Nurturing Social Innovation Capabilities in Businesses Through Open Innovation

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***Abstract*—Companies are increasingly committed to pursuing social goals with the development of social innovation (SI), but they need to adopt adequate mechanisms to effectively manage, promote, and sustain it in the long term. This article aims to explore how businesses leverage open innovation (OI) practices to tackle social challenges in collaboration with SI stakeholders. We performed a multiple case study in three large manufacturing enterprises that are well-known for their excellence in innovation in terms of both SI impacts and OI depth. Results show that businesses develop and nurture a set of SI capabilities founded on purposeful knowledge exchanges across organizational boundaries, enhancing innovativeness, sustaining SI, and enlarging SI social and economic outcomes. The article provides key insights into the interplay between OI and SI, still underinvestigated in the literature, identifying the capabilities that should be fostered in the innovation processes of companies tackling broad societal challenges with openness.**

***Index Terms*—Circular economy, innovation capabilities, multiple case studies, open innovation (OI), social innovation (SI), stakeholder engagement.**

I. Introduction

THE concept of social innovation (SI) entails the development of innovative ideas, products, services, or models to address social needs and create new social relationships or collaborations among actors that collectively engage in purposeful actions toward a positive, systemic social change [1], [2], [3], [4], [5]. Given the broad range of social problems worldwide to be addressed with strong innovative solutions, SI has been recognized as a phenomenon gaining momentum and deserving further in-depth investigation [6], [7], [8].

SI is an "effective, efficient, and sustainable way of responding to social needs" [9], but social problems are often characterized by missing information and multiple interconnected causes and effects [4]. The main challenges usually originate from social needs that are unmet or inadequately met [3], requiring approaches for SI to be complex and contingent on context, culture, and politics [2]. An ongoing debate in innovation management literature focuses on the generation of social value in the business context [10] and the capacity of firms to produce new SI [11].

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Businesses are increasingly committed to the pursuit of social goals beyond institutional and third sectors [12], but need to adopt adequate mechanisms for effectively managing SI and thus promote, develop, and then scale it up [2], [7], [13]. In this sense, firms can innovate socially and support their long-term social strategy by leveraging new external knowledge [14], [15]. The practices adopted by businesses to connect with external organizations can be analyzed through the lenses of the open innovation (OI) paradigm: various knowledge sources can be identified and involved in innovating products, processes, and services as "useful knowledge is generally believed to be widely distributed, and of generally high quality" [16:9]. OI assumes that organizations use both inflows and outflows of knowledge to create and capture new value in obtaining, integrating, commercializing, or interacting with internal and external market innovations [16], [17]. In this sense, Vendrell-Herrero et al. [18] argue that the enterprise of tomorrow should combine OI and SI to be capable of achieving sustainable development while enhancing competitiveness. Openness has been defined as "profoundly social," with OI accelerating the deployment of business capabilities, resources, and ideas in the context of social challenges [19]. Managing the creation of social benefits beyond the business perspective asks inevitably for an open and collaborative approach, with participation in SI projects and policies to deliver the right and sustainable outcomes [20]. On the one side, identifying cocreation opportunities and contributions to intangible assets with other SI actors allows businesses to reach more immediate and applicable social benefits and competencies development [21]. On the other side, a successful engagement of stakeholders in the innovation process requires a proper understanding of the dynamics and mechanisms through which OI generates both social and business value [17], [22]. This is true not only for developing open forms of innovation for social benefits in nonprofit and public sector organizations, defined as "open SI" [23], but also for leveraging OI in developing sustainability programs of for-profit firms [24].

Despite the enormous body of literature and practice on OI applications, few articles investigated how businesses combine OI mechanisms for the search and recombination of the identified knowledge from external sources to address the SI purposes [25] or more in general the pressing sustainability and ecological problems [24], [26], [27]. Further qualitative studies are required to understand what underlies the initiation and leading of a successful SI that is not purely developed in the for-profit environment [28], with businesses opening up their innovation process to involve proper external actors [29]. This

perspective is fundamental also to study the innovation processes contributing to the transition to circular economy and in general sustainable development and change in resource consumption, where the social dimension requires rethinking management and reorganizing stakeholder value creation [30], [31]. Literature on SI has prominently focused on the role of third sectors and nonprofit organizations as the main promoters or facilitators of collaborative innovation processes toward SI development [21]. An important focus deserving attention is how business organizations deploy their resources, and develop innovation capabilities for sustainable innovations through the implementation of the OI approach [32]. These should aim at joint value creation and knowledge exchange with SI stakeholders (i.e., the stakeholders that are specifically involved by the company for SI aims) "to get important things done" in tackling societal challenges [19] while identifying needs and opportunities for innovation and effective implementation of modes and tools within the circular economy transition [33].

This article aims to contribute to the literature and practice on the links between OI and SI by studying the context of innovation with social purposes initiated by firms but further nurtured and sustained thanks to external collaborators' engagement. The unit of analysis is the SI capabilities of business organizations, taking into account the conceptualization of SI as a "collective creation of new legitimated social practices aiming at social change […] as a result of the exchanges of knowledge and resources" [1], and the definition of Helfat and Peteraf [34] of organizational capability as "the ability of an organization to perform a coordinated set of tasks, utilizing organizational resources, for the purpose of achieving a particular end result." Thus, we focus on the capabilities that organizations—and specifically for-profit companies—should nurture to effectively sustain and reach the long-term impacts of SI implementation through purposeful exchanges of knowledge across organizational boundaries. We formulated the research question as follows:

> *RQ. How can businesses leverage OI to develop and nurture their SI capabilities?*

We conducted a multiple case study research and selected large enterprises that are well-known for their innovation excellence in terms of SI, i.e., having developed a new or improved product, process, or service to solve a social problem, and OI depth, i.e., by extensively making use of both informal and formal OI activities [35], [36]. OI depth regards the intensity and frequency of each relationship, while OI breadth refers to the extent that firms access different external knowledge sources, such as customers (or in general SI users), suppliers, competitors, universities and research centers, and society [37], [38], [39]. The qualitative investigation revealed a set of SI capabilities developed thanks successful exploitation of OI practices. These were demonstrated pivotal to broadening the SI scope and sustaining the added societal value in the long term, with results extending the role of OI as a new source for businesses to innovate socially [14], [15].

The rest of this article is organized as follows. Section II illustrates the more recent advancements in SI and OI literature, also in terms of innovation for circular economy and sustainable development, and delves into the importance of opening up in the context of SI, with evidence of the challenges for businesses in innovating for social aims, the added value of OI, and the OI practices retrieved in the literature. Section III illustrates the methodology based on case studies. Section IV presents the results of the multiple case analysis and Section V discusses them by advancing knowledge and practice with a resulting framework the interplay between OI and SI capabilities exploiting external sources of knowledge in the business context.

II. Theoretical Background

A. Main Topics and Recent Advances in OI and SI Research

The social dimension of innovation is gaining momentum from both research and practice [40], with growth in underpinning theories, intellectual communities, and perspectives [41]. Theoretical issues and conceptual investigations of the multifaceted phenomenon of SI in the innovation management literature include definitions and types of SI, its contribution to societal challenges and social change, implementation and participatory processes, role of actors, such as users, policymakers, and collaborative networks as promoters and leaders of SI [1], [2], [5], [40], [41], [42]. Academic debates have also delved into the interplay between SI and social entrepreneurship, social values, and welfare. More recent literature focused on the ways to develop more effective solutions to tackle societal challenges, turning attention to the broader issues that could be addressed by the deployment of OI and related approaches such as cocreation [19], [22], [43].

Specifically, OI was coined as a paradigm for expanding a company's innovation processes with purposeful knowledge flows from and to external sources in alignment with its business model [16]. This definition has originated a rich literature investigating OI forms and processes, OI effectiveness and performance, strategic orientation and new business models, specific aspects of knowledge transfer, and stakeholder engagement [17], [29], [44]. Interestingly, some more recent developments combine and revisit the OI approach to the specific objectives it addresses, and framing hybrid perspectives [32]. Concepts and definitions, such as sustainable OI, in line with the company business model [24], open sustainable innovation for peer development and production of more sustainable, marketable products [26], and open SI to address social and ecological problems by nonprofit and public sector organizations [23], are also guiding the creation of specific research streams on hybrid approaches.

In general, there is an increasing interest toward the intersection between innovation domains (as SI and OI) and transition processes contributing to sustainable development and resource-efficient patterns, in particular, circular economy strategies and practices [45]. SI as collective responses of creative destruction to complex challenges can merge social ambition and psychological needs of a sense of purpose, identity, and belonging together with environmental facets and values [33], [46]. OI may support the development of more effective and efficient solutions thanks to the exchange of technologies and knowledge with other actors [47]. While SI seems to offer more opportunities for community

engagement initiatives, OI has been mainly studied for the active participation and collaboration of manufacturers, suppliers, and other interested parties in cocreating value for circular economy processes [33]. OI and stakeholder collaboration are considered to enhance the environmental dimension of stakeholder value creation in sustainable development [30], but the social dimension requires rethinking stakeholder inclusion from a capabilities approach [31]. SI can be driven and promoted in a circular economy setting when themes, such as occupational health and safety, training and education, collaboration, diversity, and equal opportunities, are considered [31], [48]. The inclusion of social aspects is deemed pivotal to promoting inbound and outbound flows of knowledge between different actors for addressing circularity and sustainability issues at a larger scale [31], [47].

B. Linking OI and SI in Businesses: Added Value and Challenges

Opening up the innovation process to external sources of knowledge has been demonstrated as particularly relevant in sustaining innovative efforts and scale-up activities [23]. OI has proved to be valuable in different organizations and contexts [44], especially when the design and innovation approaches have yet to be determined, and the customer needs are highly varied or not yet fully understood, as is often the case for SI [49]. Therefore, OI can provide a reference for companies aiming to generate useful solutions to social problems through an interactive effort with communities participating and exchanging knowledge, or the establishment of partnerships to develop and propagate innovative solutions in the social sphere [23], [50]. When they embrace the open paradigm both within the internal organizational structure and in the socially innovative activities with stakeholders, organizations can head "to fully realize the potential of socially innovative behavior, and to effectively leverage the value created" [51: 18]. Enterprises pursuing social aims can leverage the multiple domains and demands of the diverse stakeholders to interpret a social problem, assimilate external ideas, and finally exploit acquired knowledge into new offerings in terms of social aims [11], [52]. The innovative ideas drawn from the systematic engagement of internal and external sources of knowledge allow for delivering superior benefits, greater ability in SI activities, and better mitigation of the risks associated [7], [51]. Specifically, when a collaborative SI process is started by for-profit entrepreneurs, the generation of social value alongside business value is shown to be resourced and financed by the same entrepreneurs [22]. The collaborative partnerships among businesses, governments, and civil society are also said to encourage the development of SI practices [53].

Conversely, the involvement of a wide network of diverse stakeholders, considering their preferences and competencies, and interconnections, can determine the nature and success of SI [9], [54]. The connection and engagement of multidisciplinary social actors in new forms of collaboration underpin the definition of SI [53], [55]. Nevertheless, mechanisms for meeting social needs by leveraging external sources of knowledge through OI in an effective and efficient way still need an in-depth investigation and empirical evidence [6], [56]. When a firm innovates to address a social problem, it has to consider that the SI primarily enhances the society rather than the firm performance, as in similar kinds of innovation [57] and that it could be subject to greater pressure to effectively display a socially acceptable behavior [11]. Moreover, companies must be aware that SI implementation needs to be understood as a process that often fails, requiring it to be institutionalized as a sustainable practice to succeed in solving social problems [8]. Involving stakeholders and bringing together their divergent perspectives is thus fundamental for companies tackling social problems [58].

C. OI Practices for Involving SI Stakeholders

One of the key features of the definition of OI is that the purpose of openness could be nonpecuniary, with purposive management that could play an important role in addressing societal challenges and aligning the business to this goal [19]. The magnitude and management of an innovation process addressed to a social purpose depends on the managerial challenges involved [59], the kind and numerousness of stakeholders required [10], and their degree of involvement [60]. The same concept of OI has currently become more complex by orchestrating large numbers of participants across multiple phases of the innovation process [61]. Specifically, actors that could be involved in the cocreation and promotion of innovations with social aims range from the overall society (including users, consumers, and citizens, according to the context), to the institutions (governments, technological institutes, and universities), to the social entrepreneurs or the companies carrying out SI as a mission [60], [62]. These can manifest different motivations, incentives, and degrees of engagement depending on the mechanisms and social issues addressed by the organization promoting SI [63]. Aspects of strategic openness are thus among the primary mechanisms that enhance stakeholders' participation in the pursuit of SI [58]. Purposive inflows and outflows of knowledge from and to external sources of innovation encompass many dimensions, as by the broad concept of OI [64]. Along this line, many distinct managerial practices and mechanisms have been identified in the OI literature [29], [61], [65] and applied to address societal problems. Table I summarizes the OI practices that can be adopted to develop and sustain SI in collaboration with external sources of knowledge. The table includes definitions and examples of applications of each OI practice to tackle specific social challenges or involve specific SI actors studied in the literature.

Activities specifically relating to peculiar technological contexts (e.g., contracting with R&D service providers) and intellectual property issues (e.g., in- and out-licensing) were excluded as not relevant for addressing social needs [51]. In addition, the ability to leverage different sources of knowledge while putting into practice OI is sensitive to context and contingency [59]. First, SI stakeholders sharing purposes for innovation can be both individuals or organizations, and be involved in different ways. For example, both user innovation and crowdsourcing extend the innovation process to a group of individuals, but the former specifically considers the societal groups experiencing the need the SI aims to tackle. Second, the focus on collaborative

TABLE I
OI PRACTICES INVOLVING SI ACTORS IN THE LITERATURE

OI practice	Definition	Examples of SI application	References
User innovation	Generation and testing of novel ideas, codesign, codevelopment, or redefinition of new products and services with their users	Codesign of social impact bonds to fund SI programs	[66]
Crowdsourcing	Outsourcing a task for solving a problem via an open call to an undefined crowd, to obtain new or reviewed ideas	Local government agencies as seekers crowdsourcing from citizens	[63]
External networking	Formal and informal activities to acquire and maintain connections with external sources of knowledge (individuals or organizations) to support innovation processes	Quadruple /quintuple helix innovation model for SI	[67]
Specialized services of OI intermediaries	Intermediary organizations or platforms specialized in OI act as intermediaries between a "seeker"—an organization with an innovation problem—and "solvers"	Nonprofit organizations as OI intermediaries in a consortium for societal change	[21]
(Social) venturing	Starting up or investing in new ventures founded by external actors, or drawing on internal knowledge and allowing the exploration of new (social) challenges	Seed investments in social startups developing SI	[68]
Innovation contests	Invitation to external actors to submit innovative ideas for tackling a (social) issue with participation in competitive contests and awards	Open social innovation contest in the field of poverty alleviation	[69]

innovation processes can differ according to the organization that initiates them and the participating actors [70].

For example, the launch of challenges in crowdsourcing platforms by public institutions and governments allows the creation of better solutions and contributes to the replication of innovations in other social contexts [56], [63]. Deliberate stakeholder engagement in SI can be often based on the cocreation with target beneficiaries [10] or innovation intermediaries to tackle societal problems. Indeed, SI is further improved if OI intermediaries, such as brokers and non-profit organizations, bring attention to the role of social structures and the provision of informal resources in the process [1], [21]. User innovation can further support gathering information on market trends and searching for individuals who have already developed solutions for specific social needs [25], or being directly involved in the coproduction process [66]. The participator forms of user involvement include contests in the form of challenges or prizes, adopted by different organizations to scout for scalable and impactful SI solutions [69]. Finally, partnerships and external networking within innovation ecosystems are also motivated by pursuing urgent social challenges and moving forward the company strategy beyond business outcomes [19], [67]. Specific partnerships and alliances with companies integrating SI in their vision, through OI practices, such as social venturing and investments in social startups, would allow to increase visibility and reach wider social outcomes [68].

III. METHODOLOGY

This article is based on a multiple case study [71], [72] of three business organizations carrying out SI and adopting an OI strategy. The case study approach allowed to explore the boundaries of different OI activities that can drive the success of SI development and sustainment by companies [22], [63], and to conduct a holistic and contextualized investigation [72]. Small sample research is appropriate to understand the peculiarities and the determinants of a phenomenon at an early stage of knowledge, by deepening or widening the current understanding.

A. Case Selection

Informed by the research question of the study, we selected large enterprises recognized as open and socially conscious firms [18], well-known for their excellence in innovation in terms of SI, i.e., having developed new or improved products, processes, or services to address social challenges.

First, a key selection criterion was the ability of companies to be recognized for their social strategy and innovative solutions toward the environment and local community by both the national and international stakeholders. For example, a distinctive feature is the acknowledgement of social impact by the achievement of awards/prizes for social challenges. In addition, they adopt processes of social and environmental certification and openly publish social and environmental reports, which were also used for data collection and triangulation purposes.

Second, the selected companies were already known and in contact with the authors for their established strategies and actions to involve stakeholders with openness and collaborative attitude, and extensively making use of both informal and formal OI activities [35], [36]. We considered the activities and the content of their innovation strategy aimed at driving R&D investments, applying full assets and expertise into deeper collaboration across internal and external sources of knowledge, and cocreating innovative solutions to social challenges [73], [74].

Third, we focused on large companies, as previous article indicates that larger organizations are more likely to be working on social issues [75], and representing different industries, innovation scopes, and types of social challenges. The companies differ also by the scope of their activities, ranging from national to international markets, which also reflects the scope of SI

TABLE II
OVERVIEW OF THE CASE STUDIES

Cases	Industry	Scope of SI	Social challenge
Case A — Loccioni	High-tech	Local	Eco-sustainability
Case B — Illycaffè	Coffee production and roasting	Glocal	High quality and ethics
Case C — Electrolux	Home appliance	International	Wellbeing

initiatives' benefits and the ability of firms to scale them while investing in the territory they base their facilities. The national context (and the SI initiatives pursued by companies) mainly pertains to Italy, where the companies have their headquarters (Loccioni and Illycaffè) or part of their facilities (Electrolux). Indeed, there is a strong mutualistic heritage, positive attitude, and mature policymaking on SI [68], [76]. This criterion allowed us to deepen the analysis of how the context characteristics of social challenges relate to the application of OI and the development of targeted capabilities.

Table II shows evidence of the variation of criteria among the cases.

The cases are briefly introduced in the following.

Loccioni is a group of companies with five main business units—energy, environment, home, humancare, and mobility—which operate in more than 40 countries. Loccioni tests solutions to manage, create, measure, and transfer data, aimed to improve the quality of products and processes for the manufacturing and service industry. Loccioni addresses the social challenge of ecosustainability with adhesion to social codes, the realization, and promotion of SI actions into concrete strategies as well as sustainability, the development of systems of accountability, and the presence of a framework of ethically connoted values, shared by the entrepreneur and his family and diffuse throughout the organization.

Illycaffè is a family business company in the coffee industry and a worldwide well-known brand for its high-quality products and processes. Its vision, mission, and values highlight the themes of quality, beauty, and ethics, toward the development of transparency, sustainability, and personal development. Illycaffè is strongly committed to issues related to the environment and social responsibility, becoming a real strategic investment, as evidenced by its sustainable value report, written and published periodically on the website to describe and promote SI. It recently adopted the status of "Benefit Corporation" as pursuing both an economic activity and one or more goals of common benefit, i.e., the creation of value for all the production chain actors, while respecting the environment.

Electrolux is a leading global appliance company, devoted to environmental and social responsibility issues. The vision of the company is declared as "to shape living for the better" and the mission states as follows: "We reinvent taste, care and wellbeing experiences for more enjoyable and sustainable living around the world." The company has been internationally awarded several times for its innovations, being considered state-of-the-art on the sustainability subject and strategic investments into SI initiatives for well-being.

B. Data Collection and Analysis

In the phase of data collection, we used semistructured interviews with key informants as primary sources of the empirical data. The interviews were conducted with the strategic manager, the innovation manager, and the responsible person for corporate social responsibility, sustainability or SI funding initiatives of each company. To ensure coherence and consistency in data gathering, a standard interview protocol was developed based on the literature review. The interview included both semistructured and open-ended questions to identify what and how OI practices have been implemented in the social dimension to reach a social benefit, but especially a profitable and sustainable change for both the company and the society [73]. We organized the questionnaire for the interviews in the following parts.

1) General description: vision and values of the company toward SI, opportunities and motivations, target users, and main funding sources.
2) Main stakeholders, exploited resources, and ways to involve them.
3) Focus on OI practices from the literature and their effective adoption for reaching social aims.

All interviews were recorded and fully transcribed. These data were also complemented with publicly available data and private data from press reviews, scientific articles, company websites, and official company archival documents provided by informants. We constructed a case-study database with interview transcripts and document syntheses per each company. This includes around 30 written pages per case, resulting in a total of 102 pages of collected data.

All data gathered were examined independently by two researchers to explore the ways the three companies developed their abilities to leverage their openness approaches to carry out and sustain SI. The data analysis was carried out for the individual case-study databases through detailed descriptions, then looking at the cases as a whole through a cross-case analysis [71], [72]. We adopted thematic content analysis to identify emergent themes and define aggregate categories, and followed the inductive process of coding proposed by Gioia et al. [77]. First-order codes were identified by mapping in vivo quotes from the unstructured data of interviews and documents collected. Then, the codes identified in the first-order analysis were grouped into more abstract themes, obtaining a total of 14 second-order codes. Finally, the two researchers discussed eventual code disagreements and systematically combined them into aggregate dimensions that built the basis for further theorizing on the interplay between OI practices and SI developed by businesses.

IV. RESULTS

The coding process, summarized in Table III, led to the identification of five themes. These represent the different ways in which businesses can effectively develop and sustain SI with openness to external sources to be engaged.

TABLE III
RESULTS OF THE CODING PROCESS

First-order codes	Second-order themes	Aggregate dimensions
Maximize the potential synergies for developing the territory and develop initiatives aimed at enriching the territory of work and knowledge for ecosustainability	Leveraging local resources and their synergies	Territory bonding
Enhancing territory resources, excellence and growth of the local companies of other sectors, and the overall community through sharing information and experiences		
Using knowledge of the territory as a knowledge resource		
To attract and permeate the territory by maximizing synergies about sustainability		
Designing sustainable solutions in sectors, such as household appliances and medical		
Ethics in all the production processes, also in recycling capsules	Embedding local cultural values	
Respect for local cultures, and the ethical values in the relationship with growers based on exchange and growth		
Pursuing ethical aims means also strongly promoting the Trieste Coffee Cluster which gathers several operators in the coffee sector for the products and excellence of services, with joint projects to stimulate innovation and dimensional growth		
Involving and promoting territorial companies and institutions	Promoting local business players	
Involving and promoting local companies in other sectors		
Increase brand awareness, especially in terms of ethics	Brand awareness and accountability	Multistakeholder knowledge platform for legitimation
Promotion and brand awareness for accountability and visibility, for example, visibility and coffee culture promotion		
Company's general commitment to investing in promoting a sustainable lifestyle		
Spread of knowledge and culture of producing quality coffee, with dedication and competence shown to customers, and transmits the values of the company to the wider public		
Establishing virtuous cooperation with suppliers, quality of the raw material, Knowledge of the raw material, and the product as a knowledge resource	Knowledge diffusion in the value chain	
Including and engaging internal employees, involving employees and consumers in sustainability practices, researchers collaborating also for developing new competencies in sustainable solutions, with employees as “collaborators”		
Report and certification, for example, comprehensive manual detailing best practices for recovery and optimal management of the forest and the number of baristas and coffee shops certified		
Cultivating dialogs by increasing the number of organizations and people involved, establishing virtuous cooperation for sustainability, and stimulating the attention on healthy food and sustainable eating habits, for well-being while maximizing sustainable choices for the environment	Establishing multistakeholders dialog	
Network of organizations as resources		
Web-based platform as a resource to favor dialog		
Diffusion of best practices as knowledge resources		
Prepare young people for the technological and social challenges of the present and the future	Future thinking spreading among generations	System thinking for innovating solutions to social challenges
Creating generational bridges and valorizing diversity		
Knowledge about the future as a knowledge resource		
To diffuse ethics on impacts on the territory from producers, as a core value and sense of responsibility toward future generations		
To detect problems and develop the living spaces of the future for well-being, while living them	Foresight, creativity and openness	
Exploration of frontier technologies and imagination of the frontier of technology and social change		
Innovative content and holistic approach in labs by collaborative development and a number of innovative projects carried out with new value activated through the differences of cultural background, character and experience, competencies, and education		
Human resources that live and interact with the technological and architectural environment		
Partnering with companies for innovating the recuperation, recovery, and reuse of coffee capsules, and with universities, research centers, trade unions to find biodegradable or ecocompatible alternatives	Involving nonconventional innovators	
External unconventional innovators as knowledge resources		
Finding "hidden" innovators among external networks, involvement of any kind of stakeholder (from companies to students of schools and Universities, to local institutions, to researchers) in innovation		
Students are full of enthusiasm and proactivity and show a high awareness toward environmental issues and technological innovations for sustainability		
Tap into the creativity of citizens, consumers, and "last-mile" of the supply chain, for example, baristas trained to generate, promote, and disseminate the knowledge and the culture of producing quality coffee		
Hacks call to stimulate creative ideas	Rewarding creative ideas	Stakeholder empowerment and relationship-based engagement
Prizes: awarded for achieving higher quality and ethics, for example, Sodalitas Social Award 2009, Finalist in "sustainable initiatives" and Partner of the European Commission in the "Sustainable Energy Europe Campaign", prize "Renewable Municipalities" for the development of an innovative energy system		
University for training and setting new research and innovation challenges, almost 30 universities and research centers involved and number of ongoing educational projects, scientific projects (with publications), and events	Education and training	
Training on approach that stimulates habits and behaviors and lessons for professionals that stimulate enhancing sustainability		
Network of education as a resource		
Establishment of training centers with professionals committed to incorporate a zero-waste approach and sharing of stories " Sustainability Around the World"		
R&D projects that are addressed toward the training of employees and the ethical and social aspects of business activity		
The ecosystem of employees, transformed into entrepreneurs and become an integral part of the production chain	Enhancing stakeholders’ role	
Explore very topical issues with social aims by aggregating research centers, universities, and companies		
Enabling transformation of the industry and the society	Business model extension for growth	Coproducing for profitability and growth
Sustainable business model of the company		
Go also beyond strategic alliance and business relations, building a knowledge network, and considering the network of entrepreneurs as a resource		
Avoiding side effects		
To establish virtuous cooperation for sustainability		
Financial resources: Group's community investment activities on food and the related sustainability issues, partnerships considering the difficulties in financing these kinds of initiatives		
Creating the next generation of entrepreneurs in the industry, a network of innovators (startups and young people) as a resource	Intrapreneurship	
Promoting spin-outs		
Looking inside and outside spreading knowledge, dialog, and meetings to promote joint projects to stimulate innovation and dimensional growth		
Number of innovative projects carried out with new value activated through the differences of cultural background, character and experience, competencies, and education		

The following sections detail the specific capabilities emerging as overarching themes from the multiple case study analysis.

A. System Thinking for Innovating Solutions to Social Challenges

All cases strongly emphasized the need to develop a mindset toward a systematic and forward-looking approach that aims to address complex societal issues through a multidimensional lens. The system thinking for innovating capability represents a paradigm shift toward holistic, future-oriented problem-solving that recognizes the interconnectedness of social challenges, SI actors, and resources, and seeks innovative solutions that are sustainable, inclusive, and resilient. To this aim, OI practices are applied to encouraging future thinking across generations, applying foresight methodologies, fostering creativity and openness, and involving nonconventional innovators.

Interviews emphasize the importance of cultivating a mindset that transcends immediate concerns and consider the long-term implications of present actions, with businesses that together with communities can proactively shape a more sustainable future through user innovation. This involves fostering an intergenerational exchange of ideas, knowledge, and perspectives, ensuring that the wisdom of experience collaborates with the "fresh insights" of emerging generations. Electrolux launched a Lab inviting ideas from citizens and students from universities as they "are necessary resources to help the future young workforce to understand and build their skills of the future […] students are full of enthusiasm and proactivity and show a high awareness towards the environmental issues and technological innovations for sustainability." Aiming to manage relationships with a wide range of customers and final users of the high-tech solutions, Loccioni developed BluZone as an open network involving schools and local universities for the hospitality and education of students, pursuing practices for user innovation. The manager explained: "It is like a workshop where school, business and territory grow together, through paths that prepare young people for the technological and social challenges of the present and the future."

Encouraging a culture of innovation and embracing diverse perspectives enables to transcend of traditional modes of thinking and fosters an environment where creativity and openness to external ideas enrich the SI process and increase the likelihood of discovering novel and effective solutions for social challenges. Aimed at perceiving and identifying new opportunities for technological and business solutions for high quality and ethics, Illycaffè organizes Coffee-Hack, a series of crowdsourcing events in collaboration with Innovation Foundries that aims at involving specific categories of innovators, especially startups and young talents, to rethink retail, product innovation, and brand engagement. According to the interviewee, "Hacks call for and stimulate creative ideas on rethinking Illycaffè's retail offer […], exploring new uses of the most advanced technology to improve products and consumer experience, and to increase brand awareness, especially in terms of ethics." In addition, we identified the ability of businesses to apply foresight methodologies to anticipate and understand the evolving landscape of social challenges. This proactive approach enables organizations to navigate the uncertainties of SI and make informed decisions based on scenario planning and trend analysis that contribute to long-term societal well-being. For example, in Loccioni, one of the companies within the group acts as an internal OI intermediary providing specialized services "to the exploration of frontier technologies and interaction with research organizations and customers […] to enable the transformation of the industry and the society." Its mission is "to think and plan" the business development of the group in the medium to long term, projecting and forecasting social challenges in a temporal dimension of 5–10 years ahead and thus to have adaptable and resilient SI.

Finally, a key driver of transformative change and system thinking emerged as the ability to involve nonconventional innovators. By expanding the pool of knowledge sources to include individuals and groups from diverse backgrounds, experiences, and needs, a more comprehensive and inclusive range of solutions to tackle social challenges can emerge. Interviewed managers recognize that innovation often arises at the intersection of different fields and perspectives, and they are putting efforts into OI networking practice to engage innovators. These resulted in fostering breakthroughs in companies' SI that may not have been possible within their traditional innovation frameworks. Loccioni launched Silverzone as a network connecting experiences and knowledge, involving "beautiful" 60-year-old people, who retired after a long working experience within the company or met along the way, "as collaborators, as customers, as suppliers, as partners and now feel the taste of transferring their experience to young people, with renewed enthusiasm, with passion and fun." The aim is "cultivating dialogues, creating generational bridges and valorizing diversity […] looking for future creative and innovative solutions [..] This is part of our social responsibility." An example in Electrolux is the HSB Living Lab, which aims to involve innovators in detecting problems and developing the living spaces of the future. The laboratory is open to students, visiting scholars, and HSB members who can live innovation in an unconventional way and interact with the environment and use all the technological and architectural innovations made available by the company.

B. Stakeholders' Empowerment and Relationship-Based Engagement

This overarching theme refers to the ability of the cases to create a collaborative environment that results from a variety of links valued in terms of knowledge exchanges and empowerment initiatives with SI stakeholders to be "customized" according to the expected outcomes. Being able to build meaningful and sustainable synergies with a diversity of actors, considering the diverse needs and capacities while ensuring that the collective impact of the shared knowledge and resources is maximized, is pivotal. In this sense, all cases demonstrated enhancing stakeholders' empowerment and excellence as a continuous process within this capability. They created diverse types of collaborative relationships and partnerships including enhancing stakeholders' roles, education, and training, and also rewarding creative ideas.

For example, Loccioni recognizes the importance of paying attention to and gathering the needs of all categories of stakeholders, such as clients, providers, general partners, public authorities, local communities, and future generations. The OI practice of user innovation is pursued through investments in education, skills development, and innovation to ensure that all knowledge sources are equipped to capitalize on emerging opportunities. As highlighted in the Illycaffè case with the University of Coffee, "The university is aimed at reaching a vast international community of users that promotes the culture of coffee of high quality all over the world, through training, but also setting new research and innovation challenges for the market." Moreover, education and knowledge creation can be fostered in the user innovation networks created with the OI strategy. Electrolux diffuses knowledge on designing and developing products that will make human life easier and more comfortable, but especially socially and economically sustainable. For example, the program Feed the Planet was born as a partnership between Worldchefs, AISEC, and Electrolux itself, to stimulate attention to healthy food and sustainable eating habits, maximizing sustainable choices for the environment. The program's first aim is to help people in poverty in specific locations worldwide. "Wellbeing means also sustainable cooking and eating habits among communities; thus we promote several initiatives towards spreading knowledge: […] lessons for culinary professionals that we stimulate in enhancing sustainability, we upload podcasts on eating habits, […] we launch food waste challenges, …."

Another ability to ensure stakeholders' engagement is by rewarding their involvement in the SI process through creative ideas and operations adaptation. Electrolux promotes several innovation awards and competitive contests especially open to its employees and consumers, both on the Electrolux website and other platforms, including SkipsoLab, 9sigma, and Innocentive. In addition, it founded the first Electrolux Ideas Lab as an evolution of the namesake Design Lab (first launched in 2003), an annual open competitive contest where citizens, and especially students, submit an idea of a product or a service for a specific social matter which changes every year. The monetary prize ensures that "with the Ideas Lab we tap into the creativity of citizens, which are our users, and we launch calls for innovative ideas for household appliances of the future, especially for a sustainable development of them." In Illycaffè, the growers play a crucial role in jointly tackling the social challenge of high quality and ethics, and a fair exchange ensures that their efforts are justly rewarded, leading to a harmonious and sustainable partnership. To this aim, the International Coffee Award is a prize given to the best producers of the beans that make up the typical coffee blend, with the growers awarded for achieving higher quality and ethics. "We recognize a prize to best growers as they have a key role, we established a long-term partnership by transferring knowledge [..] we are pioneers in the establishment of a virtuous cooperation with growers for sustainable production of high-quality coffee."

C. Territory Bonding

Regardless of the scope of the developed SI (e.g., local or international), the capability of territory bonding represents a crucial element for companies' social development and the prosperity of local communities. This ability involves establishing strong and synergistic ties with the surrounding territory, leveraging local resources sustainably, and promoting cultural values specific to the SI context. Furthermore, this approach fosters the growth and engagement of local business players, generating lasting prosperity for communities and preserving the unique essence of each territory. The capability of territory bonding represents an integrated approach that goes beyond mere resource management in an OI perspective. All cases, and especially Illycaffè and Loccioni, conceived a social strategy that embraces the territory as a whole, promoting synergy between resources, cultural values, and local actors.

The companies rely on their openness to be able to identify, understand, value, and efficiently use the diverse local resources that constitute the territory they base their headquarters and facilities. In Loccioni, the efforts are toward attracting and permeating the territory with sustainability principles, further reinforcing the sustainable development of the territory. An important example is the company's Lov—Land of Values project, involving the general environment at the local level. The company indeed declares: "Pursuing a social mission means for our territory also enhancing its resources and excellence, and giving visibility to local communities and activities with international interlocutors." By comprehensively assessing the natural resources, human capital, economic resources, and unique characteristics that set the region apart, strategies can be devised to leverage them in a manner that fosters growth and development. For example, Illycaffè adopts user innovation through the foundation of the Coffee University in Brazil, which not only aims to train local coffee suppliers but also to involve them in social challenges.

Moreover, the capability of territory bonding revolves around the incorporation of local cultural values into the dynamics of relationships, respecting and valuing traditions, beliefs, and local practices. Not only companies are committed to preserving the cultural identity of the community, but also to creating a stronger bond between the community members and their territory, fostering a sense of belonging and responsibility. It involves recognizing and valuing the rich tapestry of traditions and heritage that define a community and the company that promotes and develops the SI. Thanks to the practice of external networking, part of the SI becomes a framework of shared values, understanding, and mutual respect where the contribution of the business is culturally sensitive and ethically sound. For example, in Illycaffè, in the context of relationships with growers, an ethical framework is paramount. This entails conducting business based on principles of fairness, integrity, and transparency. The exchange-based model emphasizes a symbiotic relationship where both parties contribute to each other's growth.

The capability of territory bonding is also demonstrated on the business side, through promoting and supporting other local companies to ensure fair and sustainable economic growth with social venturing. For example, conscious of the importance of funding sources for SI development, Loccioni involves and collaborates with the institutions of the territory also by sustaining them financially. Illycaffè promoted the creation of a cutting-edge economic and technological environment with an

intermediary, i.e., the Coffee Cluster in the local territory, to stimulate the interaction of several companies for the growth and innovation of the products and services within the coffee industry. Indeed, "Pursuing ethical aims means also to strongly promote the Trieste Coffee Cluster that gathers several operators in the coffee sector for the excellence of products and services, […] with joint projects to stimulate innovation and dimensional growth."

D. Multistakeholder Knowledge Platform for Legitimation

The interviews reveal that businesses are conscious of the importance of considering the long-term sustainment of the SI. They pursue a comprehensive approach to build a knowledge platform that leverages the interconnectedness of various stakeholders in the SI ecosystem and brings in the recognition of the company's legitimacy as an SI promoter beyond the business landscape. This critical mass of knowledge serves as a virtual and dynamic framework bringing together diverse perspectives for mutual benefit enhanced by the developed SI and ensuring that organizational practices align with the expectations and values of the broader community. By promoting brand awareness, ensuring accountability, facilitating knowledge diffusion across the value chain, and establishing a meaningful dialog among various stakeholders, organizations can position themselves as responsible and responsive contributors to the well-being of the broader community and the sustainability of their operations.

The ability to spread brand awareness with the manifold SI stakeholders enhances the visibility of the brand but also fosters a sense of trust and accountability among stakeholders involved in external networking. Transparent knowledge outflows on ethical practices and corporate responsibility becomes a key component of building and maintaining a positive brand image throughout the innovation process. For example, Illycaffè is strongly committed to issues related to the environment and social responsibility, becoming a real strategic investment, as evidenced by its sustainable value report, written and published periodically on the website to describe and promote SI.

The knowledge diffusion within the value chain is also a cornerstone of building this knowledge platform for legitimation. The cases demonstrated the ability to share valuable insights, best practices, and relevant information with partners at different tiers of the supply chain to involve them in the SI value-creation process. This not only promotes efficiency but also contributes to the overall improvement of processes, product quality, and sustainability measures. For example, Illycaffè carries out numerous initiatives and events with various art institutions and the downstream supply chain, aimed to bring the final consumer closer to social and environmental issues, as well as cultural ones. An important network is one of skilled baristas carrying the title of "Artisti del Gusto," to generate, promote, and disseminate the knowledge and the culture of producing quality coffee. From the data collected emerged that they "go also beyond strategic alliance and business relation, we built a knowledge network starting from suppliers to baristas 'Artisti del Gusto' to generate and disseminate information and knowledge on how to realize a quality coffee."

Beyond the core value chain, the establishment of a multistakeholder dialog is pivotal. This dialog not only provides a forum for addressing concerns but also enables the identification of innovative solutions and opportunities for improvement. Businesses can effectively leverage their openness to make the SI stakeholders from passive beneficiaries to active participants in the decision-making processes through crowdsourcing. For example, Loccioni has developed an outstanding capacity for communicating and maintaining relationships, as well as the centrality of the individual as a knowledge source, which is concretized in the creation of sustainability-oriented networks and a peculiar model of stakeholder management. Crossworlds is a network of large international groups aimed at stimulating the transfer of technological know-how between different sectors, toward enhanced sustainable solutions in sectors, such as household appliances and medical.

E. Coproducing Social Impacts for Profitability and Growth

This capability lays the groundwork for innovative solutions that address the complex and interconnected social challenges while constituting a key driver for the growth and profitability of entailed actors. The interviewed manager highlighted the importance of not only safeguarding the brand reputation in pursuing social value but also creating a more resilient and adaptable business model that can respond effectively to changing societal norms and expectations. The emphasis lies on cultivating an exchange-based partnership that promotes mutual growth and considers social challenges that are interconnected with the developed SI, such as the ones linked to the environment. By understanding and embracing the OI practice of cocreation, businesses and stakeholders can establish a foundation built on appreciation and sensitivity to a value that is not only social but also economic.

Ensuring a broad impact in tackling social challenges requires investing in the production activities of other companies linked to the SI, ensuring holistic growth that an intermediary goes beyond the company's boundaries. Illycaffè Foundation is dedicated to supporting and developing projects with associations and institutions operating in an ethical environment, addressing issues linked to sustainability, scientific research, coffee culture, and the manufacturing food system. Considering the difficulties in financing this kind of initiative, Illycaffè strongly believes in the partnerships it has established with various international institutions and is committed to supporting its stakeholders both from an economic and R&D viewpoint. The support to the nonprofit association "is a further demonstration of the company's attention towards issues regarding the sustainable development, the respect for local cultures, and the ethical values in the relationship with growers based on exchange and growth […] focused on both product quality and improving living standards for the suppliers and their communities." Furthermore, the company is partnering with companies for innovating the recuperation, recovery, and reuse of coffee capsules, and with universities, research centers, and trade unions to find biodegradable or ecocompatible alternatives. "The close attention towards the environmental impact of products, and the company's general commitment to investing in promoting a sustainable lifestyle, brought us to give birth to a technological innovation – that is also protected by patents – of a new reusable material and recycling system." In the HSB Living Lab of Electrolux, the employees and clients—being also consumers—are involved

and engaged in SI contests, testing or developing innovative ideas or products that take into account "the innovative content, the holistic approach to sustainability, and the enhanced guest experience," thus ensuring both business and social value.

Knowledge creation and transfer are carried out by leveraging the interconnectedness of various resources and SI actors within the scope of the innovative solutions created. For example, Loccioni plays a "hub role" at the regional level within the network of schools and universities, the network of research centers, and the network of top firms and local institutions. The Group invested in the joint cocreation of the Leaf community, the first ecosustainable community in Italy, to develop projects and technologies aimed at reducing the environmental impact and improving comfort with the collaboration of different SI stakeholders. This is an international open laboratory for innovation in sustainability, for institutions, companies, research centers, schools, and universities, that received the prize "Renewable Municipalities 2018" for the development of an innovative energy system.

The coproduction of values is concretized also on the business side, by stimulating entrepreneurship for social impact. The systemic change pursued with SI can be achieved through encouraging other entrepreneurial initiatives, collaborating with small- and medium-sized enterprises, and creating commercial networks that promote mutual growth. A key example of the adoption of OI for SI is the platform Nexus of Loccioni, a network for interactions and opportunities for collaboration between entrepreneurs of the region the company belongs, aiming to collect ideas and share experiences for developing the territory and maximizing potential synergies. The interviewed manager explained that: "Nexus has the role of interconnecting the 'minds' of different entrepreneurs to maximize the potential synergies for developing the territory." In addition, new strategies, concepts, or tools are sustained through venturing into the creation of spin-offs of previous employees. The manager declared that "the ecosystem of employees, transformed into entrepreneurs and become an integral part of the production chain is part of the so-called technological tailoring," developing initiatives aimed at enriching the territory of work and knowledge for ecosustainability. Electrolux leverages the contacts with more than 250 OI intermediaries for specialized services to promote experimentation of social ideas and mobilization of resources. These actors include banks, venture capital, business angels, challenges platforms, scouting companies, startups, and innovation speed dates organizers that became unconventional SI actors with a key role in inspiring and stimulating new inventors with increasingly hard challenges. Electrolux selects the intermediaries depending on the kind of need to be tackled during the production of the SI and to have access to innovation networks, which represent a real asset for the intermediaries. "The so-called Brokers allow the group to know more easily the 'hidden' innovators: especially banks, venture capitalists and incubators, they keep on searching, screening, and bringing innovations, finding external resources that could help, they play the role of link with the external network of innovators." In this sense, OI practices allow the achievement of a social impact that can be better aligned with the objective of profitability and growth (more typical for businesses), to be broadened to other SI actors.

V. Discussion

This article sheds light on the ways businesses can purposefully involve knowledge inflows and outflows when carrying out SI to make them effective and sustained in the long term. We identify a set of capabilities that can be considered not only to properly identify and involve SI actors, but also to identify a balance between the profit and the social value in a long-term social strategy of a company.

The results and the answer to the research question can be summarized in the framework of Fig. 1, providing a reference on how businesses effectively pursue SI by leveraging OI practices, and the resulting systematic outcomes.

Each capability is "a high-level routine (or collection of routines) that, together with its implementing input flows, confers upon an organization's management a set of decision options for producing significant outputs of a particular type" [78]. Thus, OI practices become routines of companies to leverage purposeful knowledge flows outside business boundaries in order to tackle a social challenge. Their combination underlies the development and nurturing of SI capabilities, which represent high-level routines specifically targeted to producing significant social outcomes. Thus, the case-study analysis shows that the interplay between OI and SI leads to the emergence of intended or realized paths that enrich the relationships with external sources of knowledge with valuable, broader impacts [79]. The ways the companies combine the OI practices to develop and nurture SI capabilities can be identified as supporting and enhancing SI innovativeness, sustaining it through depth (number of external sources) and breadth (extent of access to these sources), and enlargement of SI outcomes in the long term.

First, the three cases cultivated the ability to improve their solutions' innovativeness to tackle social challenges in the role of main promoters and facilitators of collaborative SI development. The capability of *system thinking for innovating solutions to social challenges* demonstrates the ability of firms in scenario planning, fostering creativity, and anticipating trends as well as leveraging nonconventional innovators. This contradicts the result by Eppinger [70] arguing companies are not the actors to initiate OI practices to address anticipation. An OI practice underpinning this capability includes the user innovation for designing of the living spaces of the future for well-being, and innovating the recuperation, recovery, and reuse of products. The capability of rethinking, in reference to strategies taken by managers, design but also business models, with relevant stakeholders is also shown pivotal to addressing the social dimension of sustainability and circular economy [31].

Second, the OI mechanisms, especially external networking, were targeted for the involvement of an inclusive range of stakeholders, i.e., employees, customers, suppliers, research organizations, startups and innovators, territorial companies and institutions, associations, students and educational institutions, and citizens. While the literature argues that the involvement of a wide network of stakeholders, and their interconnections, can determine the nature and the success of SI [9], [54], results from the three cases show that the number of external knowledge sources and the frequency of their relationships—i.e., the depth and breadth of OI—leads to a combination of SI capabilities to effectively sustain the developed solution in the long term. The

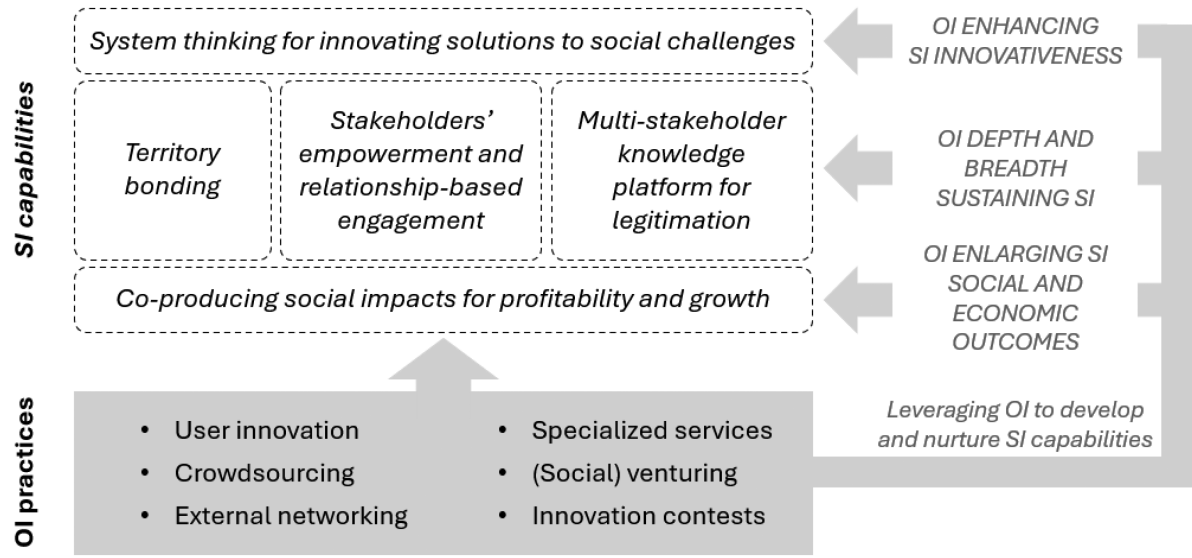

Fig. 1. SI capabilities leveraging OI practices in businesses.

capability of *stakeholder empowerment and relationship-based engagement* confirms that the collaborative SI process should derive from a constant dialog with external SI actors and the evaluation of ideas from external sources of innovation [21], [80]. The capability of *territory bonding* combines routines of external networking, social venturing, and user innovation as collective actions to codesign and codeliver with local communities, businesses, and organizations, also with a continuous interface with local policymakers and formalized institutional structures that encourage cooperation [24], [46]. This is also pivotal for generating territorial value and considering the spatial application of circular economy activities of reuse, regenerate, and rethink [31]. In addition, the creation of a *multistakeholder knowledge platform for legitimation* enhances the importance of long-term vision [24] and the sustainment of SI with a workable path creation that takes into account the accountability of the innovation but especially the business itself [70].

Third, results show that the interplay between an OI strategy and a social challenge (ecosustainability, high quality and ethics, and well-being, in the three cases) results in a company growth and innovation strategy becoming strongly intertwined with the social change pursued. The *capability of coproducing social impacts for profitability and growth* demonstrates the ability of businesses to align social business and social outcomes [19] with economic outcomes, and thus the opportunities for scaling SI toward systemic transformations [66]. Thus, both social and economic outcomes can be enlarged by leveraging routines as social venturing and innovation contexts, aimed at transforming the business and the society. Entrepreneurship and SI that involve transaction models are indeed pivotal for intensifying sustainability and circular economy practices [46].

Overall, the capabilities identified demonstrate the ability of the selected companies to deliver SI by taking into account that OI should provide adequate information and communication channels, be affordable and appropriate to the scope of innovation also in terms of company reputation and economic growth, and lead to a sustainable path creation for social impacts [70]. These capabilities are thus the foundations leading to moving the strategy, value proposition, and best practices of the company to its SI mission [67].

A. Theoretical Implications

This article provides new insights into the interplay between OI and SI in the business context, exploring the abilities of three firms in practicing OI with purposeful knowledge flows to achieve social aims. The integration of the two concepts of OI and SI originates both promising research opportunities and practical implications to help organizations improve their innovation capabilities, also in terms of contributions to sustainable development and resource-efficient patterns. Results confirm the importance of the OI approach in accelerating the development and contributing to the sustaining of socially sustainable innovation to benefit society [80]. In addition, building OI mechanisms as routines underpinning the SI process offers a potential perspective to align strategies of involved organizations toward economically and socially sustainable models [23] and overcome obstacles and risks associated with SI introduction [51].

The study of the role of OI in the context of innovation with social purposes is argued to be a relatively young field in the literature [25]. More recent research at the intersection of OI and SI explores their synergies from the perspective of the community, e.g., in fab labs [81], nonprofit organizations [21], and government agencies [63]. We contribute to this stream of research by focusing on businesses having the role of main promoters of SI, while the viewpoint of business innovators is mainly studied in the OI context [81]. From the OI viewpoint, this article provides evidence of the ability to leverage targeted OI practices to support long-term social strategy, with OI considered a new source for businesses to innovate socially [15]. In this sense, results contribute to the investigation of the mechanisms of OI being often used in practice [65] and involving multiple types of partners working together [61] as foundational routines. From the SI viewpoint, the results show that effective modes of innovating to address social challenges require the development of specific abilities for openness with a practical perspective beyond the capture of value [59]. The

overarching role in tackling sustainability issues still tends to be seen more as belonging to policymakers rather than business problems [80], and this article contributes to enhancing the role of businesses for the effective development and sustainment of SI. Finally, the results of the article contribute to the recent debates on the interplay of the innovation approaches of OI and SI to circular economy and in general sustainable development and resource-efficient patterns, showing how OI and stakeholder collaboration can be combined in high-level routines to tackle social aspects, beyond environmental values.

B. Practical Implications

This article also offers insights and support to practitioners on managerial mechanisms for effective SI implementation in companies, aiming to reach a broader and systemic impact. Results from the three cases represent a reference on the capabilities to be developed for the effective adoption of mechanisms for retaining SI stakeholders as sources of innovation. Managers and companies still need to learn how SI can succeed when the social value should be pursued with alignment with the business value, and what factors drive its growth.

In this sense, innovation managers can obtain a reference on capabilities, and combinations of them, to be fostered in SI implementation in their companies thanks to their OI strategy. Along with this line, the results from the case studies provide suggestions also for social enterprises aiming to innovate their products, services, or even business models by leveraging their network of stakeholders through collaborative mechanisms. This is true also for companies and firms that are willing to introduce innovations focused on social problems with dedicated strategic investments and resources that can have an impact beyond the economic profit. The choice of practices should consider the specific challenges to be addressed, the desired outcomes and the stakeholders to be engaged within the specific social context.

C. Limitations and Future Research

This article has also limitations that open for future contributions to both SI and OI literature. The case studies are limited to three companies that demonstrate replication (i.e., size and commitment in both collaborative mechanisms and social challenges) and variation on selection criteria (i.e., industry and global or local reach and type of social challenge). However, multiple case studies involving a higher number of companies and explorative surveys can further develop and validate the results obtained in this article. These could consider different characteristics of companies, e.g., the size with compared analyses on SMEs; the business model with social enterprises; the scope of SI with companies operating in different geographical areas; and contextual social policies that could influence their social aims. This could affect the ways businesses nurture SI capabilities, such as the *territory bonding*, which is strictly interrelated to the location of the facilities.

It would be interesting to examine unsuccessful SI while opening to stakeholders, and how the OI practices investigated are driven and bonded by both businesses and user communities, beyond the for-profit environment [28]. Future articles could investigate forms of SI developed by firms that did not succeed in addressing the social needs, due to the internal lack of ability in leveraging the related OI practices, or the role of SI actors in hampering businesses' capabilities. Empirical results would allow testing and a better understanding of the framework resulting from this article. Moreover, the effectiveness and efficiency of resulting SI capabilities could be investigated according to the stage of the SI process under analysis, distinguishing their applicability in phases of 1) prompts, inspirations, and diagnoses, 2) proposals and ideas, 3) accessing prototyping and pilots, 4) sustaining innovative efforts, and 5) scaling and diffusion [5]. In each phase, indeed, innovations involve different actors and stakeholders [23] and then could require the adoption of different combinations of practices. Finally, further article should discuss implications in terms of leveraging specific types of SI actors, e.g., government and communities, and OI strategies, i.e., inbound or outbound, with a research design that considers the dyadic perspective of both businesses and SI stakeholders. Specific outcomes, in terms of radical or incremental innovation, social inclusion, and links to circular practices, could be also explored concerning the capabilities effectively put in place for addressing circularity and sustainability issues at a larger scale. The manifold perspectives that can be considered would contribute to better theorizing on the interplay between OI and SI taking into account the complexity of both paradigms, also in terms of contributions to sustainable development and resource-efficient patterns.

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