overlapping ones. This method is referred to as axial coding by Saldaña (2021). Count hits for each chosen sub-category were first arranged per type of the interviewee's affiliation, followed by a total count hit per subcategory (see Table 3).

In assessing alignment and misalignment within the dyads, we utilized a straightforward approach. For instance, when exploring alignment and misalignment related to the "elements considered in defining the meaning of CE", we adhered to the five subcategories identified (refer to Table 3) in the literature review and assessed throughout the interviews; thereby evaluating the incidence of alignment between public entities and private companies regarding this subject matter. If a dyad, encompassing a public organization and a private company, showed alignment across all five subcategories, we classified the dyad as completely aligned. Alternatively, if the dyad participants were aligned in four out of the five subcategories, we denoted the dyad as being moderately misaligned.

Following this methodology, using the interviews, we evaluated all dyad relationships as complete alignment, moderate misalignment, substantial misalignment, or complex misalignment, according to the established criteria. The criteria employed to assess alignment and misalignment, and the four constructs that form the problem and

solution dimensions, are shown in Table 3.

Finally, we simultaneously compared the four items that form the problem/solution space (two related to the private companies—perceived problem and perceived solution, with two related to the public organizations—perceived problem and conceived solution) for each dyad. Based on this comparison, we classified dyads as.

- i. Completely aligned, if alignment is observed across all four items composing the problem and solution dimensions;
- ii. Moderately misaligned, if alignment is seen in three out of the four items forming the problem and solution dimensions;
- iii. Substantially misaligned, if alignment is witnessed only in two out of the four items that structure the problem and solution dimensions;
- iv. Complex misalignment state, if misalignment is found across all items composing the problem and solution dimensions.

3.3.2. Evaluation of the impact of alignment and misalignment within dyads

After evaluating the alignment or misalignment within the dyads, we analyzed the environmental results accomplished by private companies alongside shifts in awareness and organizational models within private corporations and public entities. The environmental results were evaluated using questionnaire data (Section 3.2.2), enabling us to monitor enhancements pertaining to the CE within private companies. Simultaneously, shifts in awareness and organizational models amongst public organizations and private companies were assessed during a final meeting involving all dyads.

Fig. 2 encapsulates the research stages and the methodological approach adopted in our investigation.

4. Results and discussion

4.1. Alignment level

In order to respond to the first RQ we classified and analyzed the twelve investigated dyads; and the results are presented in Fig. 2. Specifically, employing the configurations between the two actors as depicted in Fig. 1, we illustrated in Fig. 3 the state of alignment and misalignment within the dyads examined in our research. Three dyads were classified as having a state of complete alignment. Four dyads were identified as having a moderate misalignment, and another four showed substantial misalignment. Lastly, one dyad was categorized as having a complex misalignment.

4.1.1. Complete alignment

Three dyads (#4, #7, #10) demonstrated complete alignment, sharing the same perceptions regarding the problems and solutions. Specifically, on the private company side, the three small businesses presented a comprehensive and detailed understanding of the CE which was based on the concept of the life cycle and efficiency of production systems. All three private companies also highlighted that changes in the business model are necessary to promote the transition towards the CE. This vision was in alignment with the public organization's view, which shared a similar understanding of CE. An example is presented in Table 4.

These three dyads agreed on the obstacles encountered during the transition to CE. Specifically, both private companies and the associated public organizations concurred that overly complex legislation, insufficient financial resources, and limited coordination, especially in research, could impede the development of skills needed for transforming production processes. An example is presented in Table 5.

We also identified a strong alignment in the perception of the solutions. Specifically, the three dyads shared alignment regarding the instruments to support the transition, with the public organization having a broader vision encompassing various instruments that align with most

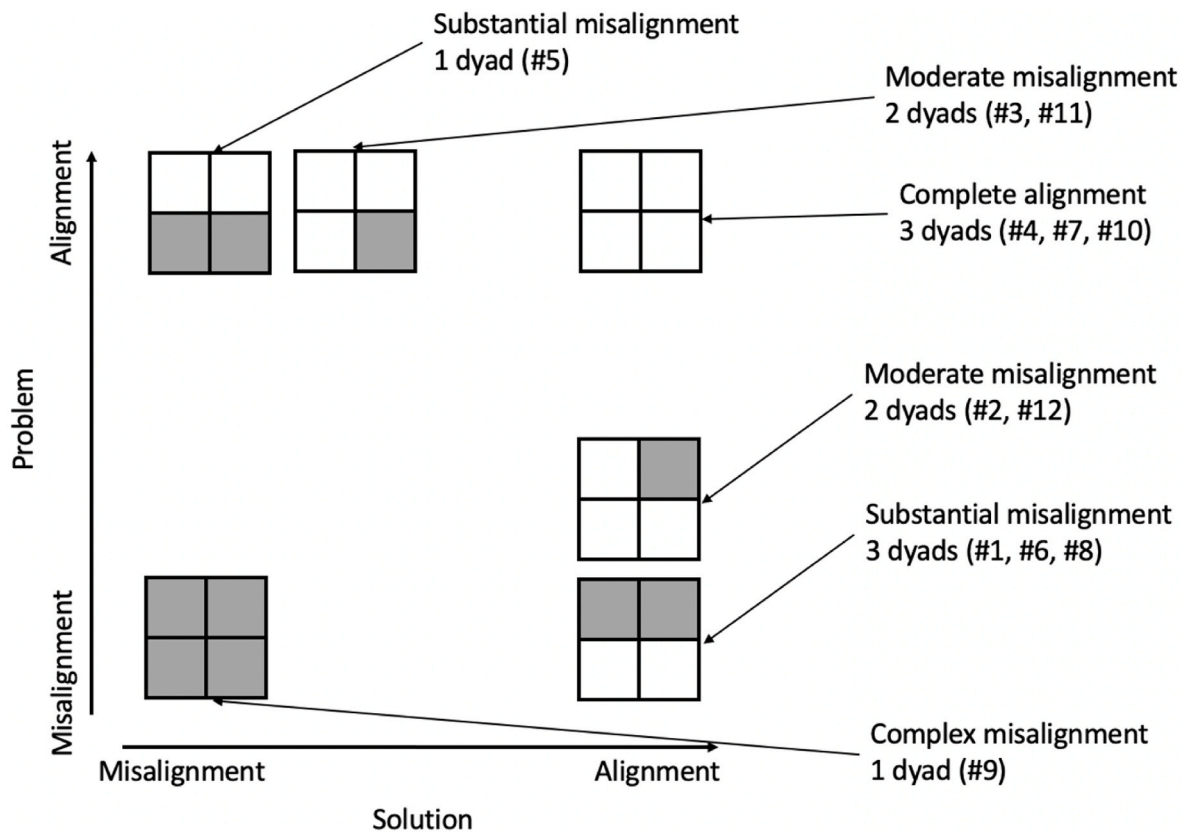


Fig. 2. Flowchart illustrating the implemented methodology and research phases.

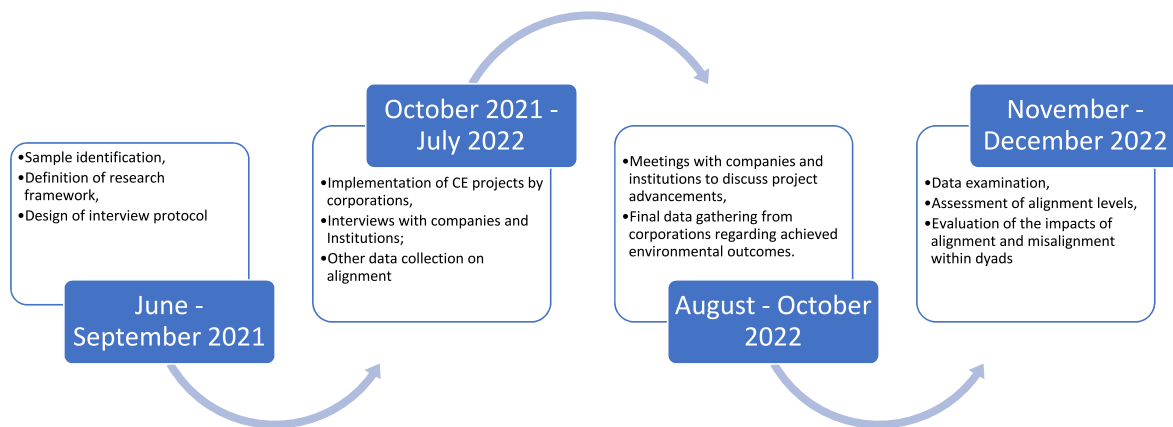


Fig. 3. Alignment and misalignment in the 12 dyads analyzed.

of the instruments mentioned by the private companies. An example is presented in Table 6.

Lastly, we detected a strong alignment in the perception of the specific need for private companies to continue the circularity improvement process. Private companies within the three dyads shared a clear vision of how to stimulate the CE transition in their activities and associated needs. This vision coincides with the broader understanding of public organizations within the three dyads (as depicted in Table 7) (see Table 8).

In terms of the factors that may influence alignment level, the three relationships (#4, #7, and #10) that exhibited complete alignment involved private companies that had previous CE experience and who had tackled numerous CE-related aspects, from product ecodesign to production efficiency and recycling. Each of the three companies had

participated in different CE experiences, such as networks to develop CE projects or previous funding tenders promoted by public organizations. In addition, in these aligned companies, the CE project was initiated in coordination with industry-specific and supply chain networks with whom they had long-standing relationships, and shared needs and potential solutions were jointly implemented to create concrete circular systems.

Simultaneously, public organizations in these three dyads also seemed to possess similar levels of experience. They had acquired CE experience in coordination with businesses through numerous initiatives involving the development of CE roundtables, meetings, and other supportive initiatives. One of the public organizations even highlighted that besides this project, their office had conducted two other projects on CE, and were currently working on another project focused on

Table 4

Extracts from interviews concerning elements considered in defining the CE in an aligned scenario.

Dyad n°	Elements considered in defining the meaning of CE from the private organization perspective	Elements considered in defining the meaning of CE from the public organization perspective
#7	From our perspective, “a CE process only uses the materials required to create a product, without generating waste, and minimizes complex assemblies from a design and engineering standpoint, often made from a mono-material, thus easy to recycle.” [...] “In our production cycle, a loop is automatically initiated; nearly everything we manufacture is inherently recyclable, so we can already close the loop in our cycle.” [...] We believe that the CE involves “collaborating closely with our customers to generate circular values.” [...] “To return to the question of what CE is, it’s obviously a principle that encourages us to maintain balance.”	“Our concept of the CE involves various facets, including product design, enhancing production process efficiency, and identifying the most suitable methods for managing waste, such as initiating industrial symbiosis exchanges between companies.” [...] “Indeed, companies are one of the key players in the CE transition, although only a few have recognized the importance of altering their strategies to create circular value.”

Table 5

Extracts from interviews concerning barriers faced in the implementation of the CE in an aligned scenario.

Dyad n°	Barriers faced in the implementation of the CE from the private organization perspective	Barriers faced in the implementation of the CE from the public organization perspective
#4	“The primary issue in our case is the current economic climate, with the cost of certain materials increasing and loans becoming harder to secure” [...] “this has somewhat stifled the company’s environmentally-oriented decisions” [...] “other obstacles exist at the regulatory and administrative levels.”	“There are numerous barriers obstructing the transition process. Recently, the political stability of the country has influenced the decisions of small and medium-sized enterprises. This is linked with the enforcement and adoption of regulations” [...] “additionally, businesses are increasingly struggling to secure financing” [...] “the lack of CE-specific expertise can also be a barrier.”

industrial symbiosis [dyad #4]. Such experiences may have enabled them to form a comprehensive vision of the problems associated with CE implementation and a mutual understanding of the solutions.

4.1.2. Moderate misalignment

The four dyads categorized as moderately misaligned depict two distinct situations. In two dyads (#2 and #12), the public organization’s perception of the problem is misaligned with the remaining three dimensions. As presented in Table 8, the CE vision in private companies #12 is narrow and significantly limited; the specific industrial sectors (mining and IT) in which these firms operate and the unique challenges associated with these sectors might explain such a vision.

On the other hand, dyads #3 and #11 display misalignment concerning the solution. Specifically, there is common agreement between the two actors about the perception of the problem and what public organizations have contributed. However, neither company believes that this is sufficient to overcome the barriers to full CE implementation. While these private companies appreciate the efforts of public organizations, they do not believe that the solutions are adequate. These two private companies desire greater involvement from public organizations in establishing networks and developing production chains that foster coordination between multiple stakeholders. Conversely, the public organizations of the two respective dyads are marginally involved in

Table 6

Extracts from interviews concerning tools and instruments to support the transition towards the CE in an aligned scenario.

Dyad n°	Tools and instruments to support the transition towards the CE from the private organization perspective	Tools and instruments to support the transition towards the CE from the public organization perspective
#4	“As far as our understanding goes, certifications like ours, such as ‘ReMade in Italy’, are excellent tools to catalyze the transition and mitigate customer skepticism regarding these products. Similarly, incentives like the ones we received are crucial not just for the financial support, but also for the application process itself, which stimulates our business both internally and externally, as we must find partners and jointly plan project ideas.”	“There is a need for dialogue and collaboration within supply chains and with various stakeholders to drive research and innovation in CE. Economic and fiscal instruments such as incentives are fundamental to promoting the transition towards CE, like the financial stimulus we offered firms to initiate the conversion process. [...] I also believe that the creation of new policies and regulatory simplification are necessary. In this context, our organization should enhance dialogue with other public actors such as regulatory authorities. The nurturing of appropriate knowledge and technical expertise is also essential. Finally, certifications are undoubtedly required to encourage both public and private consumers to accept circular products.”

Table 7

Extracts from interviews concerning companies needs for the continuation of the circularity improvement process from the private organization perspective in an aligned scenario.

Dyad n°	Companies needs for the continuation of the circularity improvement process from the private organization perspective	Companies needs for the continuation of the circularity improvement process from the public organization perspective
#10	“We need consultations with experts ... [...] We definitely need comprehensive training to empower managers, particularly middle management. Legal advice is also necessary, given the rapid changes in legislation.”	“Businesses intending to implement CE activities have diverse needs. We’ve initiated a tailor-made assistance program specifically designed for different businesses to support them in the CE transition. This service relies on external experts such as consultants and laboratories with unique competencies in materials, design, etc. [...] We also promote seminars with the help of various universities to educate and update businesses on CE.”

Table 8

Extracts from interviews concerning Elements considered in defining the CE in a moderate misalignment scenario.

Dyad n°	Elements considered in defining the meaning of CE from the private organization perspective	Elements considered in defining the meaning of CE from the public organization perspective
12	“We believe that the CE is primarily about waste reduction. We are extremely focused on developing solutions that enhance company efficiency, particularly in the use of raw materials and consequently in waste reduction.”	“CE encompasses a wide variety of aspects ranging from product design, making production processes cleaner, building consumer awareness, and determining the best method of waste management”

network building, delegating such responsibility to other actors (e.g., industrial associations). Examples of extracts from the interviews are presented in Table 9.

Table 9

Extracts from interviews concerning company requirements for improving the circularity process in a moderate misalignment scenario.

Dyad n°	Companies needs for the continuation of the circularity improvement process from the private organization perspective	Companies needs for the continuation of the circularity improvement process from the public organization perspective
11	<i>"Generally, CE initiatives stem from networks, clusters, and supply chains where companies share needs and experiences. We require a coordinated approach that encompasses the main actors in CE development. We hope that institutions can support companies in developing sectoral networks to share best practices, new technologies, and solutions in order to become more circular."</i>	<i>"We have promoted training initiatives, consulting, and other activities. Network development is complex for public authorities, and this role is typically covered by trade associations. We only support clusters and networks linked with other organizations."</i>

Some similarities can be found within the four dyads. On the private company side, one manager with specific competencies mainly drove the transition towards CE and involvement in the project, promoting the CE theme within the company with marginal support from other teams. One of the private companies highlighted that: "The presence of managers with qualified and specific skills inspired this project idea based on our needs. The project concept was subject to strong internal sharing among the team managers who then involved all the relevant departments" [dyad #2].

4.1.3. Substantial misalignment

Four out of twelve dyads were found to be substantially misaligned. In three of these dyads (#1, #6, #8), substantial misalignment was evident regarding the problems, whereas in the remaining dyad, the significant misalignment was related to the solutions. Specifically, in dyads #1, #6, and #8, the private companies' perceived problem and the public organization's perceived problem are aligned, as are the private businesses' perceived solution and the public organization's conceived solution. However, the two pairs differ from each other. Generally, this configuration relates to the resource constraints on the part of the public organization, which limited its ability to satisfy the private companies' CE needs (Dyad #1, Table 10). In more detail, full alignment was found regarding solutions: the institutions' proposals, which included funding, incentives, and training support, were valid and widely appreciated, fostering alignment in both stakeholders' perceptions and regarding the measures used to evaluate the solutions. However, the solution seemed insufficient.

Dyad #6 is another example of substantial misalignment (see Table 10), in this case related to the funding allocated by the public organization. Specifically, the company emphasized the need to extend the funding over time to support the CE project in order to extend it to other products/services of the organization. On the other hand, the public organization perceived the role of funding as the principal initiative to overcome the barriers to CE, but in its vision, the funding is perceived as an instrument to kickstart the transition process.

Several private companies that were substantially misaligned with public organizations participated in the project mainly due to an external actor (i.e., a consultant or supply chain partner). For example, the company belonging to dyad #6 said: "Our external consultants proposed this project to us, also linking it to regional funding opportunities, and so we started this process to improve our circularity". Meanwhile, some commonalities emerge from the public organizations in substantially misaligned dyads. "The role of consultants can be ambiguous, especially if they are not very specialized in these issues; they don't have the ability to encourage the transition to CE" [dyad #1].

Table 10

Extracts from interviews concerning companies needs for the continuation of the circularity improvement process in a substantial misalignment scenario.

Dyad n°	Companies needs for the continuation of the circularity improvement process from the private organization perspective	Companies needs for the continuation of the circularity improvement process from the public organization perspective
#1	<i>"Despite the strong limitations to CE due to the lack of technological innovation and the scarcity of new certified and traceable products, financing and economic incentives represent a way of boosting CE projects which will become effective if they are accompanied by collaborative networks that promote good practices and business opportunities" [...] "we appreciate the effort from the public administration on this and we often interact with competent personnel, however, such effort is still unable to help us progress toward the CE as we would like to."</i>	<i>"We support businesses by making resources available to companies to overcome hindrances and obstacles in credit access. Additionally, we are trying to develop a network for best practice exchange."</i>
#6	<i>"The funding received has sped up the reuse of new recycled products in which the company has invested and tried to put into action. However the maintenance and growth of our firm's circularity requires further economic support to enable us to continue and to extend it to further areas of our production process".</i>	<i>"The transition from a linear economy to a CE is long and requires institutions to take a guiding role. Funding can activate the process without the business becoming dependent on such funding, which must make CE its business model. An extension of economic support for the CE initiative to businesses risks feeding the market negatively, fueling non-competitive dynamics".</i>

4.1.4. Complex misalignment

Finally, the last dyad (i.e. #9) can be classified as being in a state of complete cognitive misalignment. A general misalignment was found in relation to the problems and solutions. In this scenario, the understanding of CE was limited on both sides. This limited understanding of the problem in this dyad also influenced the understanding of solutions on both sides.

4.2. Impacts of alignment and misalignment within dyads

With regard to the second research question, it is evident that the degree of alignment profoundly influences the trajectory towards the CE for both categories of actors. Our findings underscore the fact that an aligned or moderately misaligned state between private companies and public organizations facilitates the advancement of the CE by fostering a process change.

Specifically, an analysis of the data gathered after the project had finished revealed that companies that were either aligned or moderately misaligned with public organizations achieved significant outcomes in the transition towards CE, particularly in areas such as procurement, resource use efficiency, and waste reduction. A number of these companies (e.g., #2, #3, #4, #7, #10, #11, and #12) successfully restructured their procurement processes or substituted natural resources in the production process with secondary raw materials (+5% in company #12). Other companies that were either aligned or moderately misaligned with public organizations implemented more efficient resource usage strategies; for instance, company #7 reported a 20% reduction in energy consumption and a 15% decrease in water usage. There were also immediate impacts on waste management, with several companies reducing their amounts of waste. Companies #11 and #12 reduced their non-hazardous waste by an average of +3%, while company #10, which operates in the mining sector, enhanced waste recovery in other production chains (+4%). Conversely, in companies where the alignment level was substantial or completely misaligned, the execution of CE

appeared to be marginal.

The alignment between private companies and public organizations also supported companies in their CE implementation, for instance, by adopting managerial tools that aid in identifying environmental impacts. For example, at the project's conclusion, six companies exhibited interest in employing the Life Cycle Assessment (LCA)—used to evaluate the environmental impact of products and processes (Svanes et al., 2011). In contrast, companies with a moderate or complex state of misalignment with public organizations demonstrated no intention to adopt such tools or instruments.

Our results highlight how an alignment between private companies and public organizations played a crucial role in fostering a common understanding of the CE. Aligned actors reported a shift in mindset, particularly among staff and managers, towards a more expansive understanding of CE, its drivers, and obstacles. For instance, company #4 stated, “we have adopted a new production philosophy linked to the concept of efficiency and reuse,” while the public organization in the same dyad expressed an increased openness and awareness of CE topics. Notably, private companies and public organizations reported the creation of new professional roles specializing in the CE, the enlistment of expert consultants to bolster R&I structures, and significant investment in training (dyads #2, #4, and #12).

4.3. Theoretical implications

Our findings agree with earlier research on alignment and misalignment suggesting that they are dynamic by nature. Studies have posited that interacting actors modify their viewpoints over time to enhance alignment (Davis and Rusbult, 2001), and that time fosters greater alignment (Steinman et al., 2000). Our study also provides empirical support for Barnes et al.'s (2007) assertion that significant perceptual differences are more apparent in short-term relationships than in long-term ones. Indeed, our findings showed that initial interactions between private companies and public organizations predominantly resulted in a misalignment.

Conversely, but in line with other studies (e.g., Kayikci et al., 2021), our findings demonstrate how misalignment can generate uncertainty in implementing CE initiatives and inadequate results. As previously suggested, alignment among stakeholders' aids companies in the execution of sustainable business models (Geissdoerfer et al., 2018), thus misalignment can be viewed as a barrier to CE. In essence, implementing effective and circular strategies can be difficult if there is a misalignment between stakeholders' values and practices (Missimer et al., 2017a). Hence, consensus on the nature of CE and its implementation methods aids in overcoming obstacles and impediments (Beck and Ferasso, 2023). We thus assert that one of the significant challenges in advocating for a CE transition is cultivating alignment among stakeholders. Such alignment could prove essential not only in shaping policies that address environmental aspects but also in garnering acceptance by private enterprises.

4.4. Managerial implications

From the perspective of public organizations, which are often tasked with instituting policies and instruments at the local level, a misalignment with private companies could precipitate the non-adoption or ineffective application of CE practices by those businesses. Therefore, understanding this alignment is crucial to ensuring that regulations boost the CE rather than obstruct it. Simultaneously, alignment is necessary for private companies to optimize their activities, reap benefits from resources provided by public organizations, and concurrently mitigate operational risks connected to the CE.

To cultivate alignment, governance methods may be vital. The primary objective of such methods is to ensure the engagement of multiple stakeholders, foster knowledge development, and facilitate flows of knowledge, resources, and feedback, thereby enhancing focus on the CE

and promoting its implementation.

For example, a network could be formed among and across various actors, coordinating events, and initiating opportunities for interaction and networking with a broad range of public and private participants, as well as different stakeholders. The nurturing of these relationships involves mapping and aligning stakeholders' cognitive understanding of the CE but also interests, negotiating perspectives, and assisting in financial resource support. It might also be beneficial to identify actors that could serve as catalysts for change towards CE thinking across various sectors, as reported by Whicher et al. (2018). The role of such actors could be likened to ‘assembling the appropriate individuals around the table’, thereby amplifying the ‘interconnected’ nature of dialogues regarding the CE.

Another managerial recommendation to encourage alignment between public organizations and private companies involves the deployment of partnership tools. Such tools could include integrated managerial systems, potentially assisting stakeholders or facilitators in directing relationships and efforts towards the CE. Design-thinking tools could also promote such alignment. For instance, public organizations can leverage these instruments to amass consensus on policies and supportive measures for the CE. Concurrently, private companies may find these tools beneficial in aligning with public organizations, by aiding in the selection of the most appropriate strategies regarding the implementation of the CE.

5. Conclusions

Our exploratory investigation has examined the cognitive alignment and misalignment that transpire when public and private organizations coordinate to expedite the transition to a CE. This study contributes to the investigation of the relationship between private companies and public organizations, which has only been marginally explored by other researchers, and yet is profoundly significant. This was highlighted recently by the European Commission (2020) who suggested that mutual understanding and institutional support to companies play a crucial role in the transition to CE.

In greater detail, our findings highlight the beneficial outcomes when private companies and public organizations coordinate on CE projects. Alignment acts as a catalyst for internal changes within both private companies and public organizations. However, establishing such alignment has proven challenging and occurs infrequently. In fact, only three dyads exhibited complete alignment, while the others revealed different perceptions of the problems and solutions.

From a theoretical standpoint, our findings suggest that the creation of a mutual comprehension of the CE is pivotal for attaining alignment, requiring an evolution over time through continued interactions. Furthermore, our outcomes enrich the literature on the CE by characterizing the cognitive misalignment between public and private actors as a barrier to the CE.

Despite the significance of our findings, several limitations need highlighting. Firstly, the study's research context affects the generalizability of the results. The states of alignment and misalignment may be different across different scenarios. In fact, the alignment between private companies and public organizations may also be influenced by the nation's regulatory framework, political climate, and economic vigor, or even the financial resources accessible to public and private actors. Furthermore, while certain nations exhibit an advanced understanding of environmental issues, others wrestle with the integration of sustainability and principles of the CE into their system. Thus, there is a pressing need for more research to understand and address the situations of alignment and misalignment in varied contexts.

A second constraint of this research is its focus on the alignment and misalignment between two types of actors. Future studies could benefit from a multi-stakeholder perspective, thereby deepening our understanding of the interactions among various influential entities in CE transitions, such as non-governmental organizations, research

institutions, and consumers.

Furthermore, another constraint of the study could be the components that make up the problems/solutions space. Although these are based on the literature, additional items could be incorporated into future research exploring alignment and misalignment among different stakeholders.

The final constraint of the study pertains to the temporal dimension in which alignment has been assessed. Although our data were collected over a one-year period and we also enquired about experiences from the past between private companies and public organizations, alignment and misalignment can evolve over a significantly longer timeframe. In this context, future research could explore the dynamics of alignment and misalignment involving multiple stakeholders in the CE, as well as how perceptions of problems and solutions transform over an extended period.

Appendix A. List of dyads

Dyad n°	Private companies				Public organizations		
	Size (employees)	Sector	Project goal	Role of interviewee	Type	Level	Role of interviewee
#1	small	apparel and leather	Introduction of bio-based products	Director and environmental manager	Milan Chamber of commerce	territorial	Manager
#2	small	mining	Industrial symbiosis	Operations and Environment manager	Environmental department of Lombardy local government	regional	Manager
#3	micro	energy	Solutions for energy saving and recovery	Director and Marketing manager	Environmental department of Lombardy region	regional	Manager
#4	micro	road maintenance	Reuse of industrial waste for road maintenance	Director and environmental manager	Chamber of commerce Como	territorial	Manager
#5	medium	waste management	New products with recycled and compostable material	Director and operations manager	Chamber of commerce Como	territorial	Manager
#6	micro	IT	Development of new fertilizers	Director and environmental manager	Chamber of commerce Milano	territorial	Manager
#7	medium	apparel	Implementation of bio-based products	Director and environmental manager R&D manager	Chamber of commerce Sondrio	territorial	Manager
#8	small	IT	New products with recycled and compostable material	Director and Marketing manager	Chamber of commerce Brescia	territorial	Manager
#9	medium	food	Development of new recycled packaging	R&D manager Operations and Environment manager	Environmental department of Lombardy	regional	Manager
#10	small	mining	Industrial symbiosis	Director and environmental manager	Chamber of Commerce of Lombardy	regional	Manager
#11	medium	paper	Increase the level of recyclability of the paper	R&D manager Operations and Environment manager	Environmental department of Lombardy region	regional	Manager
#12	micro	IT	New products with recycled and compostable material	Operations and Environment manager	Environmental department of Lombardy region	regional	Manager

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