

# **Bridging sustainability: the role of the intermediary in Industrial Symbiosis**

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Society faces pressing sustainability challenges, including global temperature rise, population growth, and resource scarcity. These challenges are compelling businesses to play an active role in ecological transition (Porter, 2021). In recent years, there has been a growing interest among businesses in adopting Circular Economy (CE) principles. CE promotes sustainability by fundamentally reshaping the economic paradigm, where the concept of waste is no longer marginalised (Murray & Haynes, 2017). Instead, waste assumes a central role as both an endpoint and starting point in productive processes.

Consequently, innovative economic approaches have emerged such as Industrial Symbiosis (IS). IS involves traditionally independent businesses collaborating in specific geographical areas, exchanging by-products, resources, or energy in a mutually beneficial manner (Chertow, 2000). This concept promotes a circular economy model, aiming to minimise environmental impact and foster economic and environmental synergies among various industrial entities. This collaboration ensures a structured industrial ecosystem (Deutz, 2014; Herczeg et al., 2018; Södergren & Palm, 2021) and serves as a business strategy embodying values such as mutual trust, and continual commitment to resource sharing (Corsini et al., 2022; Walls & Paquin, 2015).

Acknowledging the intricacies involved in implementing the green transition and process innovation for sustainability (CE and IS), intermediaries assume a pivotal role. They are instrumental in fostering innovation and steering transition processes within businesses (Kivimaa, et al., 2019). They facilitate connections among stakeholders, overcoming cognitive and geographical barriers, identifying valuable resources, and promoting inventive strategies for material reuse and recovery (Henriques et al., 2021; Notarnicola et al., 2016; Patala et al., 2020). Intermediaries can adopt diverse forms, each with specific modes of engagement, including research and development institutions, governmental bodies, and leading companies (Henriques et al., 2021). As innovation promoters,

intermediaries act as facilitators, generating opportunities, establishing networks, and managing the allocation, gathering, or distribution of resources, thereby contributing to the collaborative journey of implementing circular and symbiotic practices (Howells, 2006; Kolfschoten et al., 2012). This role covers the entire facilitation process—a collaborative journey from initiation to completion, encompassing the establishment of process structure, objectives, and essential tools. The support persists through development, encouraging participation, providing assistance, and culminating in result collection (Howells, 2006; Kolfschoten et al., 2012). In the context of IS, the facilitator actively engages in development, employing "*conversation actions*" to foster collaboration by introducing potential partners and identifying exchange opportunities. Moreover, they execute "*co-creation actions*" to bolster network infrastructure development and manage resource flow (Paquin & Howard-Grenville, 2012).

Therefore, intermediaries play a crucial role in IS development (Patala, 2020), acting as a vital enabler, while their absence poses a primary barrier (Henriques, 2021). This underscores the importance of intermediaries, not only in facilitating partner meetings but also in nurturing their relationships. Hence, it becomes essential to delve into the motivations guiding their actions and streamline their mediation process. However, despite the existing literature emphasising the crucial role of intermediaries to IS (Paquin & Howard, 2012; Zaoual & Lecocq, 2018; Patala et al., 2020) and their involvement in fostering cooperation and revaluation of waste (Zaoual & Lecocq, 2018), research on intermediaries in IS is still limited, particularly in understanding the motivations guiding their actions.

The paper aims to fill this gap, by addressing the following question: **How do the motivations of intermediaries influence the dynamics of matching and trust among companies in IS?**

We will use a comparative case study approach, interviewing actors in specific Italian industrial ecosystems, each with its different symbiosis case and corresponding intermediary (see below).

- Regusto, established in 2016, acts as an intermediary to prevent waste and surpluses in both food and non-food supply chains. Its platform connects real-time supply and demand for products at risk of waste, facilitating inventory management for both profit and non-profit organisations.
- The second intermediary is Sfridoo, founded in 2017, is a matchmaking platform that specialises in guiding businesses through the transition to a Circular Economy model. It helps companies maximise the value of waste, by-products, secondary materials, and surplus inventory in line with circular principles.
- The third intermediary is Ri-genera, a service offered by the regional industrial association, Unindustria, in the Reggio Emilia district of Italy. It aims to reduce environmental impact and create positive social effects. It facilitates IS between companies and innovative startups, emphasising efficiency, energy savings, and the enhancement of the value of company production waste and residues.

The goal is to examine the motivations of three different intermediaries: digital, phygital, and physical, through interviews with the representatives of the company or service and the other actors involved.

## Keywords

Intermediaries, Industrial Symbiosis, Match, Comparative case study

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