

Determinants of Open Social Innovation: A Quantitative Approach

José Nicolás Pacheco

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DOCTORAL THESIS

Determinants of Open Social Innovation: A Quantitative Approach

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List of Abbreviations

APS	Adult Population Survey
B2B	Business-to-Business
CRE	Correlated Random Effects
CSR	Corporate Social Responsibility
DIY	Do-It-Yourself
DV	Dependent Variable
ESG	Environmental, Social, and Governance
GALI	Global Accelerator Learning Initiative
GDP	Gross Domestic Product
GEM	Global Entrepreneurship Monitor
GICS	Global Industry Classification Standard
HC	Human Capital
IHS	Inverse Hyperbolic Sine
ISCED	International Standard Classification of Education
IV	Independent Variable
JCR	Journal Citation Reports
JIF	Journal Impact Factor
LSEG	London Stock Exchange Group
MLogit	Multinomial Logistic Regression
NDE	Natural Direct Effect
NGO	Non-Governmental Organization
NIE	Natural Indirect Effect
OR	Odds Ratio
OSI	Open Social Innovation
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
R&D	Research and Development
SE	Standard Error
SEE	Social Economy Enterprise
SLR	Systematic Literature Review
SME	Small and Medium-Sized Enterprise
TEA	Total Early-Stage Entrepreneurial Activity
UN	United Nations
VIF	Variance Inflation Factor
WDI	World Bank World Development Indicators
WoS	Web of Science

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Abstract

Open Social Innovation (OSI) has emerged as a paradigm for coordinating heterogeneous actors around shared social and environmental challenges that exceed the capacity of individual firms, governments, or nonprofit organizations to address in isolation. However, OSI research remains fragmented and theoretically underdeveloped, with partial conceptualizations, empirical work concentrated on isolated initiatives, and the absence of an integrative framework for its determinants across individual, organizational, and institutional levels. The main objective of this research is to analyze the determinants of Open Social Innovation across multiple levels of analysis. Specifically, it examines the evolution of the OSI literature and proposes an integrative conceptual framework; analyzes founders' human capital as a determinant of OSI orientation, moderated by organizational form; examines social entrepreneurs' individual resources as determinants of product innovation novelty, moderated by national cultural dimensions; and examines organizational policies as determinants of environmental innovation, mediated by cross-sector partnerships. The research combines a systematic literature review of 115 articles, a conceptual theory-adaptation design, a bivariate probit model on 11,953 early-stage social ventures (Global Accelerator Learning Initiative, 2013–2019), a multilevel mixed-effects ordered logistic regression on 9,642 social entrepreneurs in 47 countries (GEM and Hofstede, 2021–2023), and a causal mediation analysis on 3,372 firm-year observations from 454 consumer-sector firms in 45 countries (London Stock Exchange Group, 2014–2024). The theoretical framework integrates human capital theory, the resource-based view, the institutional approach, hybrid organizing, and legitimacy theory. The findings reveal a cross-level asymmetry: experience-based human capital and stakeholder-proximate policies directly predict OSI-relevant outcomes, whereas formal education, financial capital, and market-oriented policies do so only under enabling conditions. Founders' managerial experience predicts OSI orientation across organizational forms, whereas formal education does so only in for-profit ventures. Human and social capital predict product innovation novelty: individualism amplifies returns to human capital, whereas power distance and uncertainty avoidance attenuate them. Human rights-oriented and consumer-oriented policies operate through the partnership-mediated pathway to environmental innovation only in the high-visibility consumer discretionary sector. From a theoretical perspective, the dissertation consolidates OSI research into an ecosystem-based framework, refines hybrid organizing and human capital theory, and recasts legitimacy as contingent on audience proximity. From a practitioner and policy perspective, accelerators should privilege managerial experience over formal credentials, cross-cultural programs should account for institutional contingency, and ESG raters should prioritize stakeholder-proximate policies over market-oriented signals.

Keywords: open social innovation, social entrepreneurship, cross-sector partnerships, environmental innovation, human capital theory, institutional approach, legitimacy theory.

Chapter 1

Introduction

1 Introduction

1.1 Problem Statement and Objectives of the Research

Complex societal and environmental challenges have outgrown the capacity of single firms, governments, or nonprofit organizations to resolve them in isolation (Ferraro et al., 2015; George et al., 2016; Rittel & Webber, 1973; Selsky & Parker, 2005). Scholarly and practitioner attention has consequently shifted toward collaborative, distributed approaches that mobilize heterogeneous actors around shared social and environmental purposes (Mair & Gegenhuber, 2021; McGahan et al., 2021). Open Social Innovation (OSI) has emerged as the overarching paradigm that characterizes this shift. Chesbrough and Di Minin (2014) introduced OSI as the extension of open innovation beyond commercial value creation to societal challenges, with inbound and outbound strategies and business model innovation serving as the vehicle for producing and scaling solutions. Subsequent work has formalized OSI as a cross-sectoral and multi-stakeholder organizing form that rests on the orchestration of heterogeneous actors around shared social purposes (Gegenhuber & Mair, 2024). OSI therefore inherits the distributed coordination logic of open innovation while extending its purpose to social and environmental ends, and shares the social purpose of classical social innovation while replacing its typically focal-organization coordination with multi-stakeholder, ecosystem-based coordination.

Despite growing scholarly and practitioner attention, OSI research remains fragmented and theoretically underdeveloped. The field exhibits a proliferation of partial conceptualizations, a concentration of empirical work on specific initiatives such as Living Labs and crowdsourcing platforms, and the absence of a cohesive framework that integrates OSI initiatives across levels of analysis. The theoretical warrant for the ecosystem lens itself remains limited, and the boundary separating OSI from adjacent phenomena such as bilateral cross-sector partnerships and classical open innovation is not fully articulated (Gegenhuber & Mair, 2024). These limitations manifest as three specific gaps that this research addresses, organized around the determinants of OSI engagement and the mechanisms linking those determinants to collaborative innovation outcomes.

OSI materializes through initiatives that span the stages of the social innovation process, from problem identification and ideation to implementation and scaling (Murray et al., 2010). These initiatives engage heterogeneous actors and unfold under different organizing logics, yet their viability depends on the individuals who launch and sustain them and on the organizations through which collaborations are formalized and innovation outcomes produced. This thesis focuses on the participation of entrepreneurs and organizations in these processes, situating its empirical determinants at the individual and organizational levels of analysis. Within this scope, three specific gaps in the existing literature motivate the analyses that follow.

A first gap concerns the individual-level resources of those who initiate OSI. Human capital theory (Becker, 1964) posits that education and experience equip individuals with valuable capacities that, as subsequent research has shown, help identify opportunities, access distributed knowledge flows, and mobilize support (Davidsson & Honig, 2003). Yet, the open-innovation literature has developed this account primarily for commercial firms (Bogers et al., 2018), leaving unresolved how general and specific human capital shape founders' orientation toward OSI, and whether this relationship operates differently across organizational forms. Hybrid and for-profit social ventures face legitimacy conditions distinct from those of nonprofit forms (Battilana & Lee, 2014; Townsend & Hart, 2008). These conditions likely alter the returns to education and managerial experience when founders consider adopting an open, collaborative orientation.

A second gap concerns the organizational level, specifically how OSI is enacted through cross-sector partnerships. While such partnerships represent a salient mechanism for OSI, their formation relies heavily on organizational policies that signal credibility to external actors. Yet, the existing literature on environmental innovation has largely focused on direct policy-to-innovation pathways. Furthermore, it tends to treat legitimation as a uniform mechanism, overlooking the differentiated typology established in legitimacy theory (Suchman, 1995). Integrating this typology with an institutional approach (North, 1990) suggests that distinct stakeholder-oriented policies function as heterogeneous legitimation signals, attracting cross-sector partners to varying degrees. Consequently, this partnership-mediated pathway to environmental innovation remains theoretically underdeveloped, particularly regarding how it is conditioned by sectoral visibility.

A third gap concerns the institutional boundary conditions of individual resources in social entrepreneurship. When applied to the individual entrepreneur, resource-based reasoning treats human, social, and financial capital as conditions for generating novel offerings (Alvarez & Busenitz, 2001; Davidsson & Honig, 2003). Yet, the conversion of these resources into novelty is not uniform across institutional contexts. Informal institutions, captured by national cultural dimensions (Hofstede et al., 2010), condition the translation of resources into entrepreneurial behavior and innovation outcomes (Shane, 1993). This boundary condition is particularly salient in social entrepreneurship, where the collaborative logic of OSI stands in tension with the individualistic cultural profile that traditional innovation research associates with high innovativeness.

In sum, the fragmented state of OSI literature calls for conceptual consolidation and multilevel empirical exploration. Motivated by these gaps, the main objective of this research is to analyze the determinants of Open Social Innovation across multiple levels of analysis. To achieve this, the research integrates conceptual theory-building and empirical evidence, explicitly testing the contingencies and mediating effects that shape OSI.

The specific objectives of the research are:

1. To explore the content and evolution of Open Social Innovation research and propose an agenda for future research.
2. To propose an integrative conceptual framework for Open Social Innovation.
3. To analyze the effect of founders' human capital on their Open Social Innovation orientation, considering the moderating role of the venture's organizational form.
4. To examine the effect of social entrepreneurs' individual resources on product innovation novelty, considering the moderating role of national cultural dimensions.
5. To examine organizational policies as determinants of innovation addressing environmental issues, considering the mediating role of cross-sector partnerships.

To address these objectives, the thesis proceeds from a review of the literature (Chapter 2) and an integrative conceptual framework (Chapter 3) to multilevel quantitative analyses. The three empirical chapters examine the multilevel structure of OSI through complementary quantitative designs matched to the analytical level of each research question. Chapter 4 examines the individual-level determinants of the venture's joint orientation toward openness and innovation; Chapter 5 models the resource–novelty relationship at the individual level and its cross-level moderation by national cultural dimensions; and Chapter 6 estimates partnership-mediated policy effects at the firm level. Section 1.3 specifies the samples, periods, and data sources for each design.

1.2 Conceptual Framework

This thesis integrates resource-based and institutional perspectives to examine OSI, with the empirical chapters jointly spanning the micro, meso, and macro levels of analysis. Chapter 4 examines founders' OSI orientation through human capital theory, drawing on hybrid organizing as the meso-level moderator. Chapter 5 examines social entrepreneurs' product innovation novelty through the resource-based view applied to the individual entrepreneur, drawing on the institutional approach for the macro-level cultural moderation. Chapter 6 examines firm-level environmental innovation through legitimacy theory, drawing on cross-sector partnerships as the meso-level mechanism. Each framework is introduced in turn, and their integration across the micro, meso, and macro levels is taken up at the close of the section.

Chapter 4 draws on human capital theory (Becker, 1964) to examine the founder-level determinants of OSI orientation. The theory holds that the knowledge, skills, and experience embodied in individuals are productive resources that raise the returns to economic action. It distinguishes between general human capital, typically operationalized as formal education and associated with broad cognitive capabilities, and specific human capital, typically operationalized as managerial or industry-specific experience. Davidsson and Honig (2003) extended this distinction to

entrepreneurship by identifying entrepreneurship-specific human capital as the cognitive and experiential endowment that bears most directly on opportunity recognition and venture formation. In social ventures, where founders must coordinate heterogeneous actors and reconcile competing logics, the same distinction provides the microfoundation for understanding why founders differ in their orientation toward collaborative innovation.

The returns to human capital, however, are not invariant across organizational forms; Chapter 4 therefore incorporates organizational form as a moderating condition. Hybrid organizations are those that combine institutional logics conventionally treated as separate or competing in the literature, most often the social-mission logic of nonprofit forms and the commercial logic of for-profit forms (Battilana & Lee, 2014). The hybrid organizing literature shows that legitimacy conditions vary systematically across these forms. Nonprofit founders derive legitimacy from normative alignment with a stated social mission, whereas for-profit and hybrid founders must reconcile that mission with commercial accountability and the legitimacy pressures attached to it (Townsend & Hart, 2008). Because the strategic value of coordinating heterogeneous partners is conditional on the legitimacy frame within which the venture operates, organizational form shapes how individual cognitive and experiential endowments translate into an open, collaborative orientation.

Chapter 5 adopts the individual-level resource bundle as the analytical lens for examining product innovation novelty. The resource-based view (Barney, 1991) holds that heterogeneity in outcomes among comparable actors reflects heterogeneity in the resource bundles they assemble and deploy. Although originally formulated at the firm level, the resource-based view has been extended to the individual entrepreneur, where human, social, and financial capital are treated jointly as the input bundle from which novel offerings are generated (Alvarez & Busenitz, 2001). The extension is consequential for social ventures, where novelty in mission-primary contexts draws on relational resources that secure support, on financial slack that buffers experimentation, and on the cognitive resources captured by Becker's (1964) framework.

Chapter 5 further draws on the institutional approach to examine the cultural moderation of the resource–novelty relationship in mission-primary social ventures. The conversion of individual resources into novelty is, however, institutionally contingent. The institutional approach treats institutions as the socially constructed rules and constraints that organize human interaction. North (1990) distinguishes formal institutions, comprising written rules, laws, and property-rights regimes, from informal institutions, comprising codes of conduct, conventions, and shared values. Together, they structure which behavior is feasible and which is sanctioned. Informal institutions, in particular, exert a profound influence on entrepreneurial behavior (Welter & Smallbone, 2011), playing a more decisive role than formal regulations in shaping a venture's social orientation (Maaßen et al., 2026). National cultural dimensions (Hofstede et al., 2010) provide the most widely used operationalization

of informal institutions, capturing the value patterns through which individuals interpret opportunities and convert resources into action (Shane, 1993).

Chapter 6 applies legitimacy theory (Suchman, 1995) to analyze how organizational policies translate into environmental innovation through cross-sector partnerships. At the organizational level, legitimacy theory specifies the mechanism that connects firm-level characteristics to collaborative outcomes. Suchman (1995) defines legitimacy as a generalized perception that an organization's actions are desirable and appropriate within a socially constructed system of norms, values, and beliefs. Legitimacy management consists of the strategic use of signals that external audiences interpret as evidence of normative alignment, and the perceived credibility of these signals shapes the willingness of external actors to engage in collaboration. Stakeholder-oriented organizational policies function as one such class of signals, and cross-sector partnerships operate both as an observable expression of legitimacy and as a mechanism through which firms access the distributed knowledge that environmental innovation requires.

The frameworks operate at different levels of analysis, yet they jointly account for OSI as a multilevel phenomenon. Human capital theory specifies the cognitive and experiential endowments that predispose individuals to initiate collaborative innovation, and hybrid organizing identifies the meso-level legitimacy conditions under which those endowments translate into OSI orientation. The individual-level extension of the resource-based view broadens the micro argument from human capital alone to a wider input bundle, and the institutional approach specifies the macro-level contingency, operating through informal institutions, that conditions this conversion in social ventures. Legitimacy theory completes the framework by specifying the meso-level mechanism through which organizational policies mobilize the cross-sector partnerships that OSI presupposes. No single framework addresses all three levels; in combination, they enable the analyses that follow to treat OSI as a phenomenon constituted across the individual, organizational, and institutional levels.

1.3 Structure of the Research

The previous section discussed the theoretical foundations underpinning this research. This section provides an overview of the thesis, structured into five chapters, each addressing one of the specific objectives set out in Section 1.1. As mentioned, OSI research remains fragmented and theoretically underdeveloped. The structure of the thesis therefore proceeds from an assessment of the field (Chapter 2) to the conceptual framework that supports its ecosystem logic (Chapter 3), and then to empirical evidence on the individual- and organizational-level determinants of specific OSI approaches (Chapters 4, 5, and 6).

Chapter 2 maps the content and evolution of OSI research, providing the foundation for the empirical chapters. Through a systematic literature review combining bibliometric techniques with multilevel content analysis, we examine 115 peer-reviewed articles indexed in management, business, economics, and public-administration journals from the Web of Science Core Collection. Co-citation and co-occurrence analyses, performed with the bibliometrix R package, are complemented by a thematic synthesis organized around antecedents, processes, relationships, and consequences. The findings consolidate a fragmented literature into a coherent analytical framework and motivate a multilevel research agenda that frames the empirical chapters.

Chapter 3 then moves from the assessment of the field to its conceptual consolidation. Building on the gaps identified in Chapter 2, we propose an integrative conceptual framework for OSI through a theory-adaptation design in which the wicked-problem tradition (Ferraro et al., 2015; Rittel & Webber, 1973) operates as method theory to elaborate the ecosystem framework of OSI 2.0 as domain theory (Gegenhuber & Mair, 2024). We map four structural requirements of complex social problems (distributed agency, constitutive framing, temporal orchestration, and cross-phase scaling) onto functional ecosystem roles. The chapter provides the theoretical justification for the ecosystem lens and clarifies the conceptual boundary between OSI and adjacent phenomena, including classical open innovation, bilateral cross-sector partnerships, traditional social innovation, crowdsourcing, and grand-challenge research.

Chapter 4 begins the empirical part of the thesis at the individual level, focusing on the founders' cognitive and experiential endowments that shape the orientation toward OSI at venture inception. Founders bring distinct resources to the social-venture context, and their education and managerial experience are likely to translate into a collaborative innovation orientation differently across organizational forms. To examine this question, a bivariate probit model is estimated on 11,953 early-stage social ventures from 157 countries drawn from the Global Accelerator Learning Initiative database for the period 2013–2019. We operationalize OSI orientation as the joint probability of openness and innovation at the venture level and test whether general human capital (formal education) and specific human capital (managerial experience) predict that orientation differently across for-profit and nonprofit forms. The findings extend human capital theory to the social-venture context by establishing the boundary conditions under which general and specific human capital translate into a collaborative innovation orientation.

While Chapter 4 isolates founders' human capital and its dependence on organizational form, Chapter 5 extends the individual-level analysis from human capital alone to the broader resource bundle of the social entrepreneur and embeds it in the institutional context. Particular attention is paid to national cultural dimensions as informal-institutional moderators of the relationship between individual resources and innovation novelty. Multilevel mixed-effects ordered logistic regressions

with cross-level interactions are estimated on 9,642 social entrepreneurs nested in 47 countries, pooled across the 2021–2023 Global Entrepreneurship Monitor waves, with four of Hofstede’s cultural dimensions (individualism, masculinity, power distance, and uncertainty avoidance) as country-level moderators. The findings show that the conversion of human, social, and financial capital into novelty is not uniformly sensitive to informal institutions, and that this cultural contingency varies across the components of human capital, with collectivistic settings shaping the resource–novelty relationship in distinctive ways for social entrepreneurs.

Chapter 6 shifts the level of analysis from the individual entrepreneur to the established firm and examines how organizational policies translate into environmental innovation through cross-sector partnerships, one of the collaborative mechanisms that OSI presupposes at the organizational level. Stakeholder-oriented policies signal credibility to external actors, and the partners they attract are central to the distributed knowledge that environmental innovation requires. To capture this mediated pathway, a causal mediation framework accommodating exposure–mediator interactions is applied through fixed-effects and correlated random-effects regressions to an unbalanced firm-year panel covering 2014–2024, comprising 3,372 observations on 454 consumer-sector firms across 45 countries from the London Stock Exchange Group (LSEG) Workspace database. We disaggregate stakeholder-oriented policies into three indices (human rights-oriented, consumer-oriented, and market-oriented) and condition the mediation on sector type (consumer discretionary versus consumer staples) to capture stakeholder proximity and external scrutiny. The findings integrate legitimacy theory with the institutional approach by identifying which policy signals activate partnership-mediated pathways to environmental innovation and under which sectoral conditions the pathway operates.

Considered as a whole, the chapters follow a sequential logic that parallels the multilevel nature of OSI. Chapter 2 establishes the state of the field and its principal gaps; Chapter 3 provides the theoretical foundation for the ecosystem lens that the empirical chapters presuppose; and Chapters 4, 5, and 6 offer evidence on the micro- and meso-level determinants of OSI, following the conceptual sequence in which these determinants operate within the organizing process: from founders’ human capital at venture inception (Chapter 4), to the broader individual resource bundle and its cultural contingency among social entrepreneurs (Chapter 5), and finally to the organizational policies that mobilize cross-sector partnerships in established firms (Chapter 6). The progression thus advances from field consolidation to conceptual framework to empirical evidence; within the empirical part, the level of analysis ascends from the individual founder to the firm, tracing OSI from its micro-foundations to its organizational outcomes. Table 1.1 summarizes this structure, linking each chapter to its specific objective, variables, and method and data.

Table 1.1 Thesis summary

Chapter title	Specific objective	Variables	Method and data
Chapter 2 - Open Social Innovation: A Systematic Literature Review and Future Research Agenda	To explore the content and evolution of Open Social Innovation research and propose an agenda for future research.	Not applicable (Systematic literature review).	Method: SLR (PRISMA) combining bibliometric mapping (co-citation/co-occurrence networks) and content analysis. Data: 115 peer-reviewed WoS Core Collection articles up to Aug 2024.
Chapter 3 - Conceptualizing Open Social Innovation: Structural Requirements, Boundaries, and Multi-Stakeholder Configurations	To propose an integrative conceptual framework for Open Social Innovation.	Not applicable (Conceptual theory adaptation).	Not applicable (Conceptual theory adaptation).
Chapter 4 - Determinants of Open Social Innovation: The Role of Human Capital and the Moderating Effect of Profit Orientation	To analyze the effect of founders' human capital on their Open Social Innovation orientation, considering the moderating role of the venture's organizational form.	IVs: General HC (education); Specific HC (managerial experience). DV: OSI orientation (joint probability of open and innovation orientation). Moderator: Profit orientation (for-profit vs. nonprofit).	Method: Bivariate probit model with maximum likelihood estimation and average marginal effects. Data: 11,953 early-stage social ventures across 157 countries (2013–2019, GALI database).
Chapter 5 - Social Entrepreneurs' Individual-Level Resources and Innovation Novelty: The Moderating Role of Cultural Context	To examine the effect of social entrepreneurs' individual resources on product innovation novelty, considering the moderating role of national cultural dimensions.	IVs: General HC (education); Specific HC (entrepreneurial experience); Social capital; Financial capital. DV: Innovation novelty. Moderators: Individualism, Masculinity, Power distance, Uncertainty avoidance.	Method: Multilevel mixed-effects ordered logistic regression with cross-level interactions. Data: 9,642 social entrepreneurs nested in 47 countries (2021–2023, GEM & Hofstede).
Chapter 6 - Organizational Policies and Environmental Innovation: The Mediating Role of Environmental Partnerships	To examine organizational policies as determinants of innovation addressing environmental issues, considering the mediating role of cross-sector partnerships.	IVs: Org. policies (Human rights, Consumer, Market indices). DV: Environmental innovation. Mediator: Environmental partnerships. Moderator: Sector visibility (Discretionary vs. Staples).	Method: Causal mediation framework (Valeri & VanderWeele, 2013) via fixed-effects linear and correlated random-effects logistic regressions. Data: 3,372 firm-year observations from 454 consumer-sector firms in 45 countries (2014–2024, LSEG database).

Notes: IV, independent variable; DV, dependent variable; SLR, systematic literature review; GALI, Global Accelerator Learning Initiative; GEM, Global Entrepreneurship Monitor; LSEG, London Stock Exchange Group; HC, human capital.

Chapter 2

Open Social Innovation: A Systematic
Literature Review and Future Research
Agenda

2 Open Social Innovation: A Systematic Literature Review and Future Research Agenda^{*}

2.1 Introduction

The need for innovative approaches to tackling complex societal challenges has never been greater, as highlighted by the Sustainable Development Goals Report (United Nations, 2023). Open Social Innovation (OSI) has emerged as a promising approach for answering this call, building on the principles of open innovation (Chesbrough, 2003a) and social innovation (Holmes & Smart, 2009; Murray et al., 2010). By harnessing the collective knowledge, resources, and creativity of diverse stakeholders, OSI provides novel perspectives for tackling societal challenges (Chesbrough & Di Minin, 2014; Gegenhuber & Mair, 2024). However, despite its potential, OSI remains fragmented, where conceptual proliferation obstructs theoretical cohesion and the field lacks a cohesive framework to integrate its research domain.

Beyond this fragmentation, OSI remains under-theorized, lacking a well-developed framework. Indeed, similar to open innovation (Bogers et al., 2017), OSI could be considered more of an emerging phenomenon than a mature area of research, marked by a lack of cohesive study and understanding. The research on OSI, drawing from diverse perspectives, has resulted in fragmented insights and explanations, obstructing the synthesis of findings and the accumulation of knowledge. In addition, there have been multiple definitions of OSI proposed by scholars, each with its own focus. This has led to a proliferation of terminology and a lack of cohesion between studies, making it difficult to evaluate and compare findings from different sources.

Previous reviews on OSI have focused on specific social issues, levels of analysis, or initiatives, such as Living Labs (Edwards-Schachter et al., 2012), Do-It-Yourself (DIY) Labs (Dzandu & Pathak, 2021), crowdfunding processes (Cillo et al., 2023), urban-regional open initiatives (Anthony, 2023; Appio et al., 2019), collaborative public service relationships (Merlin-Brogniart et al., 2022), or environmental/sustainability issues (Kimpimäki et al., 2022; Melander, 2017; Urbinati et al., 2023). These studies show that unlike open innovation's traditional focus on firm-centric strategies for knowledge inflows and outflows (Bogers et al., 2017), OSI transcends organizational boundaries, prioritizing collective action for societal change.

Similar to Stanko et al.'s (2017) conceptualization of open innovation as an umbrella term, we regard OSI as a broader concept encompassing pre-existing research areas (e.g., participatory governance, open eco-innovation, or community-driven innovation) at the intersection of openness and social

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innovation. This inclusive perspective addresses a critical gap: the lack of integration of management-driven practices of open innovation into a broader social application (Bogers et al., 2017). Building on prior research and the gaps outlined in Chapter 1, this chapter provides a systematic literature review (SLR) to comprehensively analyze OSI research. To this end, we answer the following research question: *What key themes, conceptual frameworks, and factors (i.e., antecedents, processes, and consequences) shape and constitute the emerging paradigm of Open Social Innovation?*

In pursuit of this aim, we retrieve data from 115 articles published in top-tier journals. Our approach combines quantitative bibliometric techniques, including co-citation analysis, with qualitative multilevel content analysis. By systematically gathering and synthesizing findings from various studies (Tranfield et al., 2003), we focus on influential journals, leading scholars, and research methods (Martin, 2012). This allows us to map the existing knowledge landscape and identify evolving trends in OSI.

Our contributions are fourfold. First, we synthesize dispersed OSI literature into a coherent intellectual map, revealing overlooked connections between theories and concepts. This synthesis aims to contribute to the development of theoretical frameworks that could enhance research foundations and potentially support the implementation of more effective OSI initiatives. Second, we extend the open innovation approach by providing evidence of the relationship between these practices and societal impact across stakeholders beyond private firms. Third, we provide an ecosystem-based framework that could stimulate future research by facilitating knowledge integration and pattern recognition while enabling comparative analysis of similar methods across the OSI process. Finally, by addressing the gaps identified in the literature, we propose a research agenda to advance OSI principles and their practical application.

The remainder of the chapter is structured as follows. Section 2.2 summarizes the key definitions related to OSI. Section 2.3 outlines the methodological approach employed in this SLR. Section 2.4 presents the SLR results and Section 2.5 proposes an integrative conceptual framework. Section 2.6 discusses the theoretical and managerial implications. Section 2.7 outlines a future research agenda for OSI. Finally, Section 2.8 concludes the chapter by highlighting the main study's implications, limitations, and future research avenues.

2.2 Definitions and Scope

Open innovation emerged as a paradigm shift from closed, firm-centric Research and Development (R&D) strategies to collaborative models. According to Chesbrough and Bogers (2014), it is defined as “a distributed innovation process based on purposively managed knowledge flows across organizational boundaries” (p. 17). At its core, open innovation emphasizes boundary-spanning

practices to accelerate value creation and capture. Concurrently, social innovation has evolved as a multidisciplinary field with various definitions (Edwards-Schachter & Wallace, 2017; van der Have & Rubalcaba, 2016), but can be conceptually delineated through its emphasis on “a novel solution to a social problem that is more effective, efficient, sustainable, or just than existing solutions” (Phills et al., 2008, p. 38). These innovation concepts demonstrate an evolution from linear processes confined to single organizational responsibility toward dynamic, multi-actor interactions across micro (individual/single community), meso (organizational/alliances), and macro (systemic/policy) levels. This evolution reflects broader theoretical shifts toward approaches like innovation ecosystems (Adner, 2006; Carayannis et al., 2018), where diverse stakeholders (entrepreneurs, activists, policymakers, etc.) co-evolve resources and capabilities around common objectives.

Over recent years, the integration of these innovation approaches into practice is illustrated by organizations such as Ashoka and OpenIDEO, as well as public participation initiatives like the City of Birmingham in the United Kingdom, which have implemented OSI frameworks (Chesbrough & Di Minin, 2014; Fayard, 2024). However, it was during the COVID-19 pandemic that OSI garnered increased academic interest, leading to several studies that empirically examined and described its initiatives (e.g., Bertello et al., 2022; Mair & Gegenhuber, 2021). The urgent need for innovation and adaptability brought about by the pandemic accelerated the adoption of the OSI approach, fostering extensive collaboration among various entities to develop community-driven solutions. These projects have provided empirical evidence (e.g., Mair et al., 2023) that enhances our understanding of OSI applications, showcasing its potential in crises across diverse domains (Chesbrough, 2020; Scheidgen et al., 2021).

OSI research has taken different paths depending on the authors’ initial theoretical approaches and conceptual background. From one perspective, some scholars have proposed OSI based on the frameworks of open innovation, aiming to apply aspects of crowdsourcing, collaboration, and knowledge sharing to address social problems (e.g., Bertello et al., 2022). Alternatively, scholars rooted in social innovation approaches have advocated for incorporating dimensions of openness, inclusivity, and co-creation derived from open practices (e.g., Edwards-Schachter & Wallace, 2017). Furthermore, given that these innovations emerge within contexts characterized by interconnected economic, cultural, and environmental dimensions (Baker & Mehmood, 2015; Cajas-Santana, 2014), different organizational models have been proposed that aim to advance social change while simultaneously achieving financial sustainability and generating social and environmental impact (Doherty et al., 2014; Santos, 2012). Similarly, a stream of literature has emerged that particularly focuses on the application of open innovation to environmental and sustainability challenges in organizations (Bogers et al., 2020; Chistov et al., 2021), complementing the broader OSI approach by highlighting its potential to tackle environmental issues.

Overall, the concept of OSI has evolved markedly over the past decade (see Table 2.1), reflecting a dynamic shift in approaches to social problem-solving. Initially, Chalmers (2013) distinguished OSI from traditional social innovation models by emphasizing collaborative and inclusive strategies. Chesbrough and Di Minin (2014) further define the concept, framing it as the application of inbound and outbound open innovation strategies to social challenges. In recent years, Mair and Gegenhuber (2021) expanded on this by describing OSI as a participatory approach. Gegenhuber et al. (2023) detailed OSI by focusing on the process involving multiple actors, enhancing the understanding of stakeholder interactions within OSI. Ultimately, Gegenhuber and Mair (2024) described OSI as a structured, multi-stakeholder process spanning various sectors to address complex social issues.

Table 2.1 Definitions of the OSI concept

Authors	Open Social Innovation is defined or distinguished as:
Chalmers (2013, p. 29)	“Differs from some traditional social innovation processes in that it repudiates the heroic individual approach to social innovation and identifies collaborative organizational structures and behaviours required to systematically tackle social problems.”
Chesbrough and Di Minin (2014, p. 170)	“The application of either inbound or outbound open innovation strategies, along with innovations in the associated business model of the organization, to social challenge.”
Mair and Gegenhuber (2021, p. 28)	“An open and participatory approach to social innovation based on collective action expedited by the power of digital technology.”
Gegenhuber et al. (2023, p. 1)	“Participatory approach and process involving multiple stakeholders (citizens, organized civil society, and the public and private sectors) in the idea generation process of developing and scaling solutions to make progress on such challenges.”
Gegenhuber and Mair (2024, p. 1)	“A concerted effort undertaken by multiple stakeholders from various sectors throughout the social innovation process, from diagnosing societal challenges, to developing ideas for how to solve problems, creating solutions, effectively scaling solutions and generating impact.”

2.3 Methodology

As mentioned earlier, we conducted a systematic literature review that integrates bibliometric and content analysis techniques to investigate and consolidate the findings. Bibliometric reviews provide a quantitative examination of publication patterns and are valuable for visualizing a research domain (Zupic & Čater, 2015). Moreover, scholars in innovation and entrepreneurship find bibliometrics and author citation analysis useful for quantitative assessment (Landström et al., 2012; Shafique, 2013). To examine the manuscripts using bibliometric techniques, we used the bibliometrix R package developed by Aria and Cuccurullo (2017). Specifically, the mapping of co-cited references helps to display connections between groundbreaking studies, while cluster analysis illustrates research focal points (Van Eck & Waltman, 2007). Following the bibliometric analysis, we conducted a content analysis, proceeding with a thematic review that uncovered patterns in the antecedents, processes, and consequences of OSI, as outlined by Zahra et al. (2006). We systematically extracted data from

selected studies into a structured template, capturing details such as the authors, publication year, objectives, methodologies, social issues, and key findings.

We incorporated key elements of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines into our SLR. These guidelines assist authors in transparently documenting their review process (Page et al., 2021). Before the review, a protocol was established that outlined the scope, inclusion/exclusion criteria, search strategies, and analysis methods (Moher et al., 2015). To ensure access to one of the most up-to-date and reliable sources of scientific literature for our review, we used the Web of Science (WoS) Core Collection database (Visser et al., 2021). This is due to several key factors. First, WoS is known for its selective indexing approach, which focuses on high-quality and impactful journals (Pranckutė, 2021). Second, WoS provides robust metadata that is suitable for conducting bibliometric analyses (Gaviria-Marin et al., 2019). Third, WoS offers access to interdisciplinary information, making it well-suited for innovation reviews (Schmitz et al., 2017).

Nevertheless, our initial search using the keywords “Open Social Innovation” returned only 18 articles in WoS. Tuckerman et al. (2023) address this scarcity, revealing that “openness” in OSI exists on a spectrum rather than a simple open/closed dichotomy. Moreover, as an emergent approach, OSI arguably remains under-theorized in areas of research, like some open innovation topics from years ago (Bogers et al., 2010). Therefore, in line with Randhawa et al. (2016) social innovation review, we added more search terms related to OSI.

To enhance our keyword selection method for SLR, we compiled an extensive set of keywords from highly cited articles in the WoS Core Collection database, focusing on innovation-related concepts. We began by extracting keywords from the 100 most cited articles on “Social Innovation” and “Open Innovation”, as well as from the 18 available articles on “Open Social Innovation”. This initial step amassed a vast array of keywords, from which we systematically removed duplicates to ensure a streamlined dataset. Our evaluation and selection process distilled the initial list to a curated set: 159 keywords for Social Innovation, 266 for Open Innovation, and 58 for Open Social Innovation. Following this, we undertook a classification stage, organizing these keywords into categories reflective of synonyms, subthemes, stakeholders, processes, or others. Finally, the selection of search terms was based on their relevance and criticality in representing the landscape of the respective innovation paradigms, ensuring the final collection of terms offered a comprehensive and nuanced semantic network (see Table 2.2).

Table 2.2 Selected search terms

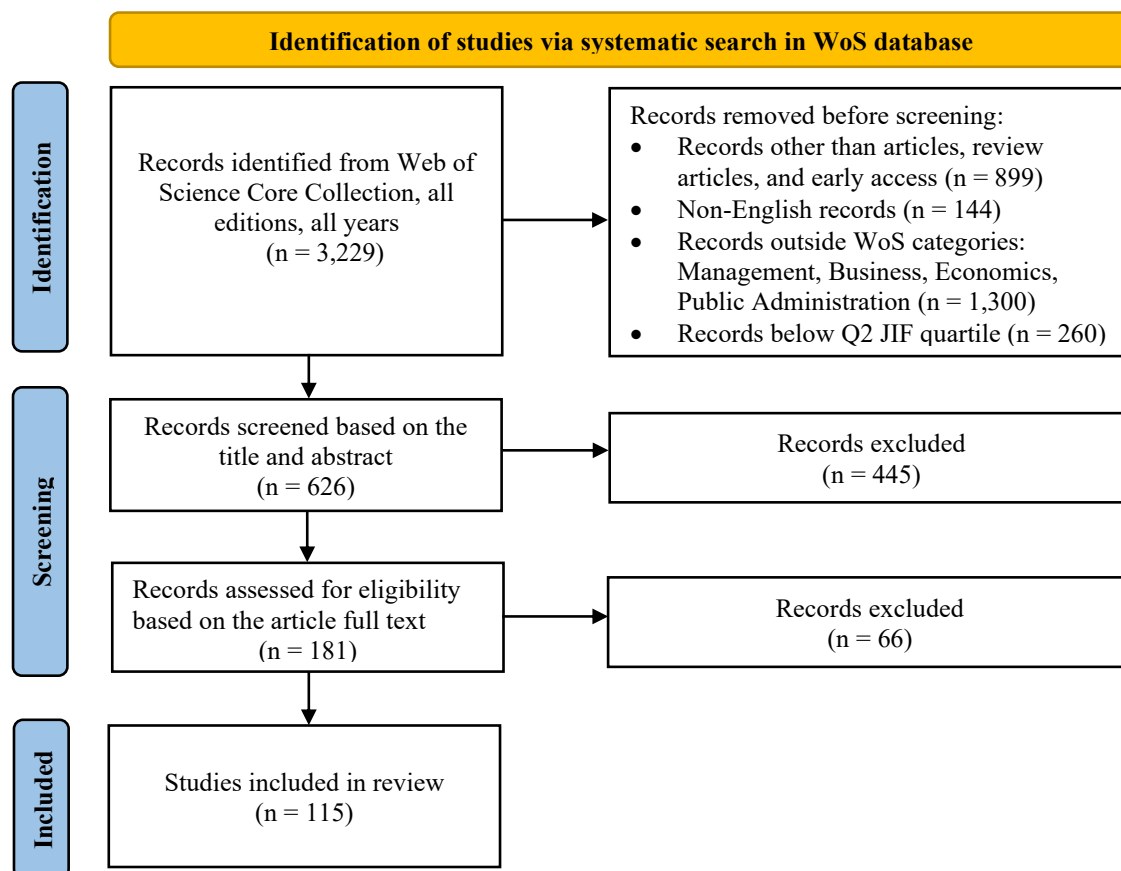
Search terms	Keyword sources
<i>Open Social Innovation</i>	
Hackathons	Gegenhuber et al. (2023)
Fab Lab / Makerspaces	Rayna and Striukova (2019)
Participatory	Gegenhuber et al. (2023)
<i>Social Innovation</i>	
Civil Society	Seyfang and Haxeltine (2012)
Co-creation	Voorberg et al. (2015)
Cooperative	Hewitt et al. (2019)
Citizens	Koirala et al. (2018)
Ecology	Winans et al. (2017)
Grassroot	Seyfang and Haxeltine (2012)
Eco-innovation	Ghisetti et al. (2015)
Nonprofit / non-profit	Westley et al. (2014)
Philanthropy	Dees (2012)
Responsible	Bock (2012)
Societal	Avelino et al. (2019)
Socio-	Baker and Mehmood (2015)
Sustainable	Boons and Lüdeke-Freund (2013)
Sustainability	McPhearson et al. (2015)
Transformative	Avelino et al. (2019)
<i>Open Innovation</i>	
Collaborative	Baldwin and von Hippel (2011)
Collaboration	Schaffers et al. (2011)
Collective	Zhao and Zhu (2014)
Community	Franzoni and Sauermann (2014)
Crowd	Franzoni and Sauermann (2014)
Crowdsourcing	Bogers et al. (2017)
Co-creation	Schaffers et al. (2011)
Distributed	Boudreau (2012)
Ecosystems	Bogers et al. (2017)
External	Mina et al. (2014)
Living Labs	Schaffers et al. (2011)
Network	Lee et al. (2010)
Openness	Dahlander and Gann (2010)
Platforms	Bogers et al. (2017)
Tournaments	Majchrzak and Malhotra (2013)

Data were collected from the WoS Core Collection database, including documents indexed up to August 1, 2024. No specific time frame restrictions were applied to the search. We searched for the terms listed in Table 2.2 in the title, abstract, and keywords of the articles. The terms listed were combined using boolean operators (AND OR), proximity operators (NEAR/X or W/X), and the wildcard character (*) for retrieving plurals and different spellings (Castaneda et al., 2018; Khare & Jain, 2022). As a result, we obtained 3,229 documents using the following search query:

TS = ((Open OR Collaborat* OR Collective* OR Communit* OR Crowd* OR Co-creation OR Distributed OR Ecosystem* OR External OR “Living lab*” OR Network* OR Openness* OR Platform* OR Tournament* OR Hackathon* OR “Fab lab*” OR Makerspace* OR Participat*) NEAR/3 (Social OR Civil OR Societ* OR Co-creation OR Cooperative* OR Citizen* OR Ecolog* OR Grassroot* OR eco-innovation* OR Nonprofit* OR non-profit* OR Philanthrop* OR Responsible OR Societal OR socio-* OR Sustainabl* OR Transformative) NEAR/3 (Innovation*))

Following that, the search was restricted to articles, review articles, or early access as the document types, while also limiting the language to English (Merigó et al., 2016). Working papers, book reviews, and conference proceedings (often referred to as gray literature) were omitted (Kraus et al., 2020). To be consistent with the content analysis objective of this review, we focused our search on the following WoS categories: management, business, economics, and public administration (Chesbrough et al., 2014). To identify high-quality journals, we only considered those with a 5-year Journal Impact Factor (JIF) of either Q1 or Q2, based on Journal Citation Reports (JCR) for 2023. Subsequently, we screened 626 abstracts using the inclusion and exclusion criteria outlined in Table 2.3, followed by a full-text review for those that appeared to be relevant. Ultimately, a sample of 115 articles was selected (see Figure 2.1).

Figure 2.1 Data collection process based on PRISMA flow diagram



Note: Adapted from Page et al. (2021).

Table 2.3 Inclusion and exclusion criteria

(A) Inclusion criteria	
1. Document type: Peer-reviewed journal articles, literature reviews, and early access.	
2. Language: Only articles published in English.	
3. Web of Science Category: Management, business, economics, and public administration.	
4. Studies within the domain of social innovation: focus on social challenges, create social value, environmental sustainability, or similar.	
5. Studies within the domain of open innovation: participatory, collaboration, engagement of multiple stakeholders, co-creation, or similar.	
6. Empirical and conceptual studies.	
(B) Exclusion criteria	
1. Studies not primarily oriented towards social innovation and open innovation domains.	
2. Book chapters, editorials, seminal papers, and conference proceedings (gray literature).	
3. Articles that are unavailable electronically or by other reasonable means.	
4. Articles published in any language other than English.	
5. Articles published in journals ranked in the third (Q3) or fourth (Q4) quartiles according to the 5-year Journal Impact Factor in the 2023 Journal Citation Reports.	
6. Articles published in journals that are not in the Core Collection database of WoS.	

To examine the conceptual foundations of OSI, we conducted a co-citation network analysis. This approach, based on WoS bibliometric data, maps the frequency with which certain articles are cited together within the literature, revealing intellectual linkages and thematic relationships between

works (Gmür, 2003). By applying the following criteria—requiring a minimum of 2 edges and removing isolated nodes—we used the Louvain clustering algorithm to investigate network modularity (Zupic & Čater, 2015). This method allows for the identification of clusters of interconnected publications, which can then be categorized based on their thematic focus. In the resulting network, the relative size of each node indicates its co-citation frequency, highlighting the most frequently co-cited articles.

In addition, to examine the conceptual structure of OSI, we conducted a co-occurrence network analysis of authors' keywords. This approach maps the frequency with which the most common keywords appear together in the literature, revealing thematic relationships and conceptual linkages in the field (Boyack & Klavans, 2010). Applying the Louvain clustering algorithm, we used the same criteria of co-citation analysis: requiring a minimum of 2 edges and removing isolated nodes. In the resulting network, the relative size of each node indicates its co-occurrence frequency, highlighting the most frequently used keywords. The thickness of links between keywords shows their frequency of simultaneous use by authors.

Finally, to examine the findings of our content analysis, we adopt a systems theory analytical approach (von Bertalanffy, 1968). A system is a set of interacting elements with a specific purpose (Ackoff, 1971; Flood & Jackson, 1991). When we mention an element, it could be an individual, an organization, a government agency, or any other relevant entity. A relationship involves two elements interacting for a specific purpose, exchanging resources or information. By employing a systems perspective, we align with recent calls for a more comprehensive understanding of the ecosystem, bridging micro, meso, and macro levels of analysis (Bogers et al., 2017; Gegenhuber & Mair, 2024). To operationalize this systems approach, we organize our content analysis into four analytical themes: (i) antecedents, (ii) processes, (iii) relationships, and (iv) consequences. These themes encompass the fundamental components and dynamics of OSI initiatives, allowing for a methodical exploration of the phenomenon.

2.4 Results

2.4.1 Descriptive analysis

In our final sample, we included 115 relevant articles from 54 different journals that delved into the field of OSI (see Appendix A). Our analysis reveals that a majority (52.2%) of these articles were published within the last three years (2022–2024), as shown in Table 2.4. This increase in publications provides evidence of the growing importance of OSI research, which can be partly attributed to case studies focusing on collaborative initiatives addressing the challenges posed by the COVID-19 pandemic (Di Minin et al., 2021; Vermicelli et al., 2021).

The study of OSI has emerged in recent decades, with the earliest article published in 2006. This signifies the emergence of an expanding area of interest, highlighting the rapid development and current significance of OSI studies. In terms of journal productivity, Technological Forecasting and Social Change, as well as Business Strategy and the Environment contribute most publications, accounting for 15.7% of the articles (18 out of 115).

Table 2.4 Journals and published articles per year

Journal	Total	2006	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Technological Forecasting and Social Change	9				1					1	2		4	1	
Business Strategy and the Environment	9							1			2	1	1	3	1
R&D Management	6									5					1
European Journal of Innovation Management	6					1	1					1		3	
Industry and Innovation	5					1			1		1			1	1
Journal of Business Research	5						1				1		2	1	
Public Money & Management	4												4		
Corporate Social Responsibility and Environmental Mgmt.	4									1	1				2
Journal of Responsible Innovation	4										1		2	1	
Journal of the Knowledge Economy	3													1	2
Research Policy	3					1			1			1			
Management Decision	3								1	1				1	
IEEE Transactions on Engineering Management	3											1	1	1	
Journal of Product Innovation Management	3								1	2					
Technology Analysis & Strategic Management	3					1						1			1
Other journals	45	1	2	2	1	2	1	1	2	3	4	1	8	12	5
TOTAL	115	1	2	2	2	6	3	2	6	13	12	6	22	25	13

To assess the articles' impact, we analyzed their total citation counts on WoS. Table 2.5 highlights the top ten cited articles. The three most cited articles focus on open sustainability approaches in the business landscape. The clear frontrunner is Ghisetti et al. (2015), garnering 318 citations for their exploration of knowledge sourcing's influence on firms' environmental innovations. In second place, Fabrizi et al. (2018) examine the impact of regulation policies and research network policies on environmental innovation. In third place, Watson et al. (2018) conducted a systematic review on stakeholder engagement as a dynamic capability for firms to co-create sustainable solutions.

Table 2.5 Most cited articles

Paper	Total citations
Ghisetti et al. (2015)	318
Fabrizi et al. (2018)	208
Watson et al. (2018)	182
Edwards-Schachter et al. (2012)	145
Ornetzeder and Rohrer (2006)	120
Melander (2017)	118
Nesti (2018)	90
González-Moreno et al. (2019)	79
Alves (2013)	78
Oskam et al. (2021)	75
Chalmers (2013)	73
Windrum et al. (2016)	73

Overall, 311 distinct authors contributed to the 115 articles reviewed, averaging 2.83 authors per article. Gallouj F. was the author with the highest number of publications, contributing four articles. Following in terms of academic impact, Triguero A. and De Silva M. received significant attention with 96 and 94 total citations, respectively. Table 2.6 provides details of authors with two or more articles and their respective WoS total global citation counts.

Table 2.6 Most frequent authors and total citations

Authors	Articles	Total citations
Gallouj F.	4	113
Triguero A.	2	96
De Silva M.	2	94
Rubalcaba L.	2	84
Schartinger D.	2	78
Windrum P.	2	78
Adomako S.	2	38
Desmarchelier B.	2	31
Djellal F.	2	31
Fuglsang L.	2	20
Scupola A.	2	20
Gegenhuber T.	2	11
Mair J.	2	11

Most papers (80.9%, 93 out of 115) are based on empirical research, with qualitative methods being the most commonly used (68.8%, 64 out of 93). This aligns with the exploratory nature of the OSI approach, where case studies serve as a valuable tool for examining novel phenomena (Eisenhardt, 1989). In terms of the social research issue, our analysis revealed that 64.3% (74) of the studies are broad-spectrum, meaning they do not focus on a particular social issue. Table 2.7 provides an overview of the number of articles considering the social issue for each type of methodology used. Among the studies that focus on a specific social issue, environmental issues stand out at 21.7% (25). Furthermore, the majority of articles in these studies are quantitative (16 out of 22) and primarily focus on examining how to reduce the environmental impact of firms.

Table 2.7 Overview methodological procedures by social issue classification

Document types (methodology)	Literature review	Conceptual	Empirical			Total empirical	Total
			Mixed methods	Qualitative	Quantitative		
Social issues							
Broad-spectrum	7	10	5	45	7	57	74
Environmental	3		1	5	16	22	25
Social integration and cohesion		1		5		5	6
Social development and well-being		1		3		3	4
Health				4		4	4
Poverty and inequality				2		2	2
Total	10	12	6	64	23	93	115

Figure 2.2 shows the bibliographic network based on co-citation analysis of the top 100 most frequently cited references, classified into three main clusters: Cluster 1: Empirical Insights: Firms, Environment, and Open Innovation; Cluster 2: Theoretical Foundations: Open Innovation and Social Innovation; and Cluster 3: Qualitative Approach: Case Studies. These clusters demonstrate thematic complementarity rather than domination, where the central theoretical frameworks (Open Innovation and Social Innovation) mediate between empirical applications and different complementary frameworks, as synthesized in Table 2.8.

Cluster 1. Empirical Insights — Firms, Environment, and Open Innovation (left)

This cluster reveals a fundamental knowledge base centered on organizational innovation practices. The co-citation patterns demonstrate theoretical linkages between open innovation performance metrics (Laursen & Salter, 2006) and environmental innovation frameworks (Horbach, 2008). The cluster's structure indicates a distinctive theoretical foundation where environmental and open innovation concepts have been systematically integrated, particularly in for-profit contexts organizations (e.g., Cainelli et al., 2012). Notably, works like De Marchi (2012) and Rennings (2000) anchor this cluster's focus on sustainability-oriented collaboration mechanisms, aligning with broader scholarly constructs such as 'sustainable open innovation' (Bogers et al., 2020). This cluster provides practical frameworks for organizations to optimize their open collaboration processes while actively contributing to environmental sustainability.

Cluster 2. Theoretical Foundations — Open Innovation and Social Innovation (center)

This cluster represents the central theoretical domain within OSI, characterized by dense co-citation patterns between foundational social innovation conceptualizations (e.g., Cajaiba-Santana, 2014; Mulgan, 2006; Murray et al., 2010) and open innovation (Chesbrough, 2003a; West & Bogers, 2014). The network structure reveals theoretical integration with alternative approaches, including local innovation (Moulaert & Nussbaumer, 2005), user innovation by von Hippel (1988), and co-creation processes (Voorberg et al., 2015). Moreover, the presence of the absorptive capacity framework (Cohen & Levinthal, 1990) within this cluster suggests its theoretical relevance within the knowledge integration processes in OSI. This cluster shows that organizations and communities can implement strategies combining openness benefits with social impact to effectively address urgent social challenges through cross-sector knowledge flows.

Cluster 3. Qualitative Approach — Case Studies (right)

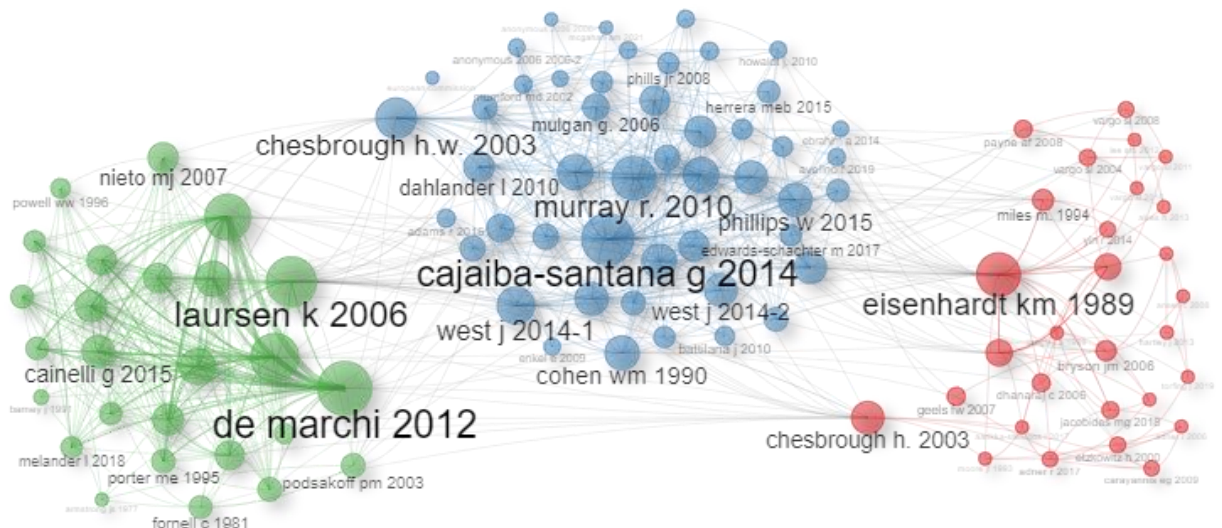
This cluster highlights a significant knowledge base grounded in qualitative research frameworks, founded upon case study methodology (Eisenhardt, 1989). It includes influential works that contribute theoretical frameworks from qualitative evidence, as exemplified by Gioia et al. (2013), Miles & Huberman (1994), and Yin (2004). Furthermore, the co-citation patterns reveal theoretical frameworks operating at broader analytical levels, including innovation ecosystems (Adner, 2006),

the triple helix model (Etzkowitz & Leydesdorff, 2000), and cross-sector collaboration works in the domain of public administration (e.g., Bryson et al., 2006; Hartley et al., 2013). This cluster establishes case studies as a fundamental approach to capture and analyze the complex dynamics of multi-actor collaboration in OSI initiatives.

Table 2.8 Prevailing theoretical perspectives analysis by cluster

Cluster	Theoretical perspectives
Cluster 1. Empirical Insights — Firms, Environment, and Open Innovation	• Sustainable development literature exhibits co-citation patterns with innovation management papers. • External knowledge sourcing studies appear connected to environmental innovation papers. • Innovation adoption research clusters with sustainability-oriented literature.
Cluster 2. Theoretical Foundations — Open Innovation and Social Innovation	• Open innovation literature forms a central node within the overall co-citation network. • Social entrepreneurship papers co-occur frequently with open innovation literature. • Multi-stakeholder collaboration studies position themselves between traditional and social innovation literature. • Public sector innovation research appears in conjunction with business innovation literature.
Cluster 3. Qualitative Approach — Case Studies	• Service-dominant logic papers form connections with both innovation and social value literature. • Papers on ecosystem approaches occupy positions linking theoretical and empirical research. • Papers on resource orchestration cluster together with firm boundary literature. • Value co-creation literature appears frequently in co-citation relationships across different research traditions. • Knowledge flow frameworks form a visible subgroup within the broader empirical cluster.

Figure 2.2 References' co-citation network of OSI research



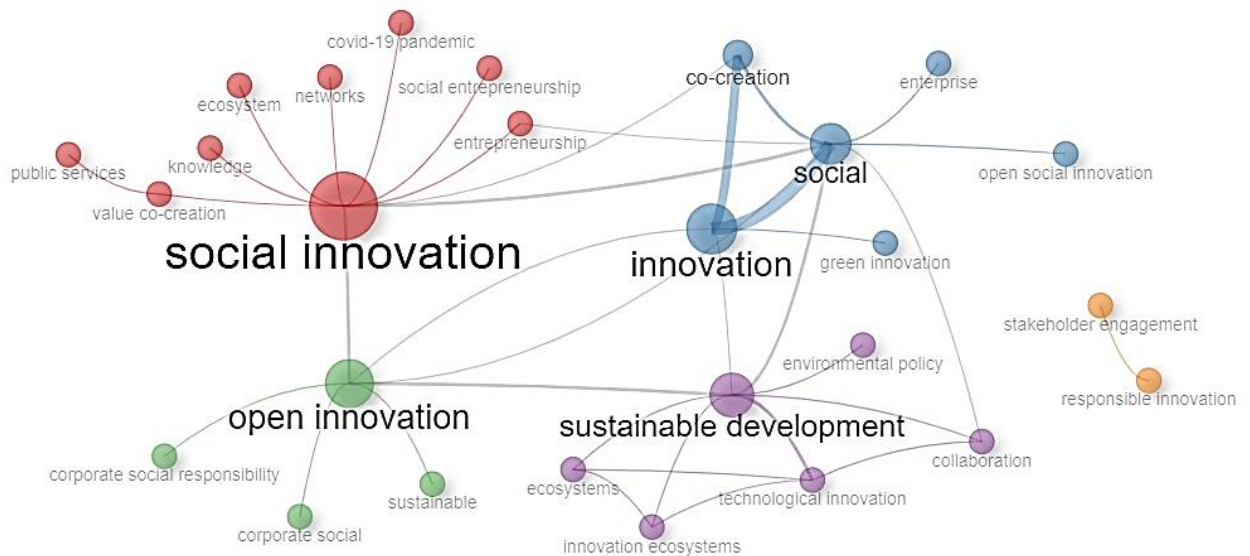
Source: Biblioshiny, based on the WoS dataset.

Finally, the co-occurrence network categorizes the top 50 most frequently used keywords into five clusters, excluding 26 isolated keywords. The results are presented in Figure 2.3. The analysis shows

that ‘social innovation’ and ‘open innovation’ are central nodes with limited direct connectivity between them. However, this weak inter-nodal connection is counterbalanced by complementary frameworks and practices emerging around each node. Within the social innovation node, links connect to terms like ‘co-creation’, ‘entrepreneurship’, ‘ecosystem’, and ‘networks’, indicating a focus on creating collaborative and participatory structures. The open innovation node, meanwhile, shows connections to ‘corporate social responsibility’ and ‘sustainable’, revealing a more formalized and business-oriented approach to OSI.

The co-occurrence analysis uncovers that different mechanisms aim to address societal issues. The social innovation cluster emphasizes bottom-up, community-driven broader approaches, while the open innovation cluster integrates open practices within sustainability and corporate social contexts. Moreover, the prominence of the ‘sustainable development’ node indicates that sustainability is a key driver in OSI studies, pointing to the field’s potential responsiveness to global issues. Notably, the smaller ‘open social innovation’ node suggests that this concept is still developing, presenting opportunities for further exploration of the interconnectedness of these research areas.

Figure 2.3 Conceptual structure of OSI research



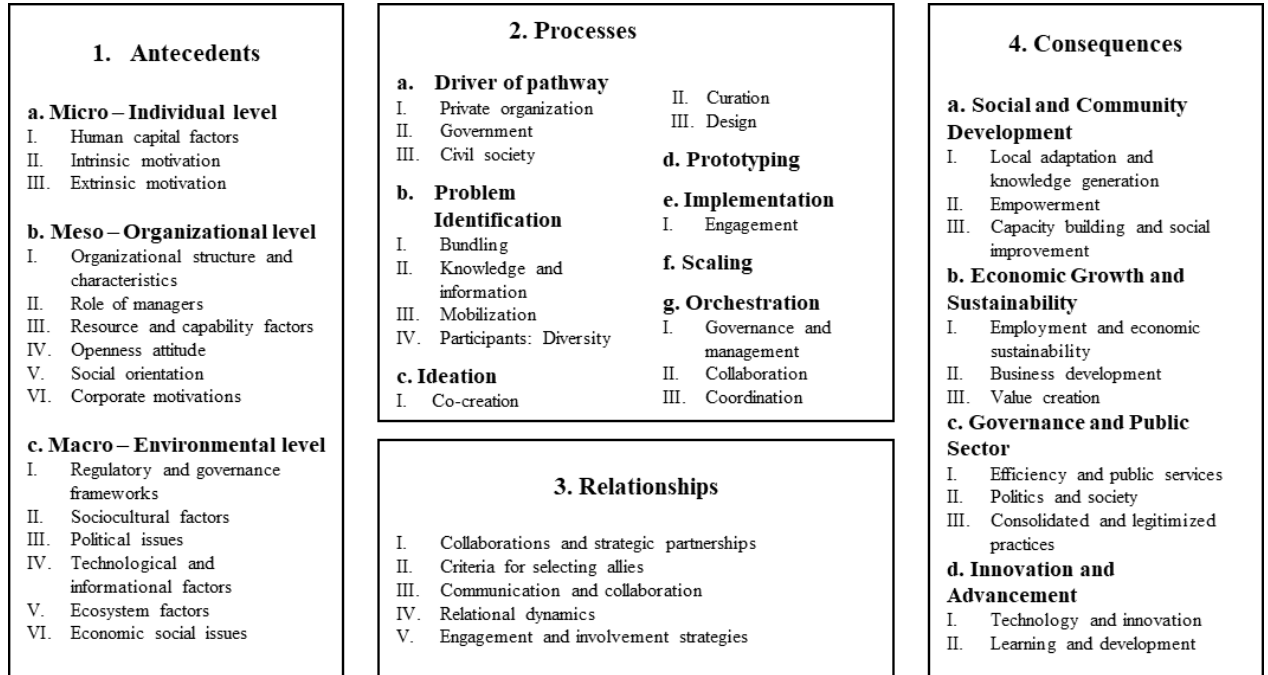
Source: Biblioshiny, based on the WoS dataset.

2.4.2 Content analysis

Drawing upon the methodology and structure of analysis employed in prior literature reviews in the fields of innovation and entrepreneurship (Urbano et al., 2019, 2022; Zahoor & Al-Tabbaa, 2020; Zahra et al., 2006), we synthesize our findings into four analytical themes: (i) antecedents, (ii) processes, (iii) relationships and (iv) consequences. The antecedents explore the determinants and drivers moderating OSI initiatives’ emergence across individual, organizational, and ecosystem levels. The relationships investigate the interconnections and interactions among actors for resource

exchange and value co-creation. The process theme examines how OSI initiatives unfold, encompassing practices, routines, and mechanisms for collaboration, coordination, co-creation and similar. The consequences analyze OSI initiatives' outcomes and implications. Figure 2.4 provides an overview of the analysis, and each theme is further discussed in the following subsections.

Figure 2.4 Overview of themes and dimensions identified through content analysis



2.4.2.1 Antecedents

Micro – Individual Level

Human capital factors emerge as determinants of OSI. Leadership skills help individuals guide and inspire others towards innovative objectives (Grama-Vigouroux et al., 2024), while knowledge acquisition across various domains provides the foundation for ideation and problem-solving processes (Kimpimäki et al., 2022; Kobarg et al., 2020). An entrepreneurial orientation, characterized by creative and ambitious thinking, is conducive to OSI (De Silva & Wright, 2019). In addition, the propensity of individuals to take risks plays a role in their decision to participate in community initiatives (Hardyman et al., 2022).

Motivation, both intrinsic and extrinsic, emerges as a recurring theme in OSI initiatives (e.g., Akasaka et al., 2023; Nesti, 2018). Intrinsic motivation, such as the entrepreneurial ambition to found ventures, drives innovation activities (Dzandu & Pathak, 2021). Extrinsic motivators, including monetary rewards, recognition, and other incentives, are also effective in encouraging engagement in OSI (Allal-Cherif et al., 2022; Fait et al., 2023; Schmidhuber et al., 2019).

Meso – Organizational Level

Organizational factors influence OSI (e.g., Gibbon & Rutter, 2022; Melander, 2017). The structure and shared values within an organization are crucial determinants of its engagement in OSI initiatives (Altuna et al., 2015; Palakshappa et al., 2024). Additionally, credibility and open networks facilitate OSI efforts by providing access to resources and enhancing organizational reputation (van Geenhuizen & Ye, 2014). Moreover, resilience (Vendrell-Herrero et al., 2023) and adaptive capacity (Smolka & Bösch, 2023) are important for overcoming OSI challenges.

Openness to knowledge exchange, encompassing acquisition and dissemination, is fundamental for OSI, as external sources enhance social innovation performance (Hagedoorn et al., 2023). For example, Allal-Cherif et al. (2022) emphasize that OSI thrives on collaboration among diverse stakeholders, with multifunctional teams enabling exceptional performance and stronger partnerships. Furthermore, diversity in top management teams, especially gender diversity, enhances OSI performance by incorporating varied perspectives and approaches, as suggested by Ten Holter (2022).

The accessibility of resources is essential for OSI initiatives (Alcalde-Heras & Carrillo Carrillo, 2023; Rey-García et al., 2019; Shaheen et al., 2023). Factors such as dedicated time for innovation, R&D investments, and knowledge capabilities have been identified as pivotal for OSI (Watson et al., 2018). Moreover, organizational attributes such as size (Moreno-Mondéjar et al., 2020), age (Kher et al., 2023), absorptive capacity (Ghisetti et al., 2015), and dynamic capabilities (Rey-García et al., 2019) play a significant role in shaping OSI potential. Notably, attributes like dynamic capabilities have been evaluated in contexts such as green innovation, contributing to sustainable practices (Khan et al., 2023). Regarding early-stage organizations, OSI initiatives, such as social accelerators, not only offer financial support but also provide business expertise, networking opportunities, and mentorship (van Geenhuizen & Ye, 2014).

Corporate social responsibility (Cai et al., 2023; Dionisio & de Vargas, 2022; Roszkowska-Menkes, 2018) and environmental sustainability (Khan et al., 2023) align organizations with OSI principles. Firms' motivations, such as enhancing competitive positioning, improving corporate image, and accessing lower-end markets, drive OSI initiatives (Babu et al., 2020). In response to societal demands, community pressure (Hofman et al., 2020) often drives organizations to adopt OSI, while power dynamics within communities influence the direction and focus of these initiatives (Camba-Fierro et al., 2024).

Macro – Environmental Level

Multiple environmental elements at the macro level shape OSI. Regulatory and governance aspects, such as bureaucracy (Grama-Vigouroux et al., 2024), normative institutions (Sweeting et al., 2022),

and regulatory laws (Fabrizi et al., 2018) influence the OSI ecosystem. In parallel, sociocultural elements, including values, legitimacy, and community attitudes, are integral to OSI regional practices (Cambra-Fierro et al., 2024; Ricciardelli et al., 2020).

The development of OSI in the public sector is shaped by factors such as political agendas, centralization, paternalism, open government practices, and local disputes (Randhawa et al., 2019; Sarma & Sunny, 2017; Sweeting et al., 2022). For example, the degree of centralization and paternalism in government affects resource distribution and decision-making processes, thereby influencing OSI's dynamics and scope (Sweeting et al., 2022). Furthermore, the relationship between political factors and OSI in society is emphasized by the importance of government transparency and openness (Colovic & Schruoffenegger, 2021).

The technological landscape and informational factors influence OSI (Gegenhuber et al., 2023), as evidenced by the role of digital technologies and data sharing in OSI initiatives. These include aspects like open data availability, which promotes transparency and accessibility, facilitating scalability (Cambra-Fierro et al., 2024; Colovic et al., 2022). These technological advancements facilitate novel approaches to collaboration and innovation management across various contexts, such as smart communities and smart cities (Ciasullo et al., 2020; Sarma & Sunny, 2017). Among these technological developments, emerging technologies are transforming how social issues are constructed and addressed (Hong & Lee, 2023; Leite, 2022; Xin et al., 2023).

Finally, the development of a favorable ecosystem for OSI is influenced by macro factors, such as social economy models (Catala et al., 2023). Globalization, on the other hand, presents both opportunities and challenges for internationalization and collaboration scaling (Lee & Restrepo, 2015). Within its ecosystem, OSI operates alongside unmet social demands (Galdini & De Nardis, 2023; Vendrell-Herrero et al., 2023) and is supported by economic resources such as philanthropic funding (Cai et al., 2023; Chalmers, 2013) and impact investing (Christopoulos et al., 2023).

2.4.2.2 Processes

The process theme in OSI involves stages that range from problem identification to scaling solutions for societal challenges. Problem identification involves recognizing and framing societal issues to invite innovative solutions, necessitating a deep understanding of the problem's roots to create collective awareness (Hansen et al., 2022). Ideation follows a bottom-up approach, empowering those affected by the problem to contribute ideas and solutions, distinguishing OSI from top-down models (Kruse et al., 2019). In addition to this, co-creation enables dynamic knowledge exchange and the development of capabilities to co-create value in innovative ways (Hardyman et al., 2022).

The iterative nature of OSI is underscored in studies by Jamieson & Martin (2022) and Kruse et al. (2019). However, the trajectory of these initiatives varies based on the leading stakeholders

addressing the issue, particularly those external to the public sector (Hansen et al., 2022). While the literature proposes horizontal (Allal-Cherif et al., 2022) or multilevel governance models (Cambra-Fierro et al., 2024; Catala et al., 2023), it is observed that a primary organization or sector may take the lead in driving these initiatives. For instance, when private companies take the lead, the research focus often includes topics such as sustainable development solutions (Chang, 2019), corporate social responsibility (Altuna et al., 2015), and legitimation (Verleye et al., 2019). On the other hand, government-led projects emphasize citizen participation (Sarma & Sunny, 2017) and improving public services (Alves, 2013), with the aim of achieving broad, long-term systemic changes (Eseonu, 2022). Meanwhile, civil society organizations prioritize citizen empowerment initiatives (Sweeting et al., 2022), socially embedded actions (Christopoulos et al., 2023), and addressing local issues (Dzandu & Pathak, 2021).

In addition to the traditional stages of the innovation process, OSI goes beyond by incorporating practices and mechanisms that facilitate collaboration, coordination, and orchestration of activities (Jarmai & Vogel-Pöschl, 2020; Oskam et al., 2021; Ricciardelli et al., 2020). Collaboration involves bringing together diverse stakeholders with unique skills and perspectives, enriching the innovation process and establishing a supportive network (Adomako & Nguyen, 2024; Rey-García et al., 2019). These innovation networks benefit from clear aims and appropriate compositions to facilitate such exchanges (Sarasini, 2015).

Effective coordination is crucial for tackling collaborative approaches like OSI. This involves aligning objectives (Oskam et al., 2021) and establishing clear communication (Olsson et al., 2021). Additionally, it is essential to ensure that stakeholders work towards a shared vision (Cutler White, 2014) and address challenges such as the scarcity of resources, including time (Kallio & Lappalainen, 2015). In this context, leaders of OSI initiatives, also known as orchestrators, perform various activities. From a functional perspective, Wegner et al. (2023) identify key orchestrating activities, including designing, organizing, integrating, monitoring, bridging, legitimizing, and adapting. Complementing this, Gegenhuber and Mair (2024) propose a process-oriented approach that outlines four phases: mobilizing stakeholders, bundling ideas, curating solutions, and scaling initiatives.

2.4.2.3 Relationships

OSI is influenced by the extensive network linkages within the process (Barrett & Dooley, 2024). These linkages contribute to resource exchange and the co-creation of value (Babu et al., 2020), encouraging novel forms of interaction among diverse stakeholders (Citroni, 2015). Trust plays an essential role in the success of these collaborations (Jarmai & Vogel-Pöschl, 2020) as it influences their stability and effectiveness (Sarasini, 2015). Additionally, community engagement is another key aspect of OSI (Dezi et al., 2018). For instance, involving citizens in the process can enhance

legitimacy and align innovations with public interest, thereby facilitating smoother implementation (Häikiö, 2012).

Research has identified several factors that contribute to these relationships and the impact of innovations. For example, forming alliances with large companies can provide access to extensive resources, broader market reach, and valuable expertise (van Geenhuizen & Ye, 2014). Additionally, collaborations with top strategic partners, who are leaders in their fields, can offer critical insights, resources, and support (De Silva et al., 2020).

2.4.2.4 Consequences

Studies have shown that OSI may generate various types of social value and yield sustainable social impact (De Silva & Wright, 2019; Fayard, 2024). This is because OSI focuses on collaborating with stakeholders to co-create solutions that are tailored to local needs, thereby enhancing their practicality and sustainability (Bentzen, 2022; Rayna & Striukova, 2019; Svensson & Hambrick, 2019). OSI initiatives, such as DIY labs and Living Labs, align technological advancements with societal needs through citizen participation (Lhoste, 2020), potentially yielding innovations that address community challenges more effectively (Edwards-Schachter et al., 2012). Consequently, these co-created solutions are more accepted by the community and exhibit greater long-term viability due to the involvement of multiple stakeholders (Windrum et al., 2016). In addition, this approach enhances social innovation performance, especially when there is strong institutional support and high levels of social legitimacy (Adomako & Nguyen, 2024).

From an economic perspective, OSI makes contributions to employment and economic sustainability. According to Kher et al. (2023) OSI initiatives, like social accelerators, have a positive impact on financing, revenues, and employment in ventures. Additionally, studies by Juusola et al. (2024) have shown that these initiatives enhance the capacity of social enterprises to generate value in underserved markets. Furthermore, OSI facilitates the creation of value by endorsing solutions that are economically viable and socially beneficial, as evidenced by Lippolis et al. (2023) in environmentally sustainable initiatives.

OSI also promotes the empowerment of individuals and communities (Nesti, 2018; Windrum et al., 2018). It achieves this by involving diverse stakeholders, including citizens, lead users, and social entrepreneurs, in the innovation process (Battisti, 2019). This collaborative approach fosters a sense of ownership and shared responsibility among stakeholders, leading to a more engaged and proactive ecosystem capable of sustaining positive change (Palakshappa et al., 2024). Furthermore, OSI initiatives facilitate legitimacy establishment through inter-organizational, multilevel, and external building blocks (Verleye et al., 2019).

In terms of community impact, OSI also enhances community well-being through mechanisms such as knowledge transfer. OSI facilitates short-lag societal impact, as evidenced by Olsson et al. (2021), who emphasize that aspects such as continuity and co-creation in collaborative research contribute to tangible community benefits. OSI encourages continuous learning, experimentation, and adaptation, fostering a culture of lifelong learning and empowering individuals and communities to tackle complex challenges (Svensson & Hambrick, 2019). Additionally, the study conducted by Rashid et al. (2024) indicates how knowledge transfer through social innovation, involving multiple stakeholders, can lead to improved living standards, enhanced community competitiveness, and the creation of sustainable economic opportunities.

Lastly, OSI initiatives enable public organizations to respond effectively to complex issues by fostering the generation of new solutions (Alves, 2013). This aligns with novel public service management practices that support collective learning of strategic importance in addressing complex societal challenges (Kallio & Lappalainen, 2015). Additionally, by adopting an ecosystems perspective, OSI initiatives may enhance understanding of experimentation and value co-creation in public services (Hardyman et al., 2022). Moreover, these collaborative approaches give rise to innovative governance models that position local governments as creators, facilitators, and gatekeepers of systems (Cambra-Fierro et al., 2024). In these systems, various stakeholders, including citizens, actively participate in decision-making processes. Through collaboration with policymakers, community leaders, and citizens, OSI enhances governance structures, making them more inclusive and adaptable to societal challenges (Merlin-Brogniart et al., 2022).

2.5 Toward an Integrative Conceptual Framework

In this section, we introduce an integrated framework that combines insights from social innovation (Murray et al., 2010), open innovation (Chesbrough, 2003a), and the findings from the SLR. The purpose of this framework is to capture the essential components and dynamics that describe OSI. We define OSI as a cross-collaborative, ecosystem-based approach to tackling social problems. It serves as a framework for the diverse models of initiatives that facilitate the orchestration of synergies and collective action to empower actors (such as communities, firms, NGOs, entrepreneurs, etc.) for transformative social change. OSI promotes distributed and participatory processes throughout the different social innovation stages. Table 2.9 provides a comparative overview of the key principles, characteristics, and practices of OSI.

Table 2.9 Overview of comparative key aspects of OSI

Key aspect	Open Social Innovation	Traditional social welfare approaches
Principles	Emphasize openness, diversity, synergy, and collaboration.	Emphasize social mission, efficiency, and outcome control.
Actors involved	Multiple stakeholders, including affected communities, the private sector, government, academia, and civil society.	Driven primarily by nonprofit organizations and government.
Sources of ideas and knowledge	Collective intelligence, co-creation, and diverse perspectives.	Internal experience and specialized knowledge.
Innovation process	Effectuation: Iterative, adaptive and based on experimentation.	Causation: Linear, planned and based on implementation.
Resources and capabilities	Mobilizing diverse and complementary resources through connections, networks, and partnerships.	Dependence on one's own resources, grants, or government funding.
Governance and decision-making	Participatory, transparent and based on collaboration between multiple stakeholders.	Hierarchical, centralized and based on the authority of the leading organization.

The proposed conceptual framework adopts a system approach (von Bertalanffy, 1968), unveiling the complex, multi-dimensional nature of OSI. Based on this framework, OSI is observed through actors interacting and exchanging resources, both tangible and intangible, over time for a specific purpose. While traditional models may limit actors to sector-based roles, innovation ecosystems, as conceptualized by Carayannis et al. (2018), promote dynamic, multilevel interactions across sectors. Consequently, our framework places emphasis on the definition of essential roles that actors assume, based on their actions and the dynamic value they bring to the OSI process (see Table 2.10). This approach is premised on the understanding that a single actor may assume multiple roles within the OSI process. For instance, the entrepreneurial university approach expands the traditional role of universities as generators of knowledge (Etzkowitz, 2003), enabling them to also facilitate inter-relationships and linkages among several external organizations through incubators and other support programs (Guerrero et al., 2016).

Table 2.10 Overview of key roles of OSI process

Role	Description	Organizational examples
Activists	These are the actors who identify and seek to transform a social issue.	Community-based organizations, city councils, community leaders, or similar.
Affected communities	These actors are directly influenced or benefited by the problematic situation.	Migrant communities, polluting companies, low-income neighborhoods, or similar.
Knowledge communities	These are groups of actors who provide relevant information or knowledge (technical-scientific, contextual-traditional knowledge, etc.).	Research centers, local knowledge holders, community leaders, think tanks, or similar.

Orchestrators– design team	These actors lead the process by facilitating collaboration among stakeholders and promoting the transformation of ideas into tangible societal innovations.	Social incubators, collaborative networks, crowdsourcing projects, public-private partnerships, Living Labs, or similar.
Entrepreneurs	These actors materialize ideas into products, services, practices, or management models in the affected communities.	Intrapreneurs in city councils, social entrepreneurs, cooperatives, or similar.
Promoters	These actors make innovations visible and disseminate them within and outside the ecosystem to support their scalability in other similar contexts.	Organizers of awards and recognitions, platforms, media, and journalists, or similar.
Enablers	These actors provide all kinds of tools and resources, monetary or in-kind, such as training, talent, consultancy, financial resources, infrastructure, and spaces in the OSI process.	Impact investors, philanthropic foundations, government agencies, coworking spaces, or similar.
Regulators	These actors define the formal institutions (norms, laws, and regulations) that influence the development and interactions of the ecosystem.	National government, local authorities, international institutions, policymakers, or similar.

The OSI process has emerged through various models that promote collaboration, co-creation, and collective action. These models engage diverse stakeholders and leverage their knowledge, resources, and capabilities to address social challenges. The process is orchestrated through a series of initiatives, also referred to as projects, which may vary in terms of their specific objectives, expected outcomes, or temporal boundaries. Table 2.11 provides a concise overview of the main examples of OSI initiatives, which have been categorized into four quadrants based on the social innovation process stages (Murray et al., 2010) and scalability (local or regional). These quadrants include: (i) multi-stakeholder issue analysis, (ii) scalable social impact initiatives, (iii) community-driven problem framing, and (iv) contextualized social innovations (see Figure 2.5). Furthermore, the OSI models can be distinguished into two primary groups depending on their main emphasis: exploration-oriented initiatives, which prioritize the initial stages of the innovation process, and empowerment-oriented initiatives, which concentrate on implementation and scaling in later stages.

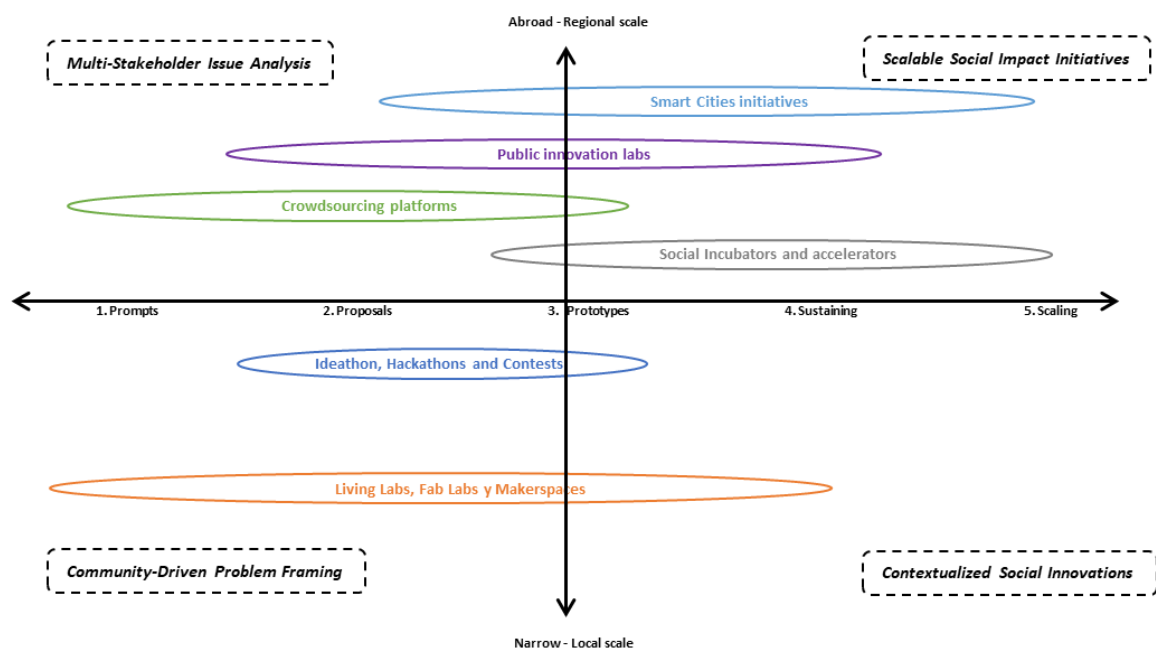
Table 2.11 Summary OSI main initiatives

OSI Initiative	Description
Crowdsourcing platforms.	Online spaces where a diverse community is invited to propose ideas and solutions to a specific problem or opportunity, leveraging collective intelligence.
Ideathons, Hackathons, and Contests.	Intensive events, programs, or competitions in which participants collaborate to develop innovative solutions for specified challenges.
Public Innovation Labs.	Public sector units that provide opportunities to experiment with new approaches, co-create solution prototypes with citizens, and test innovations before larger-scale implementation.
Living Labs, Fab Labs, and Makerspaces.	Spaces that foster collaboration and enable the community to design, prototype, and manufacture solutions using a variety of tools and equipment.

Social Incubators and Accelerators.	Programs that provide training, mentorship, networking, or funding to social ventures in order to facilitate their growth, acquire traction, and achieve greater impact.
Smart Cities Initiatives.	Initiatives aimed at improving urban services and quality of life in cities by applying digital technologies, data, and intelligent systems.

Exploration-oriented OSI initiatives target the early stages of the innovation process, such as problem identification and ideation. Examples include hackathons, which gather individuals with diverse skills to develop solutions collaboratively (Lara & Lockwood, 2016), and crowdsourcing campaigns that use digital platforms to engage many people in contributing ideas, resources, or labor (Hossain & Kauranen, 2015). Living Labs also belong to this category, offering real-life environments for users and innovators to co-create solutions iteratively (Hossain et al., 2019). On the other hand, empowerment-oriented OSI initiatives prioritize the later stages, placing emphasis on the implementation and scaling of social innovations. Social entrepreneurship accelerators are a good example in this category, providing structured support, mentorship, and resources to help social ventures expand their impact (Crişan et al., 2021; Hallen et al., 2020).

Figure 2.5 OSI orchestration initiatives



A comprehensive approach to OSI requires the strategic integration and customization of diverse initiatives, tailored to address the unique context and objectives of each social challenge. This strategy may involve, for instance, launching a broad crowdsourcing campaign, then advancing selected ideas into a specialized social incubator. By strategically merging and coordinating these initiatives across the innovation process, OSI practitioners may unlock powerful synergies and maximize the transformative impact of their efforts.

2.6 Discussion and Implications

The rapid growth in OSI-related publications, particularly following the COVID-19 pandemic, reflects increasing recognition of its potential for tackling multifaceted problems that single organizations cannot effectively address alone. Our analysis further reveals OSI's distinctive nature as more than a simple application of open innovation principles to social contexts. It represents a fundamental shift in how multiple stakeholders collectively address societal challenges through distributed processes that emphasize inclusivity, co-creation, and social change.

The conceptual framework we propose views OSI through an ecosystem lens where actors assume distinct functional roles based on their contributions rather than their sectoral origins. This perspective highlights how OSI orchestration initiatives can be strategically deployed across different innovation phases. By emphasizing both exploration-oriented initiatives and empowerment-oriented models, our framework provides a comprehensive understanding of OSI's dynamic processes. This chapter has both theoretical and managerial implications.

2.6.1 Theoretical implications

Our review clarifies the conceptual foundations of OSI by synthesizing fragmented literature and identifying distinct intellectual clusters that shape this field. By mapping the connections between open innovation and social innovation, we provide a coherent framework that addresses the current theoretical gaps. The co-citation patterns reveal the dominance of organization-centric perspectives stemming from seminal open innovation works, while simultaneously showing emerging ecosystem approaches that represent a critical evolutionary point in OSI's theoretical development. Additionally, our role-based typology extends the innovation ecosystem models beyond the triple helix and sector-based classifications, offering a more nuanced understanding of the diverse actors involved in developing an idea into real-world change. Furthermore, our categorization of OSI initiatives by orientation (exploration/empowerment) and scale (local/regional) enables complexity decomposition, allowing researchers to conduct more rigorous comparative analyses of diverse OSI approaches.

2.6.2 Managerial implications

Several managerial implications can be derived from this chapter. First, the literature has presented OSI initiatives as distinct approaches (like Living Labs, hackathons, or social accelerators) without providing practitioners with clear guidance on their strategic selection and integration. This has led to fragmented implementation where organizations often adopt a single model without considering its fit within broader innovation processes (for example, what happens with the awarded idea?). By classifying these initiatives based on orientation (exploration/empowerment) and scale (local/regional), our framework enables practitioners to envision and integrate appropriate

approaches based on specific objectives, resources, and innovation phases rather than following trends. Second, our role-based perspective helps practitioners transcend traditional sector-based thinking when forming collaborations. Instead of assuming fixed roles based on organizational type (business, government, civil society), stakeholders can strategically adopt functions that leverage their unique capabilities and resources, potentially assuming multiple roles throughout the innovation process. This flexible approach enhances resource mobilization and knowledge integration across boundaries. Third, for public sector innovators, our findings highlight how OSI approaches can enhance service delivery through citizen participation without requiring complete organizational transformation. By strategically implementing OSI initiatives that complement existing operations, public administrators can gradually build collaborative capabilities while generating tangible social value. This incremental approach reduces resistance and implementation risks. Lastly, for social funders and sponsors, our review suggests the need to shift from financing isolated projects toward supporting ecosystem development. By investing in platforms, shared infrastructure, and orchestration capabilities, funders can create enabling environments that stimulate multiple innovations rather than depending on single interventions. This systemic approach yields more sustainable impact by building collaborative capacity across stakeholders rather than creating dependency on continuous funding.

2.7 Research Agenda

Our systematic review of 115 articles reveals significant opportunities for advancing OSI research. The analysis demonstrates that while descriptive studies have proliferated, a more integrated theoretical understanding of OSI as a cross-collaborative, ecosystem-based approach to tackling social problems remains underdeveloped. Nevertheless, to break down and understand this dynamic process in which actors interact and exchange resources over time, it may be useful to employ multilevel approaches (e.g., Bogers et al., 2017), and multi-initiative frameworks. The research agenda for OSI should prioritize the exploration of complex relationships among initiatives, stakeholders, and the broader socio-economic context within which they operate. Such insights can guide the design and implementation of more effective OSI initiatives. Similar to our framework for analyzing the results, we propose four research themes that warrant scholarly attention: (i) antecedents; (ii) process and relationships; (iii) consequences; and (iv) methodological considerations. Table 2.12 presents a set of potential research questions derived from the future work suggestions identified in the analyzed studies, along with guiding theoretical frameworks that align with these research themes based on our analysis, rather than representing an exhaustive theoretical assessment.

2.7.1 Research theme 1: Multilevel antecedents of OSI

Our analysis suggests that while organizational factors influencing OSI have received considerable attention, significant gaps persist in understanding the interplay of OSI with individual-level factors (e.g., individual agency) and macro-level elements (e.g., institutional contexts and societal structures). Further research in these areas could enhance our comprehension of OSI dynamics and effectiveness across different contextual settings.

At the micro level, future research could explore the socio-psychological underpinnings that drive sustained participation in OSI initiatives. Current literature has begun to examine how intrinsic motivational factors influence user contributions (Schmidhuber et al., 2019), which presents opportunities for further theoretical development. Studies examining individual-level antecedents could benefit from greater engagement with established psychological frameworks, creating opportunities to integrate theories such as Self-Determination Theory (Deci & Ryan, 2000) to examine how individual values intersect with organizational commitments and participation patterns.

At the meso level, we identify opportunities to examine how organizational commitments and structures shape OSI development. Current research provides valuable descriptive insights into how corporate social responsibility, eco-innovation, and shared value creation influence OSI initiatives across sectors (Cai et al., 2023; Kobarg et al., 2020). Building on this foundation, future research could develop frameworks that explain these relationships in different contexts. Additionally, while studies have identified organizational considerations such as institutional adaptation, intellectual property approaches, and resource allocation (Colovic et al., 2022; De Silva & Wright, 2019), there remain opportunities to develop frameworks that explain how organizations navigate these considerations. Additionally, analyzing OSI's impact on business activities in organizations of varying sizes and product diversification may yield valuable insights into its organizational implications (Altuna et al., 2015). Future research could develop and test theoretical models that connect organizational characteristics to OSI implementation effectiveness.

At the macro level, there are promising opportunities for researching OSI's societal impacts, integrating theoretical frameworks with practical implementations (De Silva & Wright, 2019; Kruse et al., 2019; Windrum et al., 2016). This area of inquiry connects with discussions in innovation ecosystems research regarding governance approaches (Dedehayir et al., 2018). On the other hand, it may be useful to integrate theoretical frameworks widely discussed in academic disciplines, such as the institutional approach (North, 1990), to contrast the influence of formal and informal factors that facilitate the creation of an environment conducive to social innovation through openness and sustainability (Fabrizi et al., 2018; Grama-Vigouroux et al., 2024). These connections create opportunities for scholars to investigate the dynamic interplay between macro factors and OSI ecosystem development (Gegenhuber & Mair, 2024; Trischler et al., 2020).

2.7.2 Research theme 2: Process dynamics and stakeholder relationships

Our review highlights opportunities for expanding our understanding of the processes and relationships underpinning OSI initiatives. This theme encompasses four research opportunities that invite deeper investigation. First, current research has begun to address the complex leadership models and collaboration dynamics that drive OSI processes. While studies have begun examining legitimization dynamics and their broader societal impacts (Verleye et al., 2019), the analysis of how different leadership approaches affect OSI outcomes remains underdeveloped. This creates opportunities for scholars to contrast leadership models with OSI to advance understanding beyond descriptive accounts.

Second, the governance of OSI initiatives presents opportunities for future research, with a focus on optimizing network structure and function for greater impact (Sarasini, 2015). This includes scrutinizing stakeholder roles, power dynamics, resource distribution, and decision-making processes (Logue & Grimes, 2022). Further empirical validation across diverse welfare regimes could enhance these frameworks (Merlin-Brogniart et al., 2022). In this context, analyzing the dynamics of OSI at various levels and their impact on sustainability goals may enable researchers to develop and test new collaboration models that address complex sustainability challenges (Kimpimäki et al., 2022).

Third, the role of orchestrators in multi-stakeholder collaborations deserves attention. Researchers should identify the competencies, behaviors, and strategies of effective facilitators, as well as the challenges they face and the support needed for success (Wegner et al., 2023). To build on this foundation, scholars might consider systemic frameworks, such as Complex Adaptive Systems (Schneider & Somers, 2006), to examine the emergent properties and non-linear interactions within multi-stakeholder networks. This approach could reveal how collaborative structures evolve and self-organize, particularly when examining OSI implementation across diverse community contexts with varying resource constraints and societal impact objectives. Finally, the influence of digital technologies on OSI warrants considerable attention (Cosimato et al., 2024). Future studies should explore the specific capabilities of technologies like social media and crowdsourcing tools, the challenges, and opportunities they present, and their use by various actors in the innovation ecosystem.

2.7.3 Research theme 3: Longitudinal consequences and impact assessment

Our review highlights the limited number of longitudinal studies that have investigated the long-term effects of OSI initiatives. This research theme encompasses three key opportunities for development. First, longitudinal research designs could reveal important insights about OSI's potential to address complex societal challenges (e.g., Fayard, 2024). While current cross-sectional and case-based studies provide valuable insights, longitudinal approaches could enhance our understanding of how

OSI initiatives evolve and adapt over time. This area connects with discussions in ecosystem metrics research regarding contextual considerations in performance assessment (Leendertse et al., 2022). Scholars could employ longitudinal designs to examine factors contributing to OSI scalability (Rayna & Striukova, 2019), including stakeholder engagement persistence, adaptation mechanisms, and business model resilience.

Assessing the extent of OSI engagement within social ecosystems presents a complex challenge (Wegner et al., 2023). Current assessment approaches provide various valuable perspectives that could be further integrated. Future research could develop comprehensive frameworks that conceptualize various dimensions of engagement, including participation breadth and depth, stakeholder diversity, and collaboration intensity (Windrum et al., 2016). Such frameworks would enable systematic comparison across different OSI initiatives and contexts.

Finally, future studies should examine the impact of OSI initiatives adopting various organizational models, such as hybrid organizations, and the roles of different actors in social innovation ecosystems (Carayannis et al., 2021). Current research provides valuable descriptive insights into these relationships, creating opportunities for more comprehensive conceptual development. For example, scholars might investigate the application of social business models in digital social innovation ecosystems, specifically in the context of smart cities.

2.7.4 Research theme 4: Methodological considerations for advancing OSI research

OSI studies have benefited from case study approaches that provide rich contextual understanding. To further advance the field, mixed-method approaches could contribute to theoretical development by combining the contextual richness of qualitative methods with the comparative insights of quantitative approaches. This methodological integration could support robust theory building and testing, particularly for complex multilevel phenomena characteristic of OSI. Such approaches could include alternative research designs like social network analysis (Shipilov & Gawer, 2020) to examine interorganizational networks and clusters; or agent-based modeling and simulation (Wu et al., 2010) to reveal emergent properties in OSI ecosystems.

Table 2.12 Examples of research questions in OSI

Theme	Area /Level	Potential research questions (RQs)	Theoretical perspectives that can be applied	Dominant references
Antecedents	Micro (Individual)	• How do principles of responsibility in innovation processes affect the initiation and development of OSI, especially regarding ethical, social, and environmental considerations? • How do different types of motivation, for example, green individual motives, influence the quality and nature of users' contributions in OSI initiatives? • What distinctive personal values drive individuals' continuous participation and engagement in OSI initiatives compared to other forms of volunteering or innovation? • How do individual competencies and self-efficacy, as conceptualized in goal-setting theory, influence the successful implementation of empowerment-oriented OSI initiatives? • To what extent does human capital mediate the relationship between collaborative models and innovation outcomes in OSI initiatives? • How do human capital factors interact with organizational absorptive capacity to affect knowledge transfer efficacy in cross-sector OSI partnerships?	• Self-Determination • Goal-Setting • Human Capital • Personal Responsibility • Social Exchange	(Chang, 2019; Fait et al., 2023; Hong & Lee, 2023; Randhawa et al., 2019; Schmidhuber et al., 2019; Smolka & Bösch, 2023; Ten Holter, 2022; Urbinati et al., 2023; Wu, 2023)
	Meso (Organizational)	• To what extent does corporate social responsibility influence the initiation and development of OSI initiatives across different industries and cultural contexts? • To what extent do resource constraints in social organizations impact the choice and effectiveness of OSI approaches across different sectors? • What are the key organizational dynamic capabilities required for effective implementation of OSI strategies across different social issues? • How do organizational learning processes contribute to the evolution and sustainability of OSI initiatives over time? • What organizational culture and governance styles influence participation in OSI initiatives? • What factors influence how OSI impacts mainstream activities in organizations of different sizes and levels of product diversification? • How do organizational resources and capabilities influence the formation and governance of OSI initiatives?	• Dynamic Capabilities • Absorptive Capacity • Resource-Based View • Resource Dependency • Organizational Knowledge Management	(Altuna et al., 2015; Cai et al., 2023; Colovic et al., 2022; Cutler White, 2014; De Silva et al., 2020; Dionisio & de Vargas, 2022; Fait et al., 2023; Hong & Lee, 2023; Kobarg et al., 2020; Rey-García et al., 2019; Roszkowska-Menkes, 2018; Watson et al., 2018)

Processes and Relationships	Macro (Environmental)	• What role do policy interventions play in shaping cross-sector OSI collaborations for scaling impactful solutions? • How does the interplay between local and national innovation policies affect the diffusion of user-driven OSI initiatives? • How do national regulatory frameworks influence the formation and scaling of OSI initiatives focused on sustainable development goals? • What ecosystem structural factors enable the development of transformative and economically sustainable OSI initiatives? • Which local processes are generalizable for cooperating on OSI initiatives, and which are culturally specific?	• Institutional Approach • Ecosystem Approach • Innovation Systems • Complex Adaptive Systems	(Babu et al., 2020; Caridà et al., 2022; Catala et al., 2023; Christopoulos et al., 2023; Desmarchelier et al., 2021; Fabrizi et al., 2018; Grama-Vigouroux et al., 2024; Hansen et al., 2022; Kher et al., 2023; Sarasini, 2015; Trischler et al., 2020; Vendrell-Herrero et al., 2023; Windrum et al., 2018)
	Problem identification & ideation	• What problem framing and bounding strategies are most effective for engaging diverse stakeholders in OSI? • What co-creation processes and methods are most effective for absorbing and integrating knowledge from diverse stakeholders to create new solutions?	• Stakeholder Approach • Service-Dominant Logic	(Akasaka et al., 2023; Hagedoorn et al., 2023; Wegner et al., 2023)
	Implementation & scaling	• What collaborative approaches are most effective for transforming collective ideas (exploration) into real solutions (empowerment)? • How do the temporal dynamics of scaling (e.g., pace, timing) influence the resilience and adaptability of OSI initiatives?	• Organizational Resilience • Collective Action	(Bentzen, 2022; De Silva & Wright, 2019; Kohler & Chesbrough, 2019; Rey-García et al., 2019)
	Orchestration	• How do orchestrators adapt their governance approaches when scaling OSI initiatives from local to global levels? • What are the key practices that enable orchestrators to effectively manage resource constraints while fostering disruptive innovations for societal benefit? • How do orchestrators in OSI initiatives adapt their governance strategies to different stages of the innovation process (exploration-oriented vs. empowerment-oriented)?	• Adaptive Governance • Resource Orchestration	(Christopoulos et al., 2023; Fayard, 2024; Gegenhuber et al., 2023; Kruse et al., 2019; Oskam et al., 2021; Wegner et al., 2023)
	Legitimation dynamics	• How do legitimation dynamics in OSI ecosystems influence the advancement of well-being objectives beyond local networks? • What are the effects of conflicting institutional logics on specific legitimacy establishment processes in OSI initiatives? • How do conflicting tensions influence the legitimation activities used to establish the legitimacy of OSI in collaborative governance contexts?	• Shared Value • Institutional Legitimacy	(Häikiö, 2012; Oskam et al., 2021; Verleye et al., 2019)
	Stakeholders' engagement	• How can inclusive participation mechanisms effectively engage marginalized groups typically excluded from large-scale OSI processes? • What engagement strategies are most effective for sustaining stakeholder commitment throughout the implementation of OSI initiatives?	• Social Inclusion • Social Justice • Social Exchange	(Barrett & Dooley, 2024; Bentzen, 2022; Hardyman et al., 2022; Marschalek et al., 2022; Oskam et al., 2021)

Consequences	Governance of innovation networks	• What is the optimal structure of OSI networks based on the roles of stakeholders, allocation of resources, social issues, and decision-making processes? • How do different governance structures within cross-sector partnerships impact the sustainability of OSI initiatives? • To what extent do different governance models shape the centrality patterns of actors in multi-sectoral OSI networks? • What strategies do effective stakeholders employ to navigate power asymmetries across different levels (micro, meso, and macro) within network structures to ensure equitable participation in OSI initiatives? • How do mechanisms of informal influence and power distribution affect decision-making processes and resource allocation in OSI initiatives?	• Structural Contingency • Power Dependency	(Callagher et al., 2022; Desmarchelier et al., 2021; Herrera, 2016; Hong & Lee, 2023; Kimpimäki et al., 2022; Logue & Grimes, 2022; Merlin-Brogniart et al., 2022; Oskam et al., 2021; Randhawa et al., 2019; Rey-García et al., 2019; Sarasini, 2015; Wegner et al., 2023)
	Digital technologies	• How does the integration of digital tools in OSI processes affect the scaling strategies of social enterprises compared to traditional nonprofit organizations? • How are social media platforms enabling and scaling OSI initiatives? • To what extent do digital platforms enable or constrain the inclusion and empowerment of marginalized stakeholders in OSI processes? • How do digital technologies mediate the relationship between corporate social responsibility initiatives and OSI across for-profit organizations of varying sectors? • How are disruptive technologies and innovations transforming OSI initiatives?	• Digital Divide Approach • Technology Mediation • Digital Inclusion	(Cambra-Fierro et al., 2024; Carayannis et al., 2021; Caridà et al., 2022; Cosimato et al., 2024; Dezi et al., 2018; Gegenhuber et al., 2023)
	Longitudinal effects	• To what extent do “innovation mindsets” fostered by OSI initiatives persist in communities in the long term? • How do stakeholder engagement, adaptability, and business model robustness influence the persistence of impact on OSI? • How do OSI initiatives contribute to community resilience and adaptability in different socio-cultural contexts? • What unintended consequences can emerge from OSI initiatives in the long run?	• Transformative Learning • Social Capital • Social Impact Assessment	(Citroni, 2015; De Silva & Wright, 2019; Fayard, 2024; Hagedoorn et al., 2023; Hardyman et al., 2022; Oskam et al., 2021)
	Assessment of OSI engagement	• What comprehensive frameworks can be created to evaluate the breadth and depth of participation in OSI? • How do socio-economic and cultural contexts (e.g., developed versus developing countries) influence the long-term engagement in OSI among social organizations? • How does partner diversity influence sustainability outcomes in OSI? • What frameworks can compare the degree of collaboration in different OSI initiatives?	• Participatory Evaluation • Cultural Dimensions	(Bentzen, 2022; De Silva & Wright, 2019; Desmarchelier et al., 2021; Martínez-Martínez et al., 2023; Smolka & Bösch, 2023; van Geenhuizen & Ye, 2014; Windrum et al., 2016)

Quantifying impact	• How does the involvement of for-profit organizations impact the direction and outcomes of OSI initiatives? • What organizational learning processes and mechanisms enable the building of innovation capabilities through participation in OSI? • How do regional and national innovation systems impact the performance and diffusion of OSI across different sectors and geographies? • What effect does diverse stakeholder participation in OSI have on the replicability of successful initiatives?	• Hybrid Organizing • Organizational Learning	(Altuna et al., 2015; Barrett & Dooley, 2024; Cai et al., 2023; Cassetta et al., 2023; Desmarchelier et al., 2020; Hofman et al., 2020; Kallio & Lappalainen, 2015; Kruse et al., 2019; Rayna & Striukova, 2019; Wegner et al., 2023)
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2.8 Conclusions

This chapter, encompassing 115 articles from leading journals, offers an integrated perspective on the evolution and current state of OSI research. As an emerging field, OSI is a young concept in academic literature, with research in this area gaining momentum in recent years. Our analysis, rooted in content analysis and bibliometric approaches, reveals the multifaceted nature of OSI, underpinned by diverse theoretical frameworks and methodologies. The review highlights the growing interest in OSI, especially in response to complex social challenges such as the COVID-19 pandemic. This interest is reflected in the increasing volume of publications and the expanding scope of OSI in the last two years, demonstrating increased recognition of the potential of this approach to address complex societal issues.

Advancing OSI research has significant implications from both theoretical and practical point of view. From a theoretical perspective, this chapter has the potential to enhance our understanding of distributed innovation processes, particularly in social and sustainability-oriented initiatives. Additionally, it can contribute to the development of new theoretical models and refine existing ones. This includes frameworks related to stakeholder engagement, value co-creation, and the role of institutions in shaping innovation. From a practical standpoint, research on OSI may provide valuable insights for designing and implementing more effective initiatives to address pressing societal challenges. It can offer guidance on how communities and organizations can foster a culture of openness, collaboration, and social responsibility. Furthermore, it can serve as a resource for policymakers in creating an environment conducive to OSI.

Despite the comprehensive nature of this SLR, our study acknowledges limitations that warrant consideration. First, while focusing on major journals in specific fields ensured the inclusion of high-quality, peer-reviewed research, this approach may have inadvertently excluded relevant OSI studies published in other disciplines or disseminated through alternative formats. Second, although citation or co-citation analysis provides valuable insights into the impact and influence of scholarly works, it

has inherent limitations. This method does not fully capture the nuanced intentions behind each citation, as researchers may cite work for various reasons beyond its direct relevance or discussion. Additionally, as this review primarily stems from a management disciplinary perspective, valuable perspectives and transdisciplinary knowledge from other social science domains could contribute to a richer understanding of complex social phenomena like OSI. Lastly, the swiftly developing nature of the OSI field presents an ongoing challenge for literature reviews. As new research emerges and theoretical perspectives shift, the findings and conclusions of this chapter may require continual updating to maintain their relevance and applicability.

Future research on OSI presents numerous opportunities for in-depth exploration, as it is an emerging approach that can be examined from various perspectives and applied across different models of implementation. One valuable direction for subsequent research involves a deeper examination of how OSI advances, challenges, or transforms theoretical frameworks both within management studies and across adjacent disciplines. The dynamic nature of OSI, shaped by evolving societal needs and technological advancements, necessitates innovative, multidisciplinary, and collaborative research approaches. By integrating OSI with fields such as organizational creativity, strategic management, and entrepreneurship, we can enhance our understanding of its impact and the factors that influence it. As research and applications of the OSI approach continue to expand, exploring these intersections and synergies may generate novel insights and research directions. Ultimately, by bridging the gap between theory and practice, OSI research has the potential to drive positive social change and contribute to the development of more inclusive, sustainable, and resilient societies.

Chapter 3

Conceptualizing Open Social Innovation:
Structural Requirements, Boundaries, and
Multi-Stakeholder Configurations

3 Conceptualizing Open Social Innovation: Structural Requirements, Boundaries, and Multi-Stakeholder Configurations

3.1 Introduction

Chapter 2 mapped the content and evolution of OSI research and identified the limited theoretical warrant for its ecosystem lens as a principal gap. Building on this assessment, this chapter develops an integrative conceptual framework that grounds the ecosystem lens in the structural requirements of complex social problems and clarifies the conceptual boundary between OSI and adjacent phenomena.

Open Social Innovation (OSI) has emerged as an ecosystem-based paradigm for understanding how societies orchestrate multi-actor efforts to address complex social problems (Gegenhuber & Mair, 2024; Pacheco et al., 2025). A first generation of work extended open innovation principles to social challenges while retaining the focal organization as the unit of analysis (Chesbrough & Di Minin, 2014). A second generation, labeled OSI 2.0 by Gegenhuber and Mair (2024), moved the unit of analysis to multi-stakeholder configurations in which no single actor controls the problem or the process. Building on this evolution, Pacheco et al. (2025) synthesized 115 studies into an ecosystem-based framework organized around functional actor roles and two classification dimensions: orientation and scale.

This consolidation has clarified the empirical scope of OSI, yet what makes OSI conceptually distinct remains underspecified. The coexistence of multiple competing definitions (Pacheco et al., 2025) reflects this lack of conceptual consensus. Consequently, empirical studies continue to blur boundaries with adjacent phenomena such as crowdsourcing, user innovation, cross-sector social partnerships, and participatory action research (Bertello et al., 2022; Fayard, 2024; McGahan et al., 2021). OSI is often invoked to describe initiatives involving multiple sectors, open processes, or community collaboration, yet these features are not exclusive to it. While the field has settled on a common label and identified empirical referents, the theoretical warrant for OSI's distinctiveness remains underdeveloped.

This conceptual chapter addresses this theoretical gap. Adopting a theory-adaptation approach (Jaakkola, 2020), we draw on the concept of wicked problems (Rittel & Webber, 1973) as a method theory to examine the structural conditions underlying the multi-stakeholder perspective of OSI. We argue that complex social problems (regardless of their scale) share four structural properties that jointly differentiate them from the technical and market challenges around which open innovation (Chesbrough, 2003c) was originally theorized. Drawing on the grand challenges literature (e.g., Ferraro et al., 2015), these properties are: (i) distributed agency, as no single actor possesses the resources, legitimacy, or knowledge to act unilaterally; (ii) constitutive framing, as the problem is

not given but co-defined through the process of addressing it; (iii) temporal orchestration, as solutions emerge through phases requiring sustained coordination; and (iv) cross-phase scaling, as impact materializes across multiple phases and beyond the boundaries of any single phase. Together, these properties generate organizing requirements that cannot be satisfied within a focal-firm or bilateral-alliance logic, thereby requiring the configuration captured by the OSI ecosystem framework.

Three contributions follow from this argument. First, the chapter provides a theoretical rationale for the integrative framework advanced by Pacheco et al. (2025), grounding the ecosystem lens in the structural requirements of the problem rather than in descriptive enumerations of roles. Second, by mapping each requirement onto the eight functional roles, it shows that these roles constitute not a taxonomic list but a set of positions that the problem structure itself demands. Third, the analysis sharpens the conceptual boundary between OSI and five adjacent concepts: open innovation, traditional social innovation, crowdsourcing, cross-sector partnerships, and grand-challenge research.

The remainder of the chapter proceeds as follows. Section 3.2 reviews the evolution of OSI toward the ecosystem framework and identifies the theoretical question that this framework leaves open. Section 3.3 develops the four structural requirements and maps them onto the role-based ecosystem. Section 3.4 synthesizes the distinctive contribution of OSI and differentiates it from adjacent concepts. Section 3.5 concludes the chapter by highlighting the main study's contributions, implications, and future research avenues.

3.2 Evolution and Theoretical Boundaries of OSI

As discussed in Chapter 2, OSI emerged at the intersection of two distinct research traditions. On the one hand, open innovation is defined by Chesbrough and Bogers (2014, p. 12) as “a distributed innovation process based on purposively managed knowledge flows across organizational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organization's business model.” Its mechanisms (including inbound, outbound, and coupled flows; absorptive capacity; and boundary spanning) presuppose a focal organization as the locus of strategic choice (Bogers et al., 2017; Dahlander & Gann, 2010). On the other hand, social innovation is defined by Murray et al. (2010, p. 3) as “new ideas (products, services and models) that simultaneously meet social needs and create new social relationships or collaborations.” In this domain, the normative orientation toward social problems is primary (Mulgan, 2006), and openness is a feature that some, but not all, social innovations exhibit.

Initial conceptualizations of OSI combined the two traditions in ways that preserved the focal-organization assumption. Chalmers (2013) framed OSI as a corrective to the heroic-individual model of social innovation, emphasizing collaborative organizational structures to overcome barriers to

knowledge, skills, and scaling. Chesbrough and Di Minin (2014) defined OSI as the application of open innovation strategies to social challenges, retaining the focal organization as the unit of analysis. Randhawa et al. (2019) examined how seeker organizations use crowdsourcing for societal challenges, illustrating how this central actor's intent and engagement strategies dictate project outcomes. These foundational formulations constituted what Gegenhuber and Mair (2024) retrospectively labeled OSI 1.0: a view in which a focal actor decides what to open, to whom, and under what terms.

Subsequent empirical research on initiatives during the COVID-19 crisis (e.g., Bertello et al., 2022; Mair & Gegenhuber, 2021) revealed the limitations of the OSI 1.0 framing. Initiatives such as #WirVsVirus and UpdateDeutschland (Mair et al., 2023), Patient Innovation (Cosimato et al., 2024), platform-based challenges like OpenIDEO (Fayard, 2024), and Fab Lab networks (Rayna & Striukova, 2019) mobilized multiple stakeholders from different sectors who did not cluster around a single focal organization. Drawing on these observations, Gegenhuber and Mair (2024, p. 1) redefined OSI as “a concerted effort undertaken by multiple stakeholders from various sectors throughout the social innovation process, from diagnosing societal challenges, to developing ideas for how to solve problems, creating solutions, effectively scaling solutions and generating impact.” This reformulation shifted the unit of analysis from the focal organization to the multi-stakeholder configuration, grounding OSI in the empirical observation that responses to complex social problems take the form of ecosystems rather than alliances.

Pacheco et al. (2025) formalized this shift. Adopting a systematic literature review approach, they synthesized 115 studies into an ecosystem-based framework organized around two analytical contributions. The first replaces sector-based taxonomies (government, firms, civil society) with eight functional roles that actors can occupy, often simultaneously, throughout an OSI process: activists, affected communities, knowledge communities, orchestrators, entrepreneurs, promoters, enablers, and regulators. The second classifies OSI initiatives by orientation (exploration versus empowerment) and by scale (local versus regional), yielding a four-quadrant map that positions hackathons, crowdsourcing campaigns, Living Labs, public innovation labs, and social accelerators relative to the innovation stages they target. The framework is explicitly integrative, accommodating the initiatives cataloged under OSI 1.0 within a broader ecosystem logic.

While the framework clarifies the structure of the OSI ecosystem, it leaves open its theoretical rationale: why an ecosystem framing rather than a multi-stakeholder-alliance, crowdsourcing, or collaborative-innovation framing? To justify this choice, Pacheco et al. (2025) draw on a general systems perspective (von Bertalanffy, 1968), observing that OSI displays multi-dimensional and dynamic properties that single-level frameworks do not capture. While empirically accurate, this move displaces the theoretical question to a higher level of abstraction, since general systems theory

applies to a wide range of organizational phenomena and therefore underdetermines what is distinctive about the OSI configuration. What requires specification is the distinctive complexity of the problems OSI initiatives address, which makes the ecosystem configuration a structural requirement rather than merely one defensible option (Adner, 2017; Ferraro et al., 2015). The next section develops this specification.

3.3 Four Structural Requirements of Complex Social Problems

Rittel and Webber (1973) characterized wicked problems by properties that make them resistant to the technical problem-solving logic of optimization: they admit no definitive formulation, no stopping rule, and no single correct solution; every attempted solution alters the problem itself. Ferraro et al. (2015, p. 365) extended this tradition to organizational research, describing grand challenges as inherently “complex, uncertain, and evaluative” issues that require robust action rather than optimization. Mair and Seelos (2021) developed this argument further, noting that the distinctive character of social problems is that they cannot be separated from the social systems that produce them and that they, in turn, continue to reproduce. This condition is not limited to planetary grand challenges; community-level problems of housing access, educational exclusion, or local resource conflicts exhibit the same structural properties at smaller scales (Murray et al., 2010; Seelos & Mair, 2017).

Complex social problems impose distinct collaborative and coordinating demands on any organizing configuration. To address these challenges effectively, initiatives must manage specific design dimensions related to collaboration (participation structures and dynamics) and coordination (search, space, and time). In practice, these organizational requirements correspond to the ecosystem dynamics in which actors assume specific functional roles within the integrative framework.

3.3.1 Distributed agency

Complex social problems cannot be addressed by unilateral action. No single actor possesses the spatial and temporal coverage the problem demands (Ferraro et al., 2015; Mair & Seelos, 2021). No single actor possesses the combination of technical, contextual, and legitimacy resources required to diagnose and intervene (Mulgan, 2006). Furthermore, no single actor is positioned to bear the consequences of the intervention, since those consequences are distributed across affected communities, regulators, and funders (Seelos & Mair, 2017). Agency, under these conditions, is structurally distributed: it is not partitioned by design but inherently dispersed across actors who occupy complementary positions with respect to the problem.

This requirement distinguishes OSI organizing from two adjacent forms: the focal-firm logic of classical open innovation, in which distributed knowledge is channeled to a central decision-maker (Chesbrough & Bogers, 2014; McGahan et al., 2021), and bilateral cross-sector partnerships, in

which two parties negotiate complementary contributions but retain a defined division of labor (Bryson et al., 2015; Parmigiani & Rivera-Santos, 2011). In both adjacent forms, agency is coordinated rather than distributed; in OSI, it is distributed and only partially coordinated. Three functional roles, defined by the problem situation itself, address this requirement: activists who identify and seek to transform a social issue, affected communities who experience its consequences, and knowledge communities who provide technical or contextual understanding.

3.3.2 Constitutive framing

In the wicked-problem tradition, the problem is not antecedent to the process of addressing it but is constituted through that process (Rittel & Webber, 1973). What counts as the problem, who counts as affected, and what counts as a relevant contribution are matters that are settled, or left unsettled, through the initiative itself. This property has direct implications for organizing. It implies that the process cannot be structured as a call for solutions to a pre-specified brief, since the brief is part of what the process produces. It implies that standing to contribute extends beyond those positioned as solvers to include those positioned as framers. Finally, it implies that framing contributions are themselves a form of innovation rather than a preliminary activity.

Empirical OSI accounts have consistently reported this dynamic. In UpdateDeutschland, public administrations joined civil-society teams as lead users whose problem framings were reshaped through interaction with citizens rather than transferred unchanged (Mair et al., 2023). In the MyHumanKit initiative within a French Fab Lab, the problem of prosthesis access was reframed iteratively as a community of makers, medical professionals, and users converged on a commons-based rather than market-based approach (Kherrazi, 2025). In their comparative study of nine initiatives in an open digital living lab, Lührsen et al. (2026) show that the trajectories that generated public value were precisely those in which expectations and mandates were reframed through the process, while those that sought to preserve the original framing generated unintended negative consequences.

Constitutive framing corresponds to three roles within the taxonomy: the activist role (initial framing), the affected-community role (experiential framing), and the knowledge-community role (contextual framing). The three roles are not substitutable: each carries a distinct kind of framing authority that the others cannot provide. This is what the ecosystem lens captures and what the crowdsourcing lens obscures. Crowdsourcing integrates diverse inputs under a framing controlled by the sponsor (Afuah & Tucci, 2012; Estellés-Arolas & González-Ladrón-de-Guevara, 2012); OSI cannot, because the framing is itself part of what the process must produce.

3.3.3 Temporal orchestration

Solutions to complex social problems are not delivered; they emerge (Seelos & Mair, 2017). This emergence develops through interdependent phases that the literature variously labels as exploration and empowerment (Pacheco et al., 2025), or mobilizing, bundling, curation, and scaling (Gegenhuber & Mair, 2024). These phases are not modular: the resources, actors, and legitimacy assembled in earlier phases constrain what becomes possible in later ones, and the criteria of success evolve as the process proceeds. Addressing complex social problems therefore requires sustained coordination of this emergence over time.

This is the specific organizing work that Pacheco et al. (2025) and Gegenhuber and Mair (2024) call orchestration. Orchestrators issue and disseminate calls to action, translate between stakeholders who operate in different institutional logics, select and sustain promising trajectories, and manage the transitions between phases. For instance, Juusola et al. (2024) illustrate that social enterprises may act as orchestrators by mobilizing knowledge sharing to facilitate transitions from inclusive ideation to cross-phase scaling. Kherrazi (2025) documents how a Fab Lab served this function for the MyHumanKit initiative, supplying resources, networks, and legitimacy over years rather than within a single event. Conversely, Lührsen et al. (2026) show how the absence of sustained orchestration, or its failure to build “navigational capacity” in participants, accounts for the “Dead End” trajectories observed in UpdateDeutschland. The temporal-orchestration requirement is thus not a design preference; it is a structural consequence of the fact that complex social problems cannot be resolved through one-time interventions.

This requirement corresponds to the orchestrator role within the framework, and explains why that role is not reducible to the innovation intermediary or broker roles familiar from open-innovation research (Howells, 2006). While intermediaries match supply to demand in knowledge markets, OSI orchestrators sustain concerted action across phases that cannot be pre-specified (Mair et al., 2023).

3.3.4 Cross-phase scaling

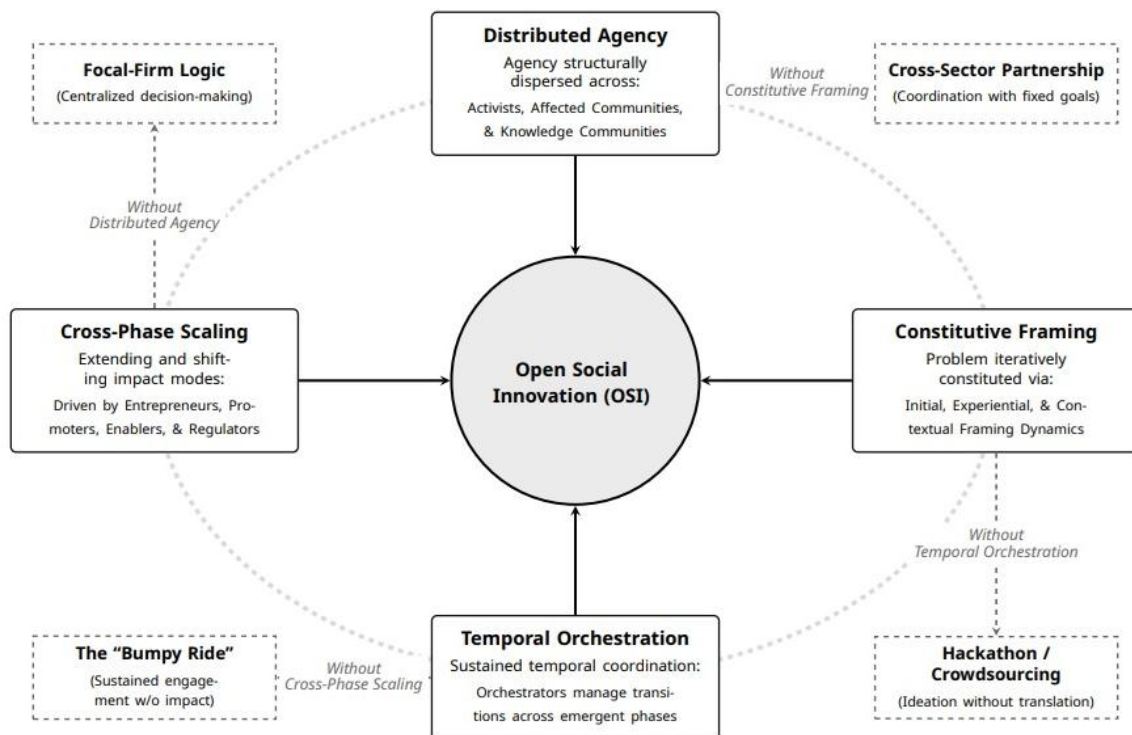
Impact on complex social problems cannot be reduced to a single dimension. The scaling literature identifies at least three modes through which social innovations extend their effects: scaling out (expanding reach across sites), scaling up (institutionalizing change in policy or law), and scaling deep (shifting values and cultural assumptions) (Moore et al., 2015). Each mode requires a distinct configuration of resources, legitimacy, and institutional access (Mair et al., 2016). A community-level innovation scaled out through replication depends on promoters and enablers; the same innovation scaled up through policy change depends on regulators and on the formal institutions (North, 1990) that structure the field. An organizing configuration that addresses complex social problems must therefore be able to shift between, combine, or sequence scaling modes as the problem and its context evolve.

This requirement accounts for the four remaining roles in the taxonomy: entrepreneurs, who materialize ideas into products, services, or management models; promoters, who support replicability across contexts; enablers, who supply resources and training; and regulators, who define the formal rules that govern which scaling paths are open. These four roles are not interchangeable: they are the functional positions that cross-phase scaling requires when an innovation moves from local prototypes to broader impact without losing the framing through which the problem was originally constituted.

3.3.5 Why the requirements are jointly necessary

The four requirements are analytically separable but empirically inseparable (see Figure 3.1). Distributed agency without constitutive framing reduces OSI to a coordination problem among actors whose goals are fixed, which is more accurately described as a cross-sector partnership (Bryson et al., 2006; Gegenhuber & Mair, 2024). Constitutive framing without temporal orchestration produces ideation events that generate framings but do not translate them into practice, which is more accurately described as a hackathon or crowdsourcing exercise (Bertello et al., 2022; Lifshitz-Assaf et al., 2021). Temporal orchestration without cross-phase scaling produces processes that sustain engagement but do not generate impact, a trajectory that Lührsen et al. (2026) describe as the “Bumpy Ride.” Cross-phase scaling without distributed agency reproduces the focal-firm logic of earlier OSI accounts.

Figure 3.1 Summary of structural requirements of Open Social Innovation



3.4 What OSI Adds

The preceding argument provides a direct answer to the research question motivating this chapter. OSI constitutes a distinct object of study because it denotes the organizing configuration through which complex social problems, at any scale, are addressed by simultaneously fulfilling four structural requirements: distributed agency, constitutive framing, temporal orchestration, and cross-phase scaling. No related concept simultaneously addresses the four requirements. Table 3.1 summarizes this comparative analysis.

Table 3.1 Comparing OSI and adjacent concepts across structural requirements

Literature stream	Open innovation (Chesbrough, 2003c; Chesbrough & Bogers, 2014)	Traditional social innovation (Cajaiba-Santana, 2014; Murray et al., 2010)	Crowdsourcing (Afuah & Tucci, 2012; Estellés-Arolas & González-Ladrón-de-Guevara, 2012)	Cross-sector partnership (Bryson et al., 2015; Parmigiani & Rivera-Santos, 2011)	Grand-challenge organizing (Ferraro et al., 2015; Mair & Seelos, 2021)	Open Social Innovation (Gegenhuber & Mair, 2024; Pacheco et al., 2025)
Structural requirements						
Distributed agency	Partial; channeled to the focal firm	Variable; not intrinsic	No; task-decomposed	Yes, but bilateral	Yes	Yes, structurally
Constitutive framing	No; problem pre-specified	Sometimes; depends on initiative	No; brief-controlled	Limited; negotiated between parties	Yes	Yes, central to the process
Temporal orchestration	No; event- or project-bounded	Variable; not intrinsic	No; campaign-bounded	Yes, but bounded to partnership	Variable	Yes, sustained across phases
Cross-phase scaling	Firm-internal	Variable	Input aggregation	Bounded by partnership scope	Variable	Yes, across multiple registers
Locus of analysis	Focal firm	Solution or process	Platform or campaign	Inter-organizational dyad	Challenge itself	Ecosystem as configuration

Two implications follow from this differentiation. First, OSI is neither “open innovation applied to social problems” nor “social innovation made open”; both formulations understate the configurational shift. OSI is a specific organizing form that emerges when all four requirements are simultaneously satisfied, and this form cannot be achieved by adding openness to a focal-firm innovation process or by adding stakeholders to a linear social-innovation process. This resolves a long-standing ambiguity in the literature. Practitioners engaged in co-creation, participatory design, or cross-sector collaboration (Voorberg et al., 2015) often regard their activities as already constituting OSI because such activities fall along a spectrum of openness (Ahn et al., 2019; Tuckerman et al., 2023) and satisfy one or two of the four requirements. As a configuration, however, OSI is not reducible to any of these activities individually.

Second, OSI is not confined to the category of grand challenges. The four requirements apply across scales: local initiatives (e.g., neighborhood transit issues), municipal-level efforts (e.g., housing affordability), and global responses (e.g., climate change) all exhibit distributed agency, constitutive

framing, temporal orchestration, and cross-phase scaling, although they differ in actor composition, resource base, and time horizon. The two-dimensional, four-quadrant typology proposed by Pacheco et al. (2025), which classifies initiatives by orientation and scale, is consistent with this view: local exploration-oriented initiatives and regional empowerment-oriented initiatives both qualify as OSI when they engage the four requirements, even when they differ in the roles emphasized and in the scaling trajectories pursued.

A corollary follows directly. A recurring concern in the field, that OSI merely renames pre-existing initiatives (hackathons, Living Labs, accelerators), misrepresents what the concept adds. The underlying logic is not that the initiatives themselves are new, but rather that the configuration these initiatives instantiate, when successfully addressing complex social problems, is the one structurally required by the four requirements. The typology proposed by Pacheco et al. (2025) can then be interpreted as a typology of initiatives through which actors engage this configuration across different combinations of orientation and scale. OSI denotes the configuration; the initiatives are the means through which it is enacted.

3.5 Conclusions

In Chapter 2, we proposed an integrative framework for OSI but did not specify why complex social problems call for an ecosystem framing rather than a multi-stakeholder alliance, crowdsourcing, or collaborative innovation framing. The four structural properties identified above offer such a specification. We have argued that complex social problems, regardless of their scale, share four structural properties that jointly differentiate them from the technical and market challenges around which open innovation was originally theorized. These properties are distributed agency, constitutive framing, temporal orchestration, and cross-phase scaling.

This chapter makes three contributions. First, it provides a theoretical rationale for the integrative framework, grounding the ecosystem framing in the structural requirements of the problem rather than in descriptive enumerations of roles. Second, by mapping each requirement onto the eight functional roles, it shows that the roles constitute not a taxonomic list but a set of positions required by the structure of complex social problems. Third, it sharpens the conceptual boundary between OSI and five adjacent concepts: open innovation, traditional social innovation, crowdsourcing, cross-sector partnerships, and grand-challenge research.

Beyond these contributions, two implications follow from the framework. For practitioners, it suggests that OSI initiatives whose design addresses only one or two of the four structural requirements, neglecting the others, are likely to produce the partial outcomes that the literature has tended to attribute to implementation failures. Diagnostic attention should therefore turn to the configuration of requirements actually present in a given initiative, identifying which of the four are

met, which are not, and the consequences of each absence for the ecosystem's capacity to address the social problem at hand. For research, the framework recasts the agenda set out in Pacheco et al. (2025) in configurational rather than variance-based terms. Rather than asking which antecedents predict which outcomes, the question becomes which combinations of requirements sustain which forms of ecosystem organizing.

This configurational reframing opens three avenues for future research. The first avenue concerns the movement of actors across functional roles over the life of an OSI initiative. These functional roles are not fixed: a single actor can occupy multiple roles simultaneously, and roles can shift as the initiative moves across phases. The literature has yet to specify the capabilities that predict successful transitions, or to examine the tensions that emerge when actors occupying different roles hold diverging goals, resources, or legitimacy expectations, and how these tensions shape the trajectory of OSI processes. Process studies on ecosystem orchestration and innovation networks (Dhanaraj & Parkhe, 2006; Reypens et al., 2016, 2021) provide one avenue for examining this question, as do studies on the capabilities that Fab Lab orchestrators mobilize when a project is spun off as an independent venture (Kherrazi, 2025). Research addressing this question would help explain why some OSI ecosystems sustain their configurational coherence across phase transitions while others revert to focal-firm or partnership logics.

A second avenue concerns the mechanisms through which OSI ecosystems translate exploration-oriented outcomes into empowerment-oriented impacts. Pacheco et al. (2025) identify the exploration–empowerment distinction as a diagnostic dimension but do not specify the mechanisms underlying the transition between the two. Gegenhuber and Mair (2024) and Kherrazi (2025) propose potential mechanisms (bundling, curation, scaling pathways; resourcing, integrating, evolving), yet comparative analysis across initiative types and scales remains lacking. Tracing how exploration-phase frames persist, or fail to persist, into empowerment-phase scaling would strengthen both the managerial and theoretical contributions of OSI research.

A third avenue concerns the institutional conditions under which ecosystem organizing emerges and is sustained. Pacheco et al. (2025) identify the institutional approach (North, 1990) as under-explored at the macro level. Research at the intersection of institutional analysis and entrepreneurship ecosystems (Urbano et al., 2019) provides a basis for specifying how formal and informal institutions shape which dimensions of openness become permissible, which functional roles gain legitimacy, and which scaling modes are feasible in a given national or regional context. Comparative designs across institutional settings represent a logical extension, offering an opportunity to test the robustness of the configurational framework developed here under the diverse socio-economic conditions of the Global South, as evidence indicates that resource constraints structurally configure ecosystems in marginalized markets (Juusola et al., 2024).

Chapter 4

Determinants of Open Social Innovation: The Role of Human Capital and the Moderating Effect of Profit Orientation

4 Determinants of Open Social Innovation: The Role of Human Capital and the Moderating Effect of Profit Orientation

4.1 Introduction

Chapters 2 and 3 established OSI as a multi-stakeholder ecosystem whose theoretical foundation rests on the structural requirements of complex social problems, leaving the empirical determinants of OSI to be examined across the levels at which they operate. This chapter begins the empirical part of the thesis at the individual level, analyzing the effect of founders' human capital on their OSI orientation and the moderating role of the venture's organizational form.

As discussed in earlier chapters, Open Social Innovation (OSI) has emerged as a promising approach to address complex societal challenges (Chesbrough & Di Minin, 2014) by involving multiple stakeholders in social innovation processes (Gegenhuber & Mair, 2024). Social ventures represent particularly relevant actors in OSI implementation stages given their capacity to integrate diverse stakeholder knowledge flows (Chalmers & Balan-Vnuk, 2013). Yet not all social ventures embrace OSI, with prior research identifying antecedents at individual, organizational, and environmental levels (Pacheco et al., 2025; Randhawa et al., 2019). In these organizations, founders' attributes are recognized as significant determinants of venture operations and strategic development (Estrin et al., 2016; Shepherd et al., 2021). Prior literature suggests that micro-level attributes such as founders' human capital are associated with external knowledge sourcing and open innovation engagement (Kato, 2020). However, this relationship remains unexplored in the social venture context, where organizations face resource-constrained environments, diverse stakeholder expectations, and hybrid organizational forms that combine business and charity (Battilana & Lee, 2014). This study addresses this gap by analyzing the relationship between founders' human capital and the likelihood of a social venture being OSI-oriented while considering the moderating effect of profit orientation.

Human capital theory posits that investments in education and experience enhance individual productivity (Becker, 1964), with entrepreneurship research showing that founders' human capital drives innovation outcomes through experience and learning mechanisms (Kato et al., 2015; Marvel et al., 2020). However, OSI initiatives such as accelerators provide structured access to knowledge, mentorship, networks, and funding (Hallen et al., 2020; Pauwels et al., 2016), raising the question of whether human capital acts as a driver of, or a substitute for, participation in these collaborative structures, particularly as for-profit and nonprofit forms face distinct resource acquisition pressures (Townsend & Hart, 2008). We consider a venture to be OSI-oriented when it participates in open innovation initiatives and builds upon newly created solutions to achieve social or environmental impact.

Our empirical analysis employs a bivariate probit model with data from the Global Accelerator Learning Initiative (GALI, 2020), which comprises 11,953 early-stage social ventures worldwide from 2013 to 2019. This dataset allows us to examine the relationship between human capital, profit orientation (for-profit vs. nonprofit), and OSI orientation while controlling for relevant individual-level (founder), meso-level (venture), and macro-level (country) variables. Our findings reveal that managerial experience significantly predicts OSI orientation, whereas formal education shows no direct effect but becomes significant when profit orientation moderates this relationship. Notably, for-profit orientation emerges as a strong predictor of OSI orientation and significantly moderates the impact of founders' educational background, enhancing education's role in OSI participation in for-profit ventures. Managerial experience, in contrast, maintains consistent positive effects across both profit orientations.

This study makes distinct contributions to the emerging field of OSI and related streams of literature. First, we advance the understanding of OSI by identifying patterns that differentiate it from open innovation in commercial firms. While previous research has suggested the relevance of general human capital in social entrepreneurship performance (Estrin et al., 2016), our findings show stronger statistical associations between specific human capital dimensions and OSI orientation. By integrating human capital theory (Becker, 1964) with the OSI framework, we find that social innovation is more strongly associated with practical experience than with formal education in collaborative context.

Second, we contribute to the social entrepreneurship literature by empirically examining the relationship between profit orientation and OSI initiatives. While previous research has explored innovative behavior in social entrepreneurship orientation (Dwivedi & Weerawardena, 2018) and founders' perceptions when choosing a profit orientation in social ventures (Townsend & Hart, 2008), our findings demonstrate significant associations between profit orientation and OSI. This extends current theory by showing that the effectiveness of general human capital varies according to the venture's profit orientation, supporting previous calls for a better understanding of the relationship between commercial and social goals in social entrepreneurship (De Silva & Wright, 2019).

Third, we make a specific contribution to the literature on the determinants of OSI. While the emerging field has primarily focused on describing initiatives or outcomes, Pacheco et al. (2025) highlight a need to understand the interplay among multilevel antecedents of OSI. We address this gap by uncovering the interplay between micro-level attributes (human capital) and meso-level strategies (profit orientation). In doing so, we respond to calls for research on resource orchestration in the organizing stage of new ventures (Shepherd et al., 2021) and on analyzing internal resources jointly rather than in isolation (Del Sarto et al., 2021), providing empirical evidence that the structural

choice of profit orientation conditions the strategic effectiveness of formal human capital for pursuing OSI.

The remainder of the chapter is organized as follows. Section 4.2 provides the conceptual framework and explores the relevant literature to develop our hypotheses. Section 4.3 details the methodology, including models, data, and variables. Section 4.4 presents the empirical results, followed by the robustness tests. Section 4.5 discusses the findings, and Section 4.6 concludes with theoretical and practical implications, as well as limitations and future research directions.

4.2 Theoretical Background and Hypotheses

4.2.1 Open Social Innovation

As established in Chapters 2 and 3, OSI combines principles of open innovation and social innovation to address societal challenges (Chesbrough & Di Minin, 2014; Pacheco et al., 2025). It involves a participatory process where multiple stakeholders collaborate on generating ideas and developing scalable solutions (Gegenhuber et al., 2023), building upon open innovation's emphasis on external knowledge flows (Dahlander & Gann, 2010) and social innovation's focus on novel solutions for societal needs (Mulgan, 2006; Mumford, 2002). By harnessing collective knowledge, OSI enables co-creation of solutions that are more sustainable and scalable than traditional approaches (Chalmers, 2013; Edwards-Schachter & Wallace, 2017).

Returning to the typology adopted in Chapter 2, OSI initiatives may be categorized into exploration-oriented initiatives, which target early social innovation stages such as ideation or co-creation, and empowerment-oriented initiatives, which target later stages of collaborative implementation and scaling. This study focuses on empowerment-oriented initiatives, specifically accelerator programs, as they represent structured mechanisms through which social ventures can access external resources and scale their innovative solutions. Within this setting, OSI is examined as an organizational orientation rather than as a discrete initiative or outcome. The two constitutive dimensions of the concept (openness to external knowledge flows and generation of novel solutions to societal needs) become observable at the venture level when ventures engage with these collaborative arrangements while developing novel solutions. This orientation-based approach makes the concept particularly suitable for the empirical analysis developed in this chapter, as it underpins the two-dimensional operationalization presented in Section 4.3.

4.2.2 Social Entrepreneurship, Human Capital, and Innovation

Social entrepreneurship research encompasses diverse theoretical approaches and levels of analysis (Saebi et al., 2019). At the meso-level, social ventures are broadly defined as organizations that engage in entrepreneurial activities with a social purpose (Certo & Miller, 2008; Shaw & Carter, 2007), while maintaining economic viability (Saebi et al., 2019). A key dimension differentiating

these ventures is their profit orientation, a topic extensively discussed in social entrepreneurship research (Maier et al., 2016; Santos, 2012; Wilson & Post, 2013). As introduced in Chapter 1, the field has experienced a paradigm shift from traditional legal status dichotomies toward hybrid organizations (Battilana & Lee, 2014; Thompson & Doherty, 2006), where for-profit entities increasingly integrate social missions into their core business models (Doherty et al., 2014; Santos, 2012), and nonprofits pursue commercial opportunities for dual value creation (Dees & Anderson, 2003; Smith & Besharov, 2019). These distinct organizational forms face different resource acquisition pressures and stakeholder expectations (Townsend & Hart, 2008).

Human capital, as conceptualized by Becker (1964), encompasses the knowledge, skills, and abilities that enhance an individual's productive capacity. This theory suggests that strategic investments in education and training yield economic returns through enhanced productivity, a framework widely applied in innovation research (Nelson & Phelps, 1966; Schultz, 1961). In the innovation context, human capital facilitates knowledge generation and diversification (Kwan & Chiu, 2015; Lee, Florida, et al., 2010), while also enabling organizations to utilize external knowledge through enhanced absorptive capacity (Cohen & Levinthal, 1990).

In line with this, a substantial body of research has examined the intersection of social entrepreneurship and innovation (Farinha et al., 2020; Maclean et al., 2013; Phillips et al., 2015). While some scholars view social entrepreneurship as inherently innovative (Mair & Martí, 2006; Roper & Cheney, 2005; Zahra et al., 2009), from an outputs perspective, social innovation specifically entails developing novel solutions or significantly improving existing ones to address social challenges (Murray et al., 2010). This distinction is relevant because social ventures may, but do not necessarily, implement social innovations. Given this distinction, open innovation initiatives, such as accelerators, serve as enablers for enhancing social ventures' innovative capacity through structured support and collaboration (Sanchez-Robles et al., 2023).

4.2.3 Hypotheses and proposed model

Based on the Open Social Innovation framework (Gegenhuber & Mair, 2024; Pacheco et al., 2025), human capital theory (Becker, 1964), and social entrepreneurship (Peredo & McLean, 2006; Townsend & Hart, 2008), we propose the following five hypotheses.

4.2.3.1 Human Capital and OSI Orientation

Education represents a crucial investment that enhances individuals' cognitive abilities and problem-solving skills (Becker, 1964). In the entrepreneurship context, general human capital contributes to founders' ability to recognize and capitalize on innovative opportunities (Marvel et al., 2020). This relationship can be explained through the concept of absorptive capacity (Cohen & Levinthal, 1990), as educated founders are better positioned to recognize, assimilate, and apply externally sourced

knowledge. Empirical evidence supports this theoretical foundation, demonstrating that founders' education level is positively associated with innovation activity (Protogerou et al., 2017). Furthermore, educational diversity within an organization is positively associated with an openness to integrating external knowledge into innovation processes (Bogers et al., 2018). In line with this, McGuirk et al. (2015) incorporated factors such as education into what they term "innovative human capital," a concept especially valuable for small firms. Moreover, higher educational attainment has been associated with increased interpersonal trust and volunteer participation (Vera-Toscano et al., 2017), while also fostering sustainability mindsets and social entrepreneurial intentions through university environments and support systems (Bazan et al., 2020; Žalėnienė & Pereira, 2021). Therefore, we pose the following hypothesis:

Hypothesis 1: Founders' general human capital (education level) increases the likelihood that social ventures are OSI-oriented.

With respect to specific human capital, managerial experience equips founders with valuable tacit knowledge and capabilities which, as demonstrated by Ucbasaran et al. (2008), significantly increase the probability of identifying and pursuing new business opportunities. This aligns with human capital theory (Becker, 1964), which suggests that job-specific experiences enhance performance in related tasks. Through experiential learning, founders transform their professional experience into knowledge that improves their ability to identify opportunities and manage venture development (Politis, 2005). Managerial experience, particularly in senior roles such as CEO or Executive Director positions, exposes individuals to complex decision-making processes and strategic planning activities (Augier & Teece, 2009; Hambrick & Mason, 1984). Research indicates that such experience is a precursor to social capital; for instance, Hsu (2007) found that prior experience enhances a founder's ability to establish direct social ties and recruit talent through personal networks, which is crucial when engaging with various stakeholders in innovation networks (Usman & Vanhaverbeke, 2017). This specific human capital enhances founders' managerial capability and their ability to secure stakeholder support, both of which are identified as key determinants of opportunity exploitation decisions (Choi & Shepherd, 2004) and legitimacy perceptions when engaging with stakeholders (Kuruppu et al., 2019; Nagy et al., 2012). This combination of opportunity identification and networking capability proves essential for social enterprises balancing diverse stakeholder expectations (Bunduchi et al., 2023). Hence, we pose the following hypothesis:

Hypothesis 2: Founders' specific human capital (managerial experience) increases the likelihood that social ventures are OSI-oriented.

4.2.3.2 Profit Orientation and OSI Orientation

Profit orientation represents a strategic choice that influences social ventures' resource contributions to OSI activities (De Silva & Wright, 2019). For instance, traditional nonprofits transform into social enterprises by adopting commercial revenue strategies, professionalizing their structure, and legitimizing a socio-commercial business model (Ko & Liu, 2021). Through the lens of the resource dependence perspective (Pfeffer & Salancik, 1978), a for-profit orientation enables social ventures to access diverse resource pools while maintaining autonomy in strategic decision-making, whereas nonprofits operate under complex regulatory environments that constrain their ability to develop such resources (Bies, 2010; Hogg, 2018). This orientation aligns with open innovation principles (Chesbrough & Bogers, 2014) by facilitating the creation and capture of value through market mechanisms, thereby enabling more sustainable participation in innovation networks. Empirical evidence supports this theoretical foundation, showing how for-profit social entrepreneurs blend their attributes and capabilities (such as opportunity recognition, collaborative mindset, and risk-taking) to resolve social issues (Marshall, 2011). Moreover, compared to nonprofits' traditionally conservative operational approaches, the commercial focus allows social ventures to scale their impact through broader market mechanisms (Ko & Liu, 2021; Reficco et al., 2021). Specifically, for-profit social ventures possess enhanced capabilities for open innovation engagement due to their market-oriented resources (Bhattarai et al., 2019) and established value capture mechanisms within innovation networks (Ozeren et al., 2018). Given these considerations, we pose the following hypothesis:

Hypothesis 3: For-profit orientation increases the likelihood that social ventures are OSI-oriented.

For-profit social ventures possess an intrinsic motivation to seek collaborative networks (Marshall, 2011). These ventures leverage such networks, together with the founder's reputation and experience, as key resources for achieving competitive advantage (Roy & Karna, 2015). Although open collaboration implies sharing knowledge without fully appropriating the value created, for-profit orientation does not discourage such engagement, because the market mechanisms through which these ventures operate allow founders' credentials to signal quality to external resource providers. In this context, founders' higher educational attainment enhances their absorptive capacity (Cohen & Levinthal, 1990), enabling them to recognize, assimilate, and deploy external knowledge. Furthermore, empirical evidence suggests that in for-profit ventures, the founders' educational credentials serve as a persistent signal that enhances their capacity to acquire external resources over time (Ko & McKelvie, 2018). By contrast, while diversifying revenue strategies in nonprofit organizations can combat resource dependence, this approach may raise questions about performance, legitimacy, and mission-aligned activities (Froelich, 1999). Moreover, the findings of

De Silva and Wright (2019) underscore this complexity by demonstrating that entrepreneurs' profit orientation significantly influences their approach to social value creation in open innovation initiatives. Therefore, we pose the following hypothesis:

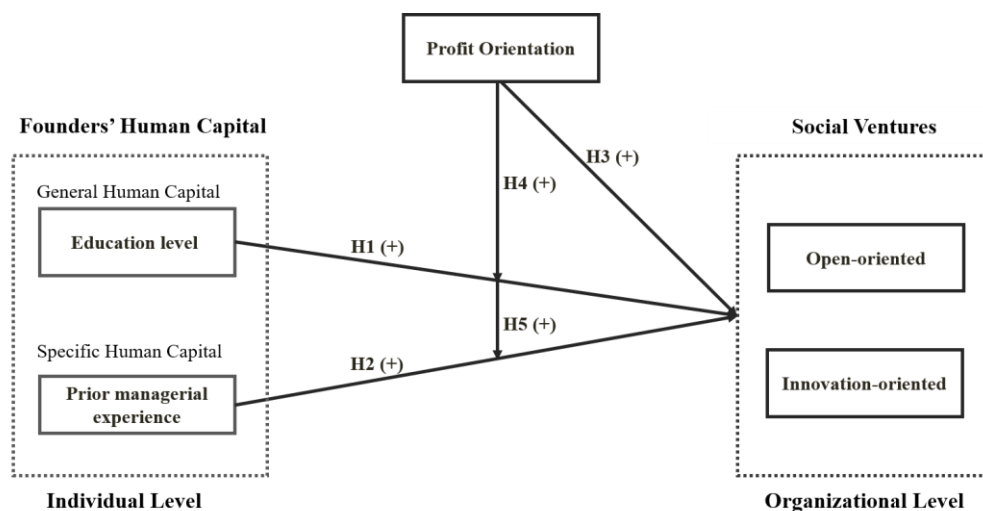
Hypothesis 4: For-profit orientation strengthens the effect of founders' general human capital (education level) on the likelihood that social ventures are OSI-oriented.

Profit orientation creates structural incentives and organizational mechanisms through which founders can effectively leverage their specific human capital toward OSI, particularly within hybrid organizational contexts requiring balance between social and commercial goals (Dufays & Huybrechts, 2016). For-profit social ventures operate within competitive market environments that demand mobilization of managerial expertise to generate both social and economic value (Murphy et al., 2022). In such contexts, founders with prior senior management experience possess organizational capabilities and strategic decision-making skills that prove particularly valuable for engaging with external partners in collaborative networks (Sharir & Lerner, 2006). Indeed, insufficient managerial capabilities can compromise social venture outcomes (Bacq et al., 2016), highlighting the value of founders' business experience for effective social impact. Therefore, we pose the following hypothesis:

Hypothesis 5: For-profit orientation strengthens the effect of founders' specific human capital (managerial experience) on the likelihood that social ventures are OSI-oriented.

Finally, Figure 4.1 summarizes the conceptual model representing the hypothesized relationships between founders' human capital and OSI orientation. The model illustrates both the direct effects of human capital components and the moderating role of venture profit orientation. This framework contributes to our understanding of the mechanisms through which individual-level attributes influence OSI initiatives.

Figure 4.1 Conceptual model



4.3 Methodology

4.3.1 Data source and sample

This study employs a quantitative research design. We conduct a cross-sectional analysis using secondary data from the Global Accelerator Learning Initiative (GALI), a project aimed at investigating the accelerator landscape and understanding the entrepreneurs who seek support from these programs. The GALI data were collected through an online survey completed by ventures before the announcement of any acceptance/rejection notifications from the accelerator programs to which they applied (GALI, 2020). The entrepreneurs who completed the survey and consented to let Emory University include their information in its research were eligible for a random drawing of USD 5,000, resulting in a high response rate and minimizing potential selection bias.

Between 2013 and 2019, GALI collected detailed data from 23,368 ventures applying to more than 369 acceleration programs worldwide. These programs vary in their social impact focus, geographical scope, cohort size, program length, and support structures. The ventures span various sectors and regions, encompassing for-profit and nonprofit forms, with diverse founder characteristics including gender composition and prior entrepreneurial experience.

We apply three inclusion criteria to focus specifically on: (i) ventures with social motives, based on the ventures' self-reported explicit intent to create social or environmental impacts, (ii) early-stage ventures, no more than four years old when applying to the acceleration program, and (iii) ventures with a defined legal status as either for-profit or nonprofit. The venture's age threshold aligns with the definition of early-stage entrepreneurial activity in the Global Entrepreneurship Monitor (GEM), which includes businesses up to 3.5 years old (GEM, 2021). By focusing on this age range, we ensure our sample represents the typical accelerator target population and enables accurate examination of factors influencing OSI participation at this critical development stage.

We conducted a comprehensive data preparation procedure. First, we applied the inclusion criteria and excluded observations with missing data on key variables. Then, we identified and removed outliers with extreme values that could impact the statistical power of the sample (Aguinis et al., 2013). Given our focus on early-stage social ventures, we then restricted the analysis by excluding ventures where founders possessed prior experience in more than 15 ventures (Katre & Salipante, 2012), where venture revenue exceeded USD 3,000,000, or where venture philanthropic support surpassed USD 3,000,000, as these characteristics could indicate more mature organizations. The final sample comprised 11,953 ventures spanning 157 countries and 16 different sectors, enhancing the generalizability of findings by capturing diverse venture contexts.

The GALI database is suitable for investigating the factors influencing ventures' participation in OSI initiatives for several reasons. First, it includes a large, diverse sample of early-stage ventures from

around the world, both accepted and rejected by accelerators, minimizing potential selection bias. Second, the dataset includes variables such as founders' education level, prior founding experience (for-profit, nonprofit, or other), and previous job roles, which are used to operationalize the key constructs of general and specific human capital in this study. These variables allow for a nuanced examination of how different aspects of founder human capital contribute to engagement with OSI initiatives. Third, the ventures' diverse representation across sectors, geographical regions, and profit orientations enables robust control of meso-level characteristics in the analysis.

Moreover, prior research has validated the usefulness of the GALI dataset for conducting rigorous empirical analyses. For example, Sahasranamam et al. (2019) used the GALI data to examine the role of founding team entrepreneurial experiences (for-profit versus nonprofit) on social enterprise performance, finding that for-profit experience boosts performance, while nonprofit experience has an insignificant effect. Similarly, Compion et al. (2025) utilized the GALI dataset to investigate gender disparities in equity funding for nonprofit, for-profit, and hybrid social ventures. Their findings shed light on the structural and individual barriers women entrepreneurs encounter in securing funding for their ventures. Furthermore, Kher et al. (2023) employed a quasi-experimental design with the GALI data to determine a causal relationship between social impact accelerators and the emergence of for-profit social ventures, although this effect varies across "who," "when," and "where" contexts.

4.3.2 Measures

4.3.2.1 Dependent variables

The dependent variables capture two key dimensions of OSI orientation through binary measures: (i) Open-oriented: this binary variable indicates whether a social venture has previously participated in an accelerator program (Battistella et al., 2017). Accelerator participation serves as a proxy for openness, reflecting the organization's engagement with external knowledge sources, collaborative learning environments, and network-based innovation processes. (ii) Innovation-oriented: to assess innovativeness, we employ the "invention-based model" variable as a proxy for innovation orientation. This binary variable indicates whether an organization builds upon newly created technology owned by the venture or its founders (or both). This approach provides a clear indicator of the capacity to generate and apply novel solutions (Crossan & Apaydin, 2010).

While innovation, especially social innovation, can encompass services or business models beyond technology, the "invention-based" variable serves as a proxy for validating an organization's innovative capacity (Gault, 2018; Hagedoorn & Cloudt, 2003). This proxy is useful as it captures an organization's ability to generate novel ideas and solutions, which is at the core of innovation processes (Crossan & Apaydin, 2010). Furthermore, in the context of social innovation, invention-based metrics can indicate an organization's capacity to develop creative approaches to addressing

societal challenges, often correlating with other indicators of social impact and systemic change potential (Nicholls & Murdock, 2012).

4.3.2.2 Independent variables

Drawing on the conceptual framework of Colombo & Grilli (2005), we include two independent variables to capture general and specific human capital, operationalized respectively as founders' education level and managerial experience. General human capital is captured through the founders' education level, which indicates the highest level of education attained (e.g., high school, bachelor's degree, master's degree, doctorate). Given that this variable comprises ten ordered categories, we treat it as continuous following established methodological practices in quantitative research, which suggest this approach is appropriate when ordinal variables have more than five categories (Rhemtulla et al., 2012). Specific human capital is captured through prior management experience, which indicates whether the founders have held executive or senior management positions (e.g., CEO, senior management, or executive roles). This binary variable reflects the founders' accumulated organizational capabilities and strategic decision-making skills that are particularly relevant for venture development (Colombo & Grilli, 2005; Marvel et al., 2016).

4.3.2.3 Moderator and control variables

Although recent theoretical frameworks address hybrid organizations and mixed forms in social entrepreneurship (Battilana & Lee, 2014), the literature predominantly adopts a binary classification based on the organization's legal status (Kistruck & Beamish, 2010). In this study, the venture's profit orientation was measured as a dichotomous variable where organizations were classified as either for-profit or nonprofit, based on their legal status declared at the time of data collection.

Based on previous literature, we control for several characteristics that may influence participation in OSI initiatives at different levels: micro (founders' age and gender), meso (venture age, venture sector, venture revenue, venture philanthropic support, venture's number of founders), and macro (country-level economic conditions). Founders' age (Kautonen et al., 2014) and gender (Gupta et al., 2009) are included to account for potential demographic influences on entrepreneurial behavior. Venture characteristics such as number of founders, revenue, sector, and philanthropic support received are included to account for meso-level factors that may influence the need to improve performance and the capacity to survive (Short et al., 2009). While prior studies typically apply natural logarithm transformations to financial variables (e.g., Lall & Park, 2022), we employed the Inverse Hyperbolic Sine (IHS) transformation instead. The IHS transformation is defined for zero and negative values (Bellemare & Wichman, 2020), making it suitable for early-stage ventures that have not yet registered revenues.

Finally, GDP per capita is included to control for country-level economic conditions that shape entrepreneurial ecosystems and support structures (Spigel, 2017). Additionally, we control for temporal variations by including year fixed effects. The description of the variables is summarized in Table 4.1.

Table 4.1 Description of variables

Variable	Name	Description
Dependent Variables (OSI)	Open-oriented.	Binary variable equal to 1 if the social venture has participated in an accelerator program, 0 otherwise.
	Innovation-oriented.	Binary variable equal to 1 if the social venture builds upon newly created technology owned by the venture and/or its founders, 0 otherwise.
Independent variable	Founders' education level.	Ordinal variable (treated as continuous) variable indicating the highest level of education attained by the founders: 1. None 2. Primary school 3. Middle school 4. Less than 9th grade 5. High school 6. Technical/Vocational degree 7. Associate degree 8. Bachelor's degree / Honours degree 9. Some graduate degree 10. Master's degree 11. PhD
	Founders' managerial experience.	Binary variable equal to 1 if the founders held senior management positions (CEO, Executive, or equivalent senior roles) in at least one of their two most recent professional positions, 0 otherwise.
Moderator variable	Venture's profit orientation.	Binary variable coded as 1 to indicate for-profit oriented ventures and 0 for nonprofit ventures.
Control variables	Founders' age.	Continuous variable indicating the age of founders.
	Founders' gender.	Binary variable coded as 1 for male founders and 0 for female founders.
	Venture's number of founders.	Categorical variable indicating the number of venture's founders: (1) One founder, (2) Two founders, (3) Three or more founders.
	Venture age.	Continuous variable indicating the age of the venture, calculated as the year of application to the program minus the year of foundation.
	Venture sector.	Categorical variable indicating the primary sector impacted by the venture's activities (e.g., Agriculture, Education, Energy).
	Venture philanthropic support.	Binary variable equal to 1 if the venture has received philanthropic support (e.g., seed grants, awards, or donations) since foundation, 0 otherwise.
	Venture revenue (IHS).	Continuous variable measuring the venture's total earned revenue since founding in USD, transformed using Inverse Hyperbolic Sine (IHS).
	GDP per capita (log).	Continuous variable measuring the natural logarithm of GDP per capita for the country where the venture main operates.
	Year fixed effects.	Categorical variable indicating the year of data collection (program year).

Note: All variables are drawn from GALI, except for GDP per capita, which is obtained from the World Bank's World Development Indicators (WDI).

4.3.3 Estimation

Given that our dependent variables, Open-oriented and Innovation-oriented, are binary, we employ a bivariate probit model. Following the econometric framework outlined by Greene (2020), this approach is appropriate when two binary outcomes are potentially correlated through unobserved factors in the error terms. Unlike estimating two separate probit models, the bivariate approach allows us to estimate the correlation parameter (ρ) between the disturbances, providing a test for the interdependence of the two outcomes after controlling for observed covariates. The model estimates two equations simultaneously:

$$\begin{aligned} Open_i^* &= X_i\beta_1 + \varepsilon_{1i}, Open_i = 1 \text{ if } Open_i^* > 0, 0 \text{ otherwise} \\ Innovation_i^* &= X_i\beta_2 + \varepsilon_{2i}, Innovation_i = 1 \text{ if } Innovation_i^* > 0, 0 \text{ otherwise} \end{aligned}$$

where $Open_i$ indicates whether a social venture has previously participated in an accelerator program, and $Innovation_i$ indicates whether the venture builds upon newly created technology owned by the venture and/or its founders. The error terms are assumed to follow a bivariate normal distribution and correlation ρ :

$$\begin{pmatrix} \varepsilon_1 \\ \varepsilon_2 \end{pmatrix} \sim N\left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{bmatrix} 1 & \rho \\ \rho & 1 \end{bmatrix}\right)$$

If $\rho = 0$, the error terms are independent, and estimating separate probit models would be sufficient. However, a statistically significant ρ indicates that joint estimation is required to obtain statistically efficient estimates and to correctly compute the joint probability $\Pr(Open = 1, Innovation = 1)$. The vector X_i includes the independent variables (founders' education level and managerial experience), the moderator (profit orientation), and control variables (founders' age and gender, venture age, sector, philanthropic support, revenue transformed via IHS, number of founders, program year fixed effects, and log GDP per capita), as detailed in Table 4.1.

The model is estimated using maximum likelihood with robust standard errors to account for potential heteroskedasticity. To test Hypotheses 1 through 3, we calculate average marginal effects on the joint probability of being both open-oriented and innovation-oriented, $\Pr(Open = 1, Innovation = 1)$, which directly corresponds to OSI orientation. For Hypotheses 4 and 5 regarding moderation effects, we extend the model to include interaction terms between profit orientation and the human capital variables, conducting simple slopes analysis at different values of the moderator.

4.4 Results

4.4.1 Descriptive statistics and correlations

Table 4.2 presents descriptive statistics and Pearson correlations for the continuous and dichotomous variables. While several associations are significant ($p < 0.05$), all coefficients are well below the

usual 0.7–0.8 multicollinearity cutoff (Midi et al., 2010); the largest absolute correlation is about 0.402.

Table 4.2 Descriptive statistics and correlation matrix

			Obs.	Mean	Std. dev.	Min.	Max.
Dep.	1	Open-oriented	11,953	0.045	0.207	0	1
	2	Innovation-oriented	11,953	0.563	0.496	0	1
Indep.	3	Founders' education level	11,953	8.348	1.348	1	11
	4	Founders' managerial experience	11,953	0.574	0.423	0	1
	5	Venture's profit orientation	11,953	0.897	0.304	0	1
Control	6	Founders' age	11,953	33.935	8.492	18	80
	7	Founders' gender	11,953	0.681	0.366	0	1
	8	Venture age	11,953	1.283	0.984	0	3
	9	Venture philanthropic support	11,953	0.257	0.437	0	1
	10	Venture revenue (IHS)	11,953	5.376	5.311	0	16
	11	GDP per capita (log)	11,953	8.918	1.491	5	12

	1	2	3	4	5	6	7	8	9	10	11
Dep.	1	1									
	2	0.018	1								
Indep.	3	0.002	0.053*	1							
	4	0.020*	0.094*	0.080*	1						
	5	-0.006	0.129*	-0.004	0.015	1					
Control	6	-0.036*	0.022*	0.206*	0.259*	-0.009	1				
	7	0.032*	0.148*	-0.038*	0.089*	0.137*	-0.044*	1			
	8	-0.005	0.042*	0.050*	0.054*	-0.065*	0.152*	-0.009	1		
	9	0.062*	0.021*	0.072*	-0.009	-0.246*	-0.063*	-0.061*	0.185*	1	
	10	-0.025*	0.008	0.034*	0.094*	0.033*	0.055*	-0.01	0.402*	0.149*	1
	11	0.020*	0.009	0.090*	-0.042*	-0.043*	0.147*	-0.031*	-0.01	0.055*	-0.078*

* p < 0.05

4.4.2 Hypotheses tests

Table 4.3 presents the results of the bivariate probit regression models examining the determinants of open and innovation orientations in social ventures. The model estimates two correlated equations simultaneously: one for open orientation (Eq1) and another for innovation orientation (Eq2). The significant correlation coefficient ($\rho = 0.094$) indicates that these two orientations are positively related, justifying the use of a bivariate probit approach.

Table 4.3 Bivariate probit regression results

Models		1) Control model				2) Main effects			
		Eq1. Open-oriented		Eq2. Innovation-oriented		Eq1. Open-oriented		Eq2. Innovation-oriented	
Variables		Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
<i>Individual (founder) level</i>									
Founders' age		-0.014***	(0.004)	0.003**	(0.001)	-0.018***	(0.004)	-0.001	(0.002)
Founders' gender		0.097	(0.093)	0.431***	(0.033)	0.047	(0.095)	0.370***	(0.034)
<i>Meso (venture) level</i>									
Venture age		0.045	(0.034)	0.053***	(0.013)	0.054	(0.034)	0.065***	(0.014)
Venture philanthropic support		0.388***	(0.069)	0.058**	(0.028)	0.430***	(0.073)	0.138***	(0.029)
Venture revenue (IHS)		0.006	(0.007)	-0.006**	(0.002)	0.002	(0.007)	-0.011***	(0.003)
Venture's number of founders									
-Two founders		0.11	(0.091)	0.129***	(0.032)	0.11	(0.091)	0.113***	(0.033)
-Three or more founders		0.289***	(0.088)	0.249***	(0.032)	0.304***	(0.088)	0.266***	(0.032)
Venture sector fixed effects	Yes			Yes		Yes		Yes	
<i>Macro (country) level</i>									
GDP per capita (log)		0.004	(0.02)	0.009	(0.008)	0.009	(0.02)	0.011	(0.008)
<i>Temporal control</i>									
Year fixed effects	Yes			Yes		Yes		Yes	
Independent	Founders' education level					0.031	(0.028)	0.041***	(0.009)
	Founders' managerial experience					0.273***	(0.078)	0.238***	(0.029)
	Venture's profit orientation					0.249**	(0.105)	0.554***	(0.042)
	Constant	-0.839***	(0.267)	-0.995***	(0.112)	-1.389***	(0.35)	-1.863***	(0.136)
	Observations	11,953				11,953			
	Log-Likelihood	-8954				-8811			
	Wald Chi2	41646				31701			
	rho (Correlation)	0.117				0.094			
	Pct Correct	97.29%				97.29%			

* p < 0.10, ** p < 0.05, *** p < 0.01

Table 4.4 presents the average marginal effects of founders' human capital on the probability of being OSI-oriented ($\Pr(\text{open}=1, \text{innovation}=1)$). Contrary to our expectations, founders' education level shows no significant effect at conventional levels ($dy/dx = 0.002$, $p < 0.10$); therefore, we reject Hypothesis 1. However, founders' entrepreneurial and managerial experience demonstrates a significant positive effect on OSI orientation ($dy/dx = 0.012$, $p < 0.01$). This finding supports Hypothesis 2.

Table 4.4 Average marginal effects of founders' human capital on OSI orientation

Variables	Probability of choosing		Being a social venture oriented	
			Pr(open = 1, innovation = 1)	
			dy/dx	Std. Err.
Independent	Founders' education level	H1	0.002*	(0.001)
	Founders' managerial experience	H2	0.012***	(0.002)
	Venture's profit orientation	H3	0.014***	(0.002)

Note: Results based on Model 2.

Consistent with Hypothesis 3, for-profit social ventures exhibit a significant positive effect on OSI orientation ($dy/dx = 0.014$, $p < 0.01$) (Table 4.4). In addition, Table 4.5 presents the conditional marginal effects analysis, which reveals that for-profit orientation significantly moderates the relationship between founders' human capital and OSI orientation. Specifically, among for-profit ventures, founders' education level shows a significant positive effect on OSI orientation ($dy/dx = 0.002$, $p < 0.05$), while this effect is non-significant for nonprofit ventures ($dy/dx = -0.001$, $p > 0.1$). This provides support for Hypothesis 4. Founders' managerial experience, by contrast, shows a positive and statistically significant marginal effect in both organizational forms: nonprofit ventures ($dy/dx = 0.009$, $p < 0.05$) and for-profit ventures ($dy/dx = 0.012$, $p < 0.01$). Because the difference between the two marginal effects is not statistically significant, Hypothesis 5 is not supported. Table 4.6 summarizes the empirical findings for all five hypotheses.

Table 4.5 Conditional marginal effects of founders' human capital by venture profit orientation (Moderation Analysis)

Variables		Effect for nonprofit ventures (Profit=0)		Effect for for-profit ventures (Profit=1)		Difference	
		dy/dx	Std. Err.	dy/dx	Std. Err.	$\Delta dy/dx$	Std. Err.
Founders' education level	H4	-0.001	(0.001)	0.002**	(0.001)	0.004**	(0.002)
Founders' managerial experience	H5	0.009**	(0.004)	0.012***	(0.003)	0.004	(0.005)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: Results based on Simple Slopes analysis. Dependent variable: Pr(Open=1, Innovation=1). The difference column reports the contrast between conditional effects, tested via a Wald chi-squared test with one degree of freedom.

Figure 4.2 and Figure 4.3 plot the predictive margins underlying these conditional effects, respectively. In Figure 4.2, the profile for for-profit ventures rises from 0.024 to 0.036 across the observed educational range, whereas the profile for nonprofit ventures declines slightly, from 0.017 to 0.011. The divergence between the two profiles is substantively meaningful, since the predicted probability of OSI orientation for a doctorate-level founding team is approximately three times as high in for-profit as in nonprofit ventures. In Figure 4.3, which plots the margins for founders' managerial experience, both profiles are positively sloped and approximately parallel, rising from 0.010 to 0.018 among nonprofit ventures and from 0.023 to 0.035 among for-profit ventures. Their vertical separation reflects the direct effect of profit orientation reported for Hypothesis 3, whereas

the similarity of their slopes is consistent with the non-significant moderating effect reported for Hypothesis 5.

Figure 4.2 Predictive margins of founders' education level on OSI orientation by venture profit orientation

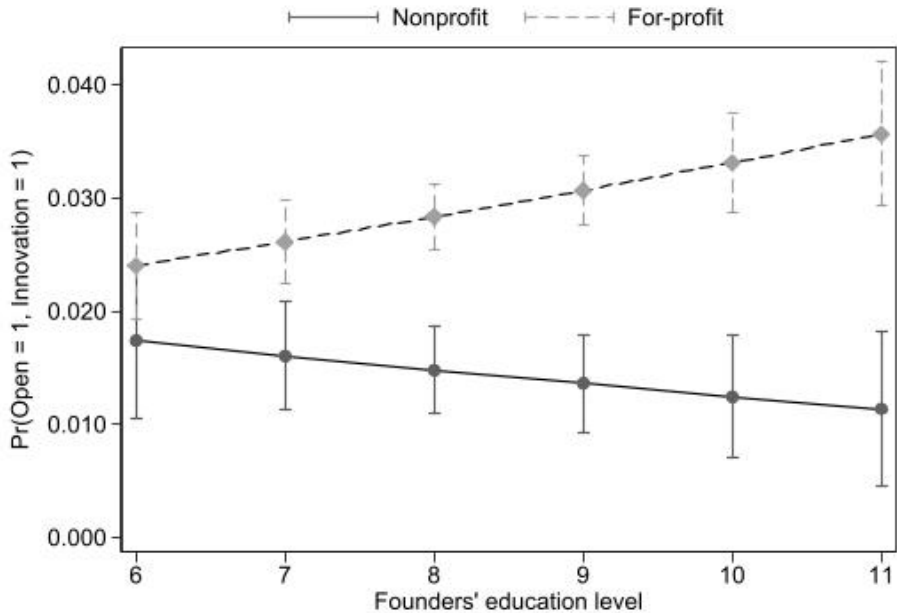
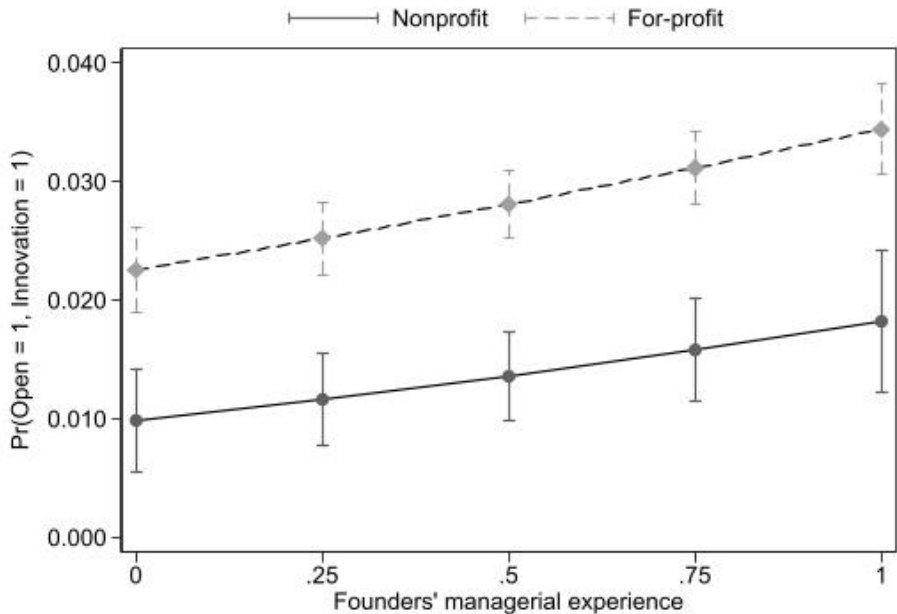


Figure 4.3 Predictive margins of founders' managerial experience on OSI orientation by venture profit orientation



In addition to our main hypotheses, the analysis in Table 4.3 reveals several significant control variables. Founders' gender emerges as a strong predictor, with male founders showing significantly higher likelihood of being innovation-oriented (coef. = 0.370, $p < 0.01$ in Model 2, Eq2). Founders' age demonstrates a significant negative relationship with open orientation (coef. = -0.018, $p < 0.01$), suggesting that younger founders are more inclined towards these initiatives. Organizational characteristics also prove influential, with larger founding teams (three or more founders) associated with increased likelihood of both open orientation (coef. = 0.304, $p < 0.01$) and innovation orientation (coef. = 0.266, $p < 0.01$). This finding suggests that diverse skill sets and broader networks within larger founding teams may facilitate external collaborations. Conversely, social venture revenue shows a significant negative association with innovation orientation (coef. = -0.011, $p < 0.01$), hinting at a possible substitution effect between internal resources and external collaborations. Additionally, venture philanthropic support demonstrates positive significant effects on both open orientation (coef. = 0.430, $p < 0.01$) and innovation orientation (coef. = 0.138, $p < 0.01$).

Table 4.6 Summary of empirical results

Hypotheses	Results
H1 Founders' general human capital (education) increases the likelihood that social ventures are OSI-oriented.	Not Supported
H2 Founders' specific human capital (managerial experience) increases the likelihood that social ventures are OSI-oriented.	Supported
H3 For-profit orientation increases the likelihood that social ventures are OSI-oriented.	Supported
H4 For-profit orientation strengthens the effect of founders' general human capital (education level) on the likelihood that social ventures are OSI-oriented.	Supported
H5 For-profit orientation strengthens the effect of founders' specific human capital (managerial experience) on the likelihood that social ventures are OSI-oriented.	Not Supported

4.4.3 Robustness checks

We conducted two robustness checks to verify the stability of our findings. First, we estimated a Multinomial Logistic Regression (MLogit) model to ensure that our main results were not driven by the distributional assumption of bivariate normality inherent in the Bivariate Probit specification (Greene, 2020; Sarrias & Daziano, 2017). The MLogit approach treats each combination of open and innovation orientations as distinct outcome categories, allowing coefficient estimates to vary freely across these categories without imposing a joint normal error structure (Wulff, 2015). Under this alternative specification (see Appendix B), the pattern of results remained consistent with our main findings: managerial experience (H2) and for-profit orientation (H3) maintained significant positive effects, the moderating effect of profit orientation on education was confirmed (H4), and the hypotheses that were not supported in our main analysis (H1 and H5) remained non-significant.

Second, we tested an alternative proxy for innovation orientation. Given that intellectual property can serve as an indicator of innovative capacity (Heimonen, 2012), we employed a binary variable indicating whether the venture possessed any form of intellectual property (patents, copyrights, or trademarks) rather than the invention-based model variable used in our main analysis. Under this specification (see Appendix C), the pattern of significant relationships remained unchanged. Overall, these robustness checks provide substantial support for the stability of our main findings.

4.5 Discussion

Our study offers insights into the relationship between founders' human capital and OSI orientation in social ventures. The findings reveal important boundary conditions that distinguish social from commercial ventures. Specifically, our results support the argument that commercial open innovation models are not directly transferable to social contexts (Ahn et al., 2019). The non-significant direct effect of education on OSI orientation challenges conventional wisdom about formal education's role in driving innovation in traditional or technological contexts (Kato et al., 2015; Marvel & Lumpkin, 2007), but aligns with prior studies in the small and medium-sized enterprise (SME) context suggesting that general educational attainment does not automatically translate into open innovation adoption (Ahn et al., 2017). This pattern suggests that, in social venture contexts, formal education may provide insufficient context-specific knowledge for navigating the unique stakeholder dynamics and community engagement requirements that characterize OSI initiatives. Drawing on the distinction between general and entrepreneurship-specific human capital proposed by Ucbasaran et al. (2008), this finding suggests that social innovation demands tacit knowledge of social problems rather than formal educational credentials. As Politis (2005) suggests, such context-specific knowledge is acquired more effectively through experiential learning than through the formal education associated with general human capital.

This interpretation aligns with the finding by Davidsson & Honig (2003) that education predicts entry into entrepreneurial activities but does not significantly determine success in the exploitation process. The compensatory role of OSI initiatives themselves may further explain the non-significant effect of education, as accelerators provide structured access to knowledge, mentorship, and networks (Hallen et al., 2020) that substitute for founders' educational limitations. Our findings align with Del Sarto et al. (2020), who found that accelerator mentorship can substitute for internationalization experience in ensuring venture survival, suggesting that OSI participation may similarly compensate for founders' limited formal education. However, education's effect becomes significant when combined with for-profit orientation, revealing that the effect is contingent rather than absent. Commercial contexts appear to provide signaling mechanisms that translate educational attainment into tangible advantages, while in nonprofit contexts, where resource acquisition depends more on mission alignment (Froelich, 1999), formal credentials carry less weight.

The significant influence of managerial experience on OSI orientation presents a contrasting pattern. Practical knowledge of organizational processes and stakeholder dynamics provides founders with cognitive frameworks particularly suited for OSI. This aligns with the findings of Sharir and Lerner (2006) regarding the role of human capital and skills in social venture success. Moreover, Ucbasaran et al. (2009) found that entrepreneurs with prior ownership experience identify more opportunities and exploit higher-quality innovative ones; our results indicate this advantage translates into an orientation toward collaborative approaches. The mechanism likely involves the relational skills and strategic decision-making capabilities that prior entrepreneurial experience develops, which prove valuable for engaging with external stakeholders in OSI ecosystems (Hsu, 2007).

The positive effect of for-profit orientation on OSI orientation supports the proposition by Battilana and Lee (2014) that organizations combining commercial and social logics develop distinctive capabilities for resource mobilization. This pattern is consistent with the argument by Townsend and Hart (2008) that commercial orientation signals commitment to sustainable operations, thereby attracting stakeholder support. Moreover, Meyskens and Carsrud (2013) found partnership diversity associated with nascent venture development, and our results suggest for-profit orientation facilitates such partnership development in OSI contexts. This extends the evidence provided by Hagedoorn et al. (2023) that commercial orientation improves social innovation performance by demonstrating that this advantage manifests specifically in OSI orientation.

Related to our moderation analysis, the effect of education is amplified by for-profit orientation, supporting the finding by Ko and McKelvie (2018) that educational credentials serve as persistent signals for resource acquisition in commercial contexts. For-profit orientation creates contexts where investor due diligence, market-based evaluation, and credential recognition translate educational attainment into tangible advantages, mechanisms largely absent in nonprofit settings (Austin et al., 2006). This extends the work by Kong and Ramia (2010) on knowledge resource utilization by demonstrating that general human capital's value is contingent on the strategic model. Since resources become sources of competitive advantage primarily when the market structure enables their economic exploitation (Barney, 1991), social ventures utilize resource-based strategies similar to those of commercial firms (Meyskens et al., 2010); yet the signaling efficiency of such resources is constrained in nonprofit structures.

Managerial experience, by contrast, operates as a critical determinant of value creation. This pattern suggests that managerial competencies represent directly transferable skills that contribute to success regardless of the specific organizational context (Unger et al., 2011). Unlike educational credentials per se, this experiential knowledge translates into operational capabilities. This aligns with Randhawa et al. (2019), whose findings suggests that project team capabilities, derived from adequate resources and expertise, act as a determinant of engagement behavior in social innovation

contexts. Specifically, the frameworks derived from a commercial or managerial background allow founders to effectively navigate the competing demands of hybrid organizations (Pache & Santos, 2013). Through selective coupling of commercial and social practices, such managers can secure legitimacy across both institutional logics. This is consistent with the conceptualization of OSI by Chesbrough and Di Minin (2014), which posits that innovation mechanisms and business models are relevant and applicable beyond the purely commercial sector, allowing for knowledge integration across different organizational forms.

Additionally, beyond our core hypotheses, our control variable analysis revealed some interesting findings. The gender disparity in OSI orientation is consistent with research on gender differences in entrepreneurship and innovation (Ahl & Marlow, 2012) and OSI contest success (Chandra et al., 2021), suggesting that barriers to women's participation extend to OSI contexts. The negative association between founder age and OSI orientation could reflect generational differences in entrepreneurial behavior (Zhang & Acs, 2018), which may extend to attitudes toward collaboration. At the organizational level, larger founding teams show greater OSI orientation, consistent with evidence that diverse teams possess broader knowledge reservoirs (Tryba et al., 2023) and represent demographic characteristics associated with the pursuit of social motives (Chandler et al., 2022). The negative relationship between venture revenue and OSI orientation suggests a substitution effect between internal resources and external collaborations, consistent with findings that resource constraints drive open innovation adoption (Garriga et al., 2013).

4.6 Conclusions

The objective of this study was to examine the relationship between founders' human capital and the likelihood of social ventures adopting an OSI orientation, considering the moderating role of profit orientation. The findings confirm that specific human capital, operationalized as managerial experience, significantly predicts OSI orientation, while formal education shows no direct effect but becomes significant when moderated by for-profit organizational forms. Additionally, for-profit orientation emerges as a strong direct predictor of OSI orientation. These results suggest that OSI initiatives may partially substitute for founders' formal educational capital, with implications for both human capital theory in social entrepreneurship and the design of support mechanisms for social ventures.

4.6.1 Theoretical implications

This study contributes to human capital theory (Becker, 1964) by identifying boundary conditions for the education-OSI relationship. Contrary to established predictions that formal education enhances innovation outcomes (Unger et al., 2011) through improved cognitive capabilities and absorptive capacity (Cohen & Levinthal, 1990), general human capital exhibits no direct effect on OSI orientation in social ventures. This finding suggests that the mechanisms through which

education drives innovation in commercial settings operate differently when ventures pursue primarily social objectives. The contingent effect of education, significant only under for-profit orientation, indicates that educational credentials function as effective signals primarily in market-oriented contexts where, as Ko and McKelvie (2018) demonstrate, resource providers rely on such proxies for quality assessment.

These findings advance understanding of hybrid organizations (Battilana & Lee, 2014) by suggesting that profit orientation functions not merely as a structural characteristic but as a contingency factor that activates otherwise latent founder resources. This implies that the determinants of OSI diverge from patterns observed in commercial open innovation, where formal education consistently drives external knowledge sourcing (Kato, 2020). In social venture contexts, organizational form determines which founder capabilities translate into OSI orientation, with for-profit structures providing the market contexts where educational credentials function as effective signals.

Beyond these contributions, our findings advance the emerging OSI framework (Gegenhuber & Mair, 2024; Pacheco et al., 2025) by identifying founder-level boundary conditions for participation in collaborative social innovation. While prior OSI research has emphasized macro-level orchestration models and meso-level organizational processes, our results show that micro-level attributes (particularly founders' human capital) interact with organizational form to shape participation patterns. The differential effects observed for general versus specific human capital suggest that the composition of OSI participants varies between for-profit and nonprofit forms, with implications for the types of knowledge and capabilities brought into collaborative processes.

4.6.2 Practical and policy implications

This study offers actionable insights for practitioners and policymakers operating within social innovation ecosystems. For accelerator managers and innovation intermediaries, the findings provide a nuanced framework for founder evaluation that foregrounds practical management capabilities as complementary to traditional credentials. The moderating role of profit orientation further suggests that educational credentials function as effective signals primarily in market-oriented contexts, whereas OSI initiatives may offer structures through which founders without traditional credentials can access collaborative innovation processes. For impact investors, these patterns suggest that management experience constitutes a valuable indicator for assessing early-stage teams' likelihood of OSI engagement.

For policymakers designing social innovation support programs, these findings underscore that both nonprofit and for-profit ventures are associated with OSI participation, although through distinct pathways. This supports program designs that tailor assessment criteria to organizational form rather than applying uniform standards. For professional development programs, practical management

skill-building and mentorship may prove more relevant for nonprofit leaders, whereas programs serving commercial social enterprises should not discount the value of formal credentials. For foundations and philanthropic organizations, the positive association between grant receipt and OSI engagement suggests that philanthropic support may play a facilitating role; accordingly, funders might consider explicitly supporting ventures' participation in accelerator programs, whether through dedicated grants or through prioritizing applicants demonstrating readiness to engage with collaborative ecosystems.

Additional observations from control variables provide further guidance for ecosystem design. Ventures with three or more founders exhibit significantly higher OSI orientation compared with solo founders, a pattern aligned with findings on founding team composition and collaborative innovation engagement (Bertin & Mavoori, 2024); entrepreneurship support centers might therefore consider facilitating networking opportunities that connect prospective founders before venture creation. The observed gender disparity, with male founders exhibiting higher OSI orientation, highlights the need for targeted support mechanisms. Accelerator programs might consider dedicated cohorts for women-led social ventures, mentorship initiatives connecting women founders with successful women social entrepreneurs, or a systematic review of selection criteria to identify potential biases. Such interventions could help ensure that the benefits of OSI remain accessible regardless of gender, thereby broadening the talent pool contributing to solutions for societal challenges.

4.6.3 Limitations and future research

This study has several limitations that provide avenues for future research. First, while the timing of GALI data collection, with surveys administered before accelerator acceptance notifications, mitigates selection bias, the cross-sectional design cannot establish causality. Time-varying cofounders, such as founders' evolving motivations or network development, could simultaneously influence human capital accumulation and OSI orientation. Future research could employ longitudinal designs tracking social ventures over time to strengthen causal identification of human capital effects on OSI orientation.

Second, our sample of ventures applying to accelerator programs introduces selection effects constraining generalizability. Ventures seeking accelerator support may possess inherent orientations towards external collaboration that distinguish them from social ventures pursuing organic growth or those operating in contexts without developed support ecosystems. These findings may not generalize to social ventures in least developed countries, established ventures beyond the early-stage threshold, or organizations avoiding formal acceleration pathways. Future research might employ qualitative methods, such as interviews with accelerator managers, to directly assess whether

selection criteria explicitly consider founders' human capital, thereby validating the proposed mechanism.

Third, our reliance on binary operationalizations introduces measurement limitations. The open-oriented variable captures only prior accelerator participation, which may not reflect the full spectrum of OSI initiatives including hackathons, public innovation labs, or informal co-creation processes, nor variation in the intensity of such collaborative engagement (e.g., the number of external partners involved). Future research employing the OSI framework proposed by Pacheco et al. (2025) could explore whether ventures engaging in exploration-oriented orchestration or spontaneous, self-organizing processes (e.g., Cucino et al., 2026) exhibit different human capital patterns compared to those pursuing empowerment-oriented approaches. Similarly, the invention-based model variable captures technological innovation but may not adequately capture social innovation, which often encompasses novel service delivery models or systemic solutions that do not rely on proprietary technology. Additionally, binary operationalizations of managerial experience obscure heterogeneity in experience duration and industry relevance (e.g., overseas or industry-specific experience) that could differentially predict OSI orientation.

Fourth, our model treats profit orientation as exogenous, reflecting the legal status declared at venture founding. While this approach is consistent with prior research treating organizational form as a foundational strategic choice (Townsend & Hart, 2008), we acknowledge that founders' human capital, the venture's organizational form, and its OSI orientation may be jointly determined by unobserved founder characteristics, such as intrinsic motivations or risk preferences. This joint determination represents a potential source of endogeneity that future research could address through instrumental variable approaches or longitudinal designs that model these choices sequentially.

Fifth, our specification, while controlling for GDP per capita, does not fully capture institutional factors that may moderate human capital-OSI pathways across contexts. Given that founders and ventures are nested within countries, this hierarchical structure may also introduce within-country correlation not fully captured by robust standard errors alone. Drawing on the institutional approach (North, 1990), both formal institutions (such as regulatory environments governing social enterprises) and informal institutions (such as cultural attitudes toward collaboration) vary substantially across the 157 countries in our sample, potentially producing distinct dynamics. Future research employing multilevel designs could examine these moderating mechanisms and their boundary conditions.

Sixth, our preliminary examination of marginal effects across different venture configurations suggested potential substitution patterns between open orientation and founders' human capital in predicting innovation outcomes. Specifically, the data indicated that human capital effects on

innovation were significant only among non-open-oriented social ventures. Future research employing longitudinal designs that track ventures before and after accelerator participation could more definitively establish whether accelerator participation compensates for limitations in founders' formal education or experience, and under what conditions such substitution effects manifest.

Finally, the gender disparity revealed in our analysis, with male founders exhibiting higher OSI orientation likelihood, presents an important avenue for future inquiry. While our design cannot identify the mechanisms underlying this pattern, these findings align with broader literature on gender disparities in entrepreneurship. Future research specifically designed to examine gender dynamics in OSI contexts, potentially incorporating qualitative methods to capture experienced barriers, could provide insights to inform more equitable design of accelerator programs or similar OSI initiatives.

Chapter 5

Social Entrepreneurs' Individual-Level
Resources and Innovation Novelty: The
Moderating Role of Cultural Context

5 Social Entrepreneurs' Individual-Level Resources and Innovation Novelty: The Moderating Role of Cultural Context

5.1 Introduction

Building on the assessment of the field in Chapter 2 and the conceptual framework developed in Chapter 3, Chapter 4 began the empirical analysis at the individual level by isolating founders' human capital and its dependence on organizational form. This chapter extends the individual-level analysis to the broader resource bundle of the social entrepreneur and embeds it in the institutional context, analyzing the effect of social entrepreneurs' individual resources on product innovation novelty and the moderating role of national cultural dimensions.

Social entrepreneurs are increasingly recognized as drivers of innovative solutions to societal challenges (Günzel-Jensen et al., 2020). At the individual level, founders' resources have been linked to entrepreneurial innovation in both commercial (Kato et al., 2015; Protogerou et al., 2017) and social ventures (Desa & Basu, 2013; Padilla-Meléndez et al., 2014), while at the country level, informal institutions (North, 1990), particularly cultural values, shape the prevalence of social entrepreneurial activity and the salience of social goals (Brieger & De Clercq, 2019; Hechavarría et al., 2017; Stephan et al., 2015). However, multilevel evidence on the innovation outcomes of social ventures, as opposed to their incidence or social orientation, remains limited. This gap matters because the cultural conditions that motivate the pursuit of social goals do not necessarily promote the innovation needed to achieve them, suggesting that social entrepreneurs may be culturally encouraged to act on social problems while simultaneously constrained from innovating in response (Estrin et al., 2013). This study therefore analyzes the relationship between social entrepreneurs' individual-level resources and innovation novelty, while examining the moderating role of national cultural context.

Cultural values have long been recognized as predictors of entrepreneurship (Mueller & Thomas, 2001; Pinillos & Reyes, 2011; Stephan & Uhlaner, 2010). Drawing on Hofstede et al.'s (2010) framework, prior research has examined how power distance, uncertainty avoidance, individualism (vs. collectivism), and masculinity (vs. femininity) shape entrepreneurial activity (Hayton et al., 2002). Within social entrepreneurship, this line of work has concentrated on the antecedents of social goals rather than on innovation outcomes. Brieger and De Clercq (2019) showed that cultural dimensions moderate the relationship between individual resources and social value creation goals, while macro-level studies confirm that national culture conditions the allocation of entrepreneurial effort toward social versus commercial objectives (Hechavarría, 2016; Hoogendoorn, 2016). Collectively, these studies establish that cultural context shapes who becomes a social entrepreneur and why, but they do not address whether the same dimensions condition the innovation outcomes of established social ventures. The distinction matters because the mechanisms that motivate social

entrepreneurial activity need not operate in the same direction when the dependent variable is the novelty of innovation rather than the pursuit of a social mission.

Building on the framework developed in Chapters 2 and 3, recent literature increasingly recognizes that innovation in social ventures unfolds through open, collaborative, and ecosystem-based processes synthesized by the approach of Open Social Innovation (OSI), which frames social problem-solving as the orchestration of distributed actors and collective action (Gegenhuber & Mair, 2024; Pacheco et al., 2025). Because OSI rests on cooperation among heterogeneous actors rather than on individual disruption, its logic stands in tension with the cultural profile that traditional innovation research associates with high innovativeness, namely high individualism and low power distance (Hayton et al., 2002; Shane, 1993). Specifically, collectivist and feminine cultures, which prioritize group loyalty and cooperation over personal assertiveness and competitive achievement (Hofstede et al., 2010), may provide the cohesion that collaborative social innovation requires while dampening the individual-level ideation typically associated with novel offerings (Goncalo & Staw, 2006). This tension makes the cultural contingency of innovation in social ventures an empirical question that prior work has not addressed.

To examine these relationships, this study focuses on innovation novelty, understood as the degree to which a social venture's product or service is new to the market (OECD/Eurostat, 2018), and considers four of the cultural dimensions proposed by Hofstede et al. (2010) at the country level. The empirical analysis employs multilevel mixed-effects ordered logistic regression on pooled cross-sectional data (2021–2023) from 9,642 social entrepreneurs across 47 countries, drawn from the Global Entrepreneurship Monitor (GEM). Our findings reveal that individual resources such as human capital and social capital are positively associated with innovation novelty, with entrepreneurial experience yielding the strongest effect, while financial capital shows no significant association. Cultural moderation, however, varies systematically across resource types. Power distance and uncertainty avoidance attenuate the positive association between individual resources and innovation novelty, with the strongest attenuation on entrepreneurial experience, while individualism and masculinity amplify it, the latter more weakly. Overall, these patterns indicate that the cultural environment in which social ventures operate can both amplify and constrain the capacity of founders' resources to generate novel outcomes.

This study makes several contributions. First, it problematizes two assumptions that have governed resource-based and institutional accounts of entrepreneurship in parallel but largely in isolation. The resource-based tradition extended to the individual entrepreneur (Alvarez & Busenitz, 2001; Unger et al., 2011) treats founders' resources as intrinsically productive, while cross-national work on culture and entrepreneurship (Shane, 1993; Stephan & Uhlaner, 2010) treats cultural institutions as shaping aggregate activity uniformly across individuals. Neither assumption has been jointly

examined for social entrepreneurs, whose mission-primacy (Dees, 1998) may alter how resources convert into innovation across institutional contexts. Our findings challenge both assumptions in this setting, as financial capital shows no significant association with innovation novelty across cultural contexts, and masculinity, the cultural dimension most strongly linked to innovation in commercial settings, exerts only limited moderating effects.

Second, the study extends human capital theory (Becker, 1964) by documenting differential institutional contingency across the components of founders' human capital. General human capital, such as education, is moderately sensitive to cultural context, while specific human capital, like entrepreneurial experience, is the most context-contingent resource. This asymmetry responds to Unger et al.'s (2011) call for contextual moderators of the human capital–outcome relationship and extends it further: human capital should not be treated as a homogeneous bundle whose institutional contingency applies uniformly to its components.

Third, the findings inform the design of support programs for social entrepreneurship. Because financial capital shows no association with innovation novelty, which aligns with evidence that financial capital plays a secondary role compared to non-financial resources in fostering innovation (Timmons & Bygrave, 1986), financial transfers alone should not be expected to produce innovative outcomes; because the returns to entrepreneurial experience are sharply attenuated under high power distance and high uncertainty avoidance (Hayton et al., 2002; Hofstede et al., 2010), experience-based interventions in these contexts should be paired with structural elements that counteract hierarchical conformity and risk aversion; and because the productivity of individual resources varies systematically with cultural context, cross-country benchmarking of social entrepreneurship support should be adjusted for the institutional contingency of the resources the program supplies.

The remainder of the chapter is organized as follows. Section 5.2 develops the conceptual framework and hypotheses. Section 5.3 details the methodology, including models, data, and variables. Section 5.4 presents the empirical results and robustness test. Section 5.5 discusses the findings, draws conclusions, and identifies limitations and avenues for future research.

5.2 Theoretical Background and Hypotheses

5.2.1 Innovation, social entrepreneurship, and institutions

Following Schumpeter (1934), innovation denotes the development and implementation of novel ideas, products, processes, or organizational forms that create economic value. Not all entrepreneurial ventures are equally innovative, however, and the extent and nature of innovation depend on the surrounding context (Autio et al., 2014). Commercial entrepreneurs orient innovation toward competitive advantage and financial returns, whereas social entrepreneurs direct it toward persistent social problems and social impact (Ramani et al., 2017; Santos, 2012). Prior definitions of

social entrepreneurship consistently embed innovation as a constitutive element (Dees, 1998; Mair & Martí, 2006; Peredo & McLean, 2006), yet social entrepreneurs vary considerably in the novelty they achieve (Hagedoorn et al., 2023; Padilla-Meléndez et al., 2014). This study focuses on innovation novelty, conceptualized following the Oslo Manual’s market-novelty criterion as the introduction of goods or services that are new to the entrepreneur’s market (OECD/Eurostat, 2018). Although the construct originates in commercial innovation research, it applies to social ventures that employ market-based mechanisms as instruments for social impact (Battilana & Lee, 2014; Santos, 2012).

Research on the determinants of innovation has concentrated on commercial entrepreneurship (e.g., Arabiyat et al., 2019; Nakara et al., 2021; Pindado, Sánchez, et al., 2023), with considerably less attention to social ventures (Gupta et al., 2020). At the individual level, human capital is among the most consistently documented predictors of innovative behavior in both commercial (Marvel et al., 2016; Unger et al., 2011) and social entrepreneurship (see Table 5.1), alongside creativity, social capital, and demographic attributes, although evidence in the social domain remains thin (Saebi et al., 2019). At the country level, Monroe-White and Zook (2018) attribute approximately 12% of the variation in social enterprise innovation to macro-level factors, among which institutional conditions figure prominently.

To specify these institutional conditions, North (1990) distinguishes formal institutions (the written rules embodied in laws, regulations, and property rights regimes) from informal institutions (the norms, values, and cultural practices that shape acceptable behavior within a society). Informal institutions are especially germane to social ventures, whose stakeholder base and mission orientation place them under normative expectations that depart from those governing commercial firms (Austin et al., 2006; Dacin et al., 2011; Thornton et al., 2011). Hofstede et al.’s (2010) cultural dimensions provide a widely used operationalization of informal institutions, and prior work has linked them to entrepreneurial decision-making (Autio et al., 2013; Brieger & De Clercq, 2019), corporate social performance (Ho et al., 2012; Ringov & Zollo, 2007), and the cross-country prevalence of social entrepreneurship (Hechavarría, 2016; Hoogendoorn, 2016). Their role as moderators of the relationship between social entrepreneurs’ individual resources and innovation novelty, however, remains unexamined.

Table 5.1 Empirical evidence on innovation determinants in social entrepreneurial contexts

Determinant factor	Entrepreneurial context	Innovation type	Key finding	Reference
<i>Individual</i>				
Education Level	Social Enterprise Hybrid	Social Innovation	Key decision makers with postgraduate education show higher social innovation performance compared to those with advanced level or degree education.	Hagedoorn et al. (2023)

Educational Level	Social economy enterprise (SEE)	Management and Technological Innovations	Degree-level education positively related to SEE innovativeness.	Padilla-Meléndez et al. (2014)
Experience	Social economy enterprise (SEE)	Management and Technological Innovations	Entrepreneur's experience positively related to SEE innovativeness.	Padilla-Meléndez et al. (2014)
Attitude Toward Innovation	Social economy enterprise (SEE)	Management and Technological Innovations	Proactive attitude toward innovation positively related to SEE innovativeness.	Padilla-Meléndez et al. (2014)
Country				
Country Context (overall)	Social Enterprise	Overall Innovation	11.8% of variation in social enterprise innovation is explained by country-level factors.	Monroe-White & Zook (2018)
Welfare State (public education and health spending)	Social Enterprise	Marketing Innovation	As welfare state spending increases, marketing innovation in social enterprises decreases.	Monroe-White & Zook (2018)

5.2.2 Hypotheses and proposed model

5.2.2.1 Individual resources and innovation

Applied to the individual entrepreneur, the resource-based view holds that founders' tangible and intangible resource endowments enable them to recognize opportunities and pursue productive activities otherwise out of reach (Alvarez & Busenitz, 2001; Wiklund & Shepherd, 2003). Brieger and De Clercq (2019) find that individual-level resources influence entrepreneurs' capacity to act on broader goals, demonstrating that while human and social capital support social value creation, individual financial capital negatively affects this orientation. We extend this logic to innovation outcomes, positing that individual resource endowments also shape the novelty of the products and services social entrepreneurs bring to market.

Human capital theory (Becker, 1964) proposes that investments in education and experience increase productive capacity. General human capital, captured by educational attainment, equips entrepreneurs with a broader knowledge base from which to identify novel resource combinations (Marvel et al., 2016; Unger et al., 2011). Specific human capital, operationalized through prior venture ownership or startup activity, provides domain knowledge about opportunity recognition, resource mobilization, and venture development that formal education alone does not supply (Davidsson & Honig, 2003; Ucbasaran et al., 2008). In the social domain, prior venture experience is particularly consequential, as founders must reconcile the tensions between social mission and operational sustainability that shape how innovation unfolds (Battilana & Lee, 2014; Desa & Basu, 2013).

Financial capital shapes the resources a founder can commit to developing novel offerings. Resource-constrained entrepreneurs tend to prioritize efficiency and survival over novelty (Voss et al., 2008), whereas financial slack allows investment in uncertain product development trajectories (Nohria & Gulati, 1996). The bricolage perspective qualifies this prediction in the social domain, arguing that

mission-driven founders advance novel solutions by recombining the resources at hand rather than relying on accumulated slack (Baker & Nelson, 2005; Desa & Basu, 2013). Financial endowment also signals credibility to external stakeholders, facilitating access to the complementary resources that novel offerings typically require (Zhang & Guan, 2018). Socially oriented entrepreneurs, however, face restricted access to financial resources relative to their commercial counterparts (Lumpkin et al., 2013), a constraint that may compress the variation through which financial slack would otherwise translate into novelty in this population.

Social capital, understood as the relational resources embedded in entrepreneurs' networks (Adler & Kwon, 2002; Hoang & Antoncic, 2003), provides access to information, advice, and complementary skills. In entrepreneurship research, ties to other entrepreneurs operate as conduits for knowledge and opportunity-relevant information (Klyver & Schenkel, 2013; Sahasranamam et al., 2021). For social entrepreneurs, who face tighter resource constraints than their commercial counterparts, social capital compensates for limited access to formal channels and enables collaborative resource mobilization (Austin et al., 2006; Montgomery et al., 2012). Co-ownership represents an internal form of social capital, pooling perspectives and skill sets within the founding team and broadening the range of product ideas the venture can generate (Adler & Kwon, 2002; Klotz et al., 2014). Therefore, we pose the following hypothesis:

Hypothesis 1: Individual resources, namely human capital, financial capital, and social capital, are positively associated with innovation novelty among social entrepreneurs.

5.2.2.2 The moderating role of cultural context

As established in Section 5.2.1, institutions comprise two components: formal rules codified in laws and regulations, and informal norms and values that define socially acceptable behavior (North, 1990). Both components shape entrepreneurial action, albeit through distinct mechanisms. Formal institutions set the incentives and constraints under which ventures operate, whereas informal institutions constitute the normative environment within which individuals decide whether and how to deploy their resources (Estrin et al., 2013; Stephan et al., 2015). For social ventures, whose legitimacy depends on conformity with societal expectations at least as much as on alignment with formal institutional requirements, informal institutions are particularly consequential (Austin et al., 2006; Dacin et al., 2011). Cross-country differences in formal institutional and macroeconomic conditions are, in turn, partially absorbed by the country-level controls and the random-intercept specification described in Section 5.3.3.

Within this institutional approach, informal institutions condition how individual resources translate into entrepreneurial actions (Brieger & De Clercq, 2019; Sahasranamam et al., 2021). Hofstede et al.'s (2010) cultural values framework remains the most widely used operationalization of informal institutions at the country level. In social ventures, however, the dimensions associated with

innovativeness in commercial settings need not operate in the same direction when innovation is pursued through collaborative, mission-driven processes (Pacheco et al., 2025). We therefore examine four of Hofstede et al.'s (2010) dimensions as moderators of the relationship posited in H1: individualism, masculinity, power distance, and uncertainty avoidance. These four dimensions have been central to the culture-and-entrepreneurship literature since Hayton et al.'s (2002) review identified them as those most systematically linked to entrepreneurial activity and innovation, and each reflects a conceptually distinct mechanism through which informal institutions condition how individual resources translate into innovative outcomes. Individualism captures the autonomy available for the generation of novel ideas, masculinity the salience of achievement-based incentives, power distance the cross-hierarchical exchange that enables resource recombination, and uncertainty avoidance the societal tolerance for the ambiguity that novel outcomes introduce (Autio et al., 2013; Shane, 1993). The complete conceptual model is summarized in Figure 5.1.

The cultural dimension of individualism versus collectivism captures the relative importance that societies assign to personal autonomy and self-reliance as opposed to group cohesion and conformity to shared norms (Hofstede et al., 2010). In individualist cultures, activities are self-initiated and personal achievement is the principal pathway to status, whereas in collectivist cultures the emphasis falls on belonging to the group and activities are shaped by collective expectations (Hofstede et al., 2010).

Individualism and collectivism shape entrepreneurial outcomes through distinct mechanisms. Tiessen (1997) characterizes individualism as associated primarily with variety generation (the creation of diverse novel alternatives) and collectivism with resource leverage through cooperative effort. Cross-national evidence indicates that individualism is positively associated with national innovation rates, partly because it fosters the autonomy and tolerance for deviation conducive to novel ideation (Shane, 1993; Taylor & Wilson, 2012). In a comparative analysis of social and commercial entrepreneurship, Sahasranamam et al. (2021) find that high-individualism cultures direct specific human capital toward commercial entrepreneurship, whereas high-uncertainty-avoidance cultures channel social capital toward social entrepreneurship.

Applied to social ventures, this logic implies that individualist contexts amplify the returns to founders' individual resources for innovation novelty. Entrepreneurs in such contexts enjoy greater autonomy to pursue unconventional ideas, and their education, experience, financial capital, and network connections translate more directly into novel offerings because normative pressure toward group consensus is weaker. In collectivist contexts, by contrast, the productivity of any single founder's resource endowment is diluted by reliance on pooled cognitive resources, and conformity pressures can constrain even well-resourced entrepreneurs from departing from established collective practice. Hence, we pose the following hypothesis:

Hypothesis 2: Individualism positively moderates the relationship between individual resources and innovation novelty among social entrepreneurs.

The masculinity versus femininity dimension reflects the extent to which a society emphasizes achievement, competition, and material success over cooperation, care, and quality of life (Hofstede et al., 2010). Masculine cultures value performance and tangible accomplishment, whereas feminine cultures prioritize benevolence and social support (Hofstede et al., 2010). Masculinity has been linked to lower corporate social performance (Ringov & Zollo, 2007), yet its implications for innovation are a distinct question. Introducing products that are new to the market entails competitive positioning against existing alternatives. In masculine cultures, the emphasis on achievement and material success reinforces the incentives for resourceful entrepreneurs to convert their human, financial, and social capital into visible, novel outputs, whereas in feminine cultures the salience of consensus and the focus on relationships attenuate that conversion (Hayton et al., 2002). Evidence on this channel remains thin in the social-entrepreneurship setting, and cross-national innovation studies have reported less consistent effects for masculinity than for the other Hofstede dimensions (Shane, 1993). We expect the performance-orientation mechanism to dominate cultural moderation in this context. Given these considerations, we pose the following hypothesis:

Hypothesis 3: Masculinity positively moderates the relationship between individual resources and innovation novelty among social entrepreneurs.

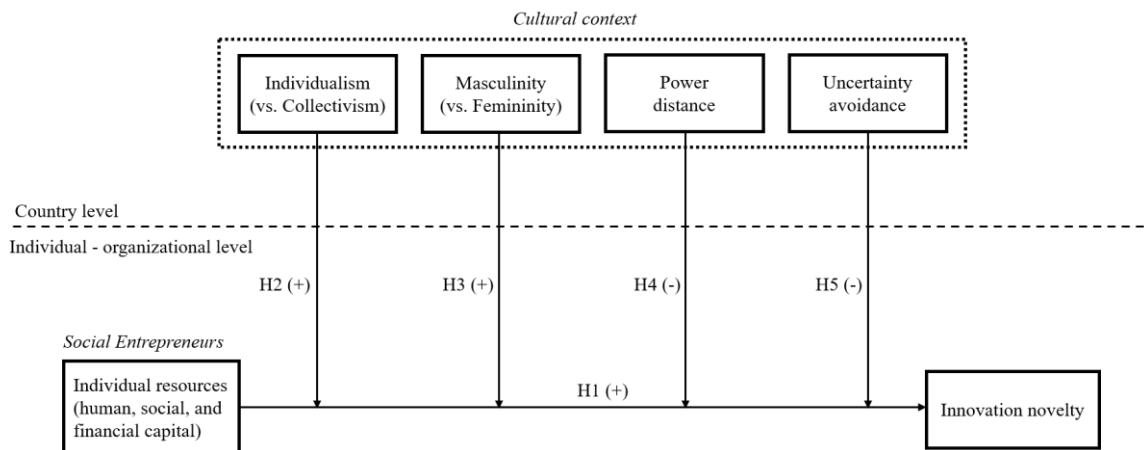
Power distance captures the extent to which less powerful members of a society accept and expect that power is distributed unequally (Hofstede et al., 2010). In high-power-distance cultures, hierarchical structures are considered natural, centralized decision-making prevails, and subordinates defer to the authority of those in positions of power. High-power-distance contexts constrain the translation of individual resources into novel products through two complementary mechanisms. First, hierarchical norms restrict the autonomy for experimentation and deviation from established practice that novel ideation requires (Shane, 1993). Second, hierarchical cultures exhibit lower information sharing across levels and reduced participation in decision-making (Hofstede et al., 2010), limiting the collaborative exchange through which founders develop novel ideas into implementable products. While Sahasranamam et al. (2021) find no significant influence of power distance on the deployment of individual knowledge capital across different entrepreneurial forms, its specific impact on the generation of novel products remains underexplored. For the specific outcome of product novelty, conformity to hierarchical authority should attenuate the returns to education, experience, financial capital, and social capital. Therefore, we pose the following hypothesis:

Hypothesis 4: Power distance negatively moderates the relationship between individual resources and innovation novelty among social entrepreneurs.

Uncertainty avoidance reflects the degree to which members of a society feel threatened by ambiguous or unknown situations and seek structure to reduce unpredictability (Hofstede et al., 2010). In high-uncertainty-avoidance cultures, individuals and organizations prefer established procedures, codified rules, and proven approaches, whereas low-uncertainty-avoidance cultures exhibit greater tolerance for ambiguity and experimentation. Introducing novel products entails unknown market responses and unproven approaches (Shane, 1995). In high-uncertainty-avoidance contexts, stakeholders and consumers favor the familiar over the unfamiliar, and social norms reward incremental improvement over disruptive novelty, dampening the returns to individual resources for product novelty. Brieger and De Clercq (2019) report that uncertainty avoidance positively moderates the relationship between specific individual resources (financial and social capital) and social value creation goals, interpreting social value creation itself as a mechanism that reduces societal uncertainty. For product novelty, which introduces rather than reduces uncertainty, cross-national evidence links uncertainty avoidance to lower national innovation rates (Shane, 1993). Therefore, we pose the following hypothesis:

Hypothesis 5: Uncertainty avoidance negatively moderates the relationship between individual resources and innovation novelty among social entrepreneurs.

Figure 5.1 Conceptual model



5.3 Methodology

5.3.1 Data source and sample

The individual-level data come from the GEM Adult Population Survey (APS), pooled across the 2021, 2022, and 2023 editions. The APS is a nationally representative survey administered annually under standardized sampling procedures and validated instruments that ensure cross-country comparability (GEM, 2023; Reynolds et al., 2005), and has been widely used in social

entrepreneurship research (Estrin et al., 2013; Hechavarría & Brieger, 2022; Lepoutre et al., 2013). Beginning with the 2021 edition, the APS introduced a dedicated module on the social and environmental motivations, strategies, and activities of nascent and established business owners, which provides the items used in this study to identify social entrepreneurs and to measure innovation novelty. Country-level data come from two further sources: Hofstede's cultural dimensions (Hofstede et al., 2010), which capture informal institutional values, and the World Bank's World Development Indicators, which supply the macroeconomic controls.

The analytical sample is restricted to social entrepreneurs, defined as individuals engaged in total early-stage entrepreneurial activity (TEA) who report the highest possible priority to social or environmental impact over profitability or growth (e.g., a score of 5 on the 5-point Likert item in the dataset used). This strict threshold isolates founders whose primary mission is the creation of social value, consistent with mission-priority conceptualizations of social entrepreneurship (Peredo & McLean, 2006; Zahra et al., 2009) and conceptually aligned with the overarching operationalization strategy in prior GEM-based work, which identifies social entrepreneurs by assessing the relative dominance of social and environmental objectives over economic ones (Lepoutre et al., 2013). We further restrict the sample to respondents aged 18 to 65 with complete data on all analytical variables and retain only countries with full coverage of the country-level variables. The final sample comprises 9,642 social entrepreneurs nested in 47 countries over the three-year window.

5.3.2 Measures

5.3.2.1 Dependent variable

The dependent variable is innovation novelty, conceptualized following the Oslo Manual as the introduction of a good or service that is new or significantly improved relative to the firm's previous offerings and assessed along a graded continuum from new to the firm to new to the market and new to the world (OECD/Eurostat, 2018). Prior work in innovation studies has operationalized this construct as a market-entry taxonomy distinguishing world-first, country-first, and firm-first innovators, on the grounds that the geographic scope at which an offering enters the market more accurately captures the radicalness of innovation than a binary classification (Therrien et al., 2011). GEM-based studies have typically operationalized innovation novelty as a binary indicator capturing whether founders perceive their offering as new to customers (e.g., Arabiyat et al., 2019; Darnihamedani et al., 2018; Poblete & Mandakovic, 2021), and a comparable approach has been adopted in social entrepreneurship work using alternative datasets, where new products, processes, and services are jointly conceptualized as social innovation (Hagedoorn et al., 2023). Other studies have aggregated novelty with process and competitive elements into a composite innovativeness index (Koellinger, 2008; Monroe-White & Zook, 2018). To preserve variation in degree and avoid conflating innovation novelty with other innovation types, we measure innovation novelty using a

four-point ordinal scale (1 = not a new product or service, 2 = new to the local market, 3 = new to the national market, 4 = new to the world).

5.3.2.2 Independent variables

We operationalize social entrepreneurs' individual resources along three dimensions: human, social, and financial capital, consistent with prior work (e.g., Brieger & De Clercq, 2019) that extends individual-level resource arguments to entrepreneurial action (Davidsson & Honig, 2003; Shepherd & Wiklund, 2005).

First, human capital is captured through two indicators reflecting Becker's (1964) distinction between general and specific human capital. General human capital is measured as the respondent's highest level of formal education, recorded as a nine-category ordinal variable based on the United Nations (UN) International Standard Classification of Education (ISCED). Education is among the most established proxies for general human capital in entrepreneurship research (Estrin et al., 2016; Hechavarría et al., 2017). Specific human capital is measured as a binary indicator of whether the respondent has discontinued a business in the past twelve months. Business discontinuation signals prior venture ownership and management experience and has been used in GEM-based research as a proxy for entrepreneurial experience that complements formal education (Pindado, Sánchez, et al., 2023; Ucbasaran et al., 2010). Second, social capital is measured through business co-ownership, recorded as the number of individuals who own the venture. Co-ownership captures the founding team's pooled relational and knowledge endowment, consistent with the entrepreneurship literature that treats partner ties as a proximate form of social capital available to the venture from inception (Davidsson & Honig, 2003). Third, financial capital is measured as a binary variable distinguishing households in the lowest national income tercile from those in the middle and upper terciles. Household income is the standard GEM proxy for the personal financial resources entrepreneurs can mobilize for venture activities and risk absorption (Brieger & De Clercq, 2019; Estrin et al., 2016).

5.3.2.3 Moderating variables

The cultural context is operationalized through four of the dimensions of national culture (Hofstede et al., 2010), which together provide the most widely used measure of informal institutions in cross-national entrepreneurship research (Hayton et al., 2002). All four scores were z-standardized prior to estimation to facilitate the interpretation of cross-level interaction effects. Based on this framework, power distance captures the extent to which less powerful members of a society accept and expect that power is distributed unequally. Uncertainty avoidance reflects the degree to which members of a society feel threatened by ambiguous or unknown situations and seek structure to reduce unpredictability. Individualism captures the degree to which individuals are expected to look after themselves rather than remain integrated in cohesive in-groups. Finally, masculinity reflects the

degree to which a society values competitiveness, achievement, and material success over cooperation, care, and quality of life.

5.3.2.4 Control variables

At the individual level, we control for age and its squared term to account for the curvilinear relationship between age and entrepreneurial activity (Pindado, Sánchez, et al., 2023), gender as a binary variable coded 1 for male (Koellinger, 2008), and household size as a categorical variable. Perceived creativity is included as a binary indicator derived from the GEM item asking whether others perceive the respondent as highly innovative, coded 1 if the respondent agrees or strongly agrees and 0 otherwise. To preserve sample size given the share of missing values on this item, we apply mean substitution and include a missing-data indicator to flag these observations. We further control for two individual-level resources that the literature has identified as proximate predictors of entrepreneurial behavior. The first is a binary indicator of whether the respondent personally knows someone who started a business in the past two years, a GEM proxy to capture entrepreneurial networks (Pindado, Alarcón, et al., 2023). The second is perceived entrepreneurial skills, a binary indicator of whether the respondent believes they possess the knowledge, skills, and experience required to start a business, which proxies for entrepreneurial self-efficacy (Arenius & Minniti, 2005). Year fixed effects absorb temporal variation across the three survey waves.

At the country level, we control for Gross Domestic Product (GDP) per capita in natural logarithm to capture economic development, GDP growth as a proxy for macroeconomic dynamism, the unemployment rate to account for labor market conditions, and population in natural logarithm to control for market size. These controls are standard in cross-national entrepreneurship research (Darnihamedani et al., 2018; Marcotte, 2014). Because the sample period overlaps with the COVID-19 pandemic, we use the five-year mean GDP growth rate rather than annual figures, which are distorted by the contraction of 2020 and the rebound of 2021. Table 5.2 summarizes the construction and source of each variable.

Table 5.2 Description of variables

Variable	Label	Description	Source
Dependent			
Innovation novelty	InNovelty	Geographic market scope to which the product or service is new (local, national, or global); ordinal (1–4)	GEM APS (sunewprod)
Independent			
<i>General human capital</i>			
Education level	Education	Respondent’s highest level of formal education based on the UN harmonized classification; nine-category ordinal	GEM APS (UNEDUC)
<i>Specific human capital</i>			
Entrepreneurial experience	EntExp	Whether the respondent discontinued a business in the past 12 months; binary	GEM APS (discent)

<i>Social capital</i>			
Business co-ownership	CoOwners	Number of individuals who own the venture; continuous	GEM APS (suowners)
<i>Financial capital</i>			
Household income	HHIncome	Household income relative to the national distribution; binary (0 = lower tercile, 1 = middle/upper tercile)	GEM APS (GEMHHINC)
Moderator			
Individualism (vs. collectivism)	IDV	Degree to which individuals are expected to look after themselves rather than remain integrated in cohesive in-groups; continuous (z-standardized)	Hofstede
Masculinity (vs. femininity)	MAS	Degree to which a society values competitiveness and achievement over cooperation and quality of life; continuous (z-standardized)	Hofstede
Power distance	PDI	Degree to which less powerful members accept unequal power distribution; continuous (z-standardized)	Hofstede
Uncertainty avoidance	UAI	Degree to which members feel threatened by ambiguous situations; continuous (z-standardized)	Hofstede
Controls (Individual)			
Age	Age	Respondent's age in years	GEM APS (age)
Age squared	AgeSq	Age squared	GEM APS
Gender	Gender	Binary (1 = male, 0 = female)	GEM APS (gender)
Creativity	Creativity	Binary indicator of whether others perceive the respondent as highly innovative (1 = agree/strongly agree)	GEM APS (creativ)
Creativity missing	CreativMiss	Binary indicator for imputed creativity values	GEM APS
Household size	HHSize	Number of household members; categorical	GEM APS (hhsiz)
Knows entrepreneur	KnowEnt	Personally knows someone who started a business in the past two years; binary	GEM APS (knowentR)
Entrepreneurial skills	EntpSkill	Believes they have the knowledge, skills, and experience to start a business; binary	GEM APS (suskillL)
Controls (Country)			
GDP per capita	LnGDPpc	Natural logarithm of GDP per capita (constant USD)	WDI
5-year GDP growth rate	GDPGrowth5y	Mean GDP growth rate over the previous five years (%)	WDI
Unemployment rate	UnemplRate	Total unemployment rate (% of labor force)	WDI
Country size	LnPop	Natural logarithm of total population	WDI

Notes: WDI = World Bank World Development Indicators. Variable names in parentheses correspond to the original GEM APS labels.

5.3.3 Estimation

The hierarchical structure of the data, with social entrepreneurs nested within countries, requires an estimator that accommodates both the ordinal nature of innovation novelty and the non-independence of observations within the same national context. We therefore estimate multilevel mixed-effects ordered logistic regression models with a country-level random intercept (Rabe-Hesketh & Skrondal, 2012). This specification partitions individual- and country-level variance and produces standard errors that correctly reflect within-country clustering, which is essential for valid inference on cross-level interaction terms (Peterson et al., 2012). The approach is widely adopted in cross-national

GEM-based research on entrepreneurial outcomes (e.g., Autio et al., 2013; Hechavarría & Brieger, 2022). Because the dependent variable is a four-category ordinal measure, the ordered logit link is preferred over the binary logit specifications more common in earlier multilevel entrepreneurship work (De Clercq et al., 2013; Guerrero et al., 2021).

For individual i in country j and threshold k , the model is specified as:

$$\log \left[\frac{\Pr(Y_{ij} > k)}{\Pr(Y_{ij} \leq k)} \right] = -\kappa_k + \beta \mathbf{X}_{ij} + \delta Z_j + \lambda (\mathbf{X}_{ij} \times Z_j) + \gamma \mathbf{W}_{ij} + \phi \mathbf{C}_j + \tau_t + u_j,$$

where Y_{ij} is the ordinal innovation novelty outcome, κ_k are the estimated cutpoints, $\mathbf{X}_{ij}$ collects the four individual-level resource variables (education, entrepreneurial experience, household income, and business co-ownership), Z_j is the focal country-level cultural moderator, $\mathbf{X}_{ij} \times Z_j$ are the cross-level interaction terms, $\mathbf{W}_{ij}$ and $\mathbf{C}_j$ are the individual- and country-level controls described in Section 5.3.2, τ_t are year fixed effects, and $u_j \sim N(0, \sigma_u^2)$ is the country-level random intercept. We specify a random-intercept rather than a random-slope model on the grounds of parsimony, given the modest number of level-two units (47 countries). Models are fit by maximum likelihood and coefficients are reported as odds ratios (OR).

5.4 Results

Table 5.3 reports descriptive statistics and pairwise correlations for the individual-level variables. Innovation novelty has a mean of 1.651 (indicating a sample average clustered between no innovation and local novelty) and a standard deviation of 0.880. Pairwise correlations remain below conventional thresholds, with the exception of Age and AgeSq ($r = 0.988$), whose overlap is mechanical, and Creativity and CreativMiss ($r = -0.380$), expected given that the latter is a missing-value indicator for the former. Among the substantive predictors, the largest correlation is 0.204 (Education with HHIncome), indicating no concern about multicollinearity in the regression specifications.

Table 5.3 Descriptive statistics and correlation matrix for individual level

Variable	Mean	Std. dev.	Min	Max
1 InNovelty	1.651	0.880	1	4
2 Age	38.468	11.644	18	65
3 AgeSq	1615.338	945.347	324	4225
4 Gender	0.558	0.497	0	1
5 Creativity	0.704	0.340	0	1
6 CreativMiss	0.373	0.484	0	1
7 HHSize	3.630	1.723	1	10
8 KnowEnt	1.760	1.058	0	3
9 EntpSkill	4.415	0.985	1	5
10 Education	4.144	1.858	0	8

11	EntExp	0.158	0.364	0	1
12	HHIncome	0.744	0.436	0	1
13	CoOwners	1.882	1.978	1	50

	1	2	3	4	5	6	7	8	9	10	11	12	13
1	1												
2	-0,018	1											
3	-0,018	0,988*	1										
4	0,025*	0,032*	0,031*	1									
5	0,059*	0,034*	0,033*	-0,013	1								
6	-0,034*	-0,038*	-0,037*	-0,010	-0,380*	1							
7	-0,021*	-0,076*	-0,082*	0,000	0,041*	-0,047*	1						
8	0,018	-0,041*	-0,045*	0,055*	0,018	0,039*	0,030*	1					
9	0,022*	0,080*	0,070*	0,053*	0,156*	-0,020	0,003	0,110*	1				
10	0,100*	-0,002	-0,016	0,003	-0,009	-0,016	-0,104*	0,072*	0,008	1			
11	0,027*	-0,012	-0,009	0,003	0,014	0,001	0,037*	0,033*	0,048*	-0,027*	1		
12	-0,004	0,014	0,004	0,164*	0,014	-0,007	0,083*	0,094*	0,028*	0,204*	-0,026*	1	
13	0,047*	0,012	0,014	0,053*	-0,013	-0,026*	0,017	0,019	-0,062*	0,069*	0,018	0,036*	1

* p < 0.05

Note: Year dummies are not included in this table.

We estimate six nested specifications on a single analytical sample of 9,642 social entrepreneurs nested in 47 countries, so that changes in coefficients across models reflect specification differences rather than sample composition. Model 1 includes only the individual- and country-level controls. Model 2 adds the four resource variables and tests Hypothesis 1. Models 3 through 6 introduce one cultural dimension at a time (individualism, masculinity, power distance, and uncertainty avoidance), together with its four cross-level interactions with the resource variables. Estimating each cultural dimension separately rather than jointly avoids multicollinearity among the Hofstede scores, which are correlated at the country level, and isolates the moderating logic of each cultural orientation. The four cultural scores are z-standardized prior to estimation so that interaction coefficients can be interpreted as the change in the resource–innovation association for a one-standard-deviation shift in the cultural moderator (Aiken & West, 1991).

Table 5.4 reports the main-effect estimates. In Model 2, three of the four individual resources show significant positive associations with innovation novelty. Education (OR = 1.057, $p < 0.01$), entrepreneurial experience (OR = 1.262, $p < 0.01$), and co-ownership (OR = 1.038, $p < 0.01$) increase the odds of moving to a higher novelty category, with entrepreneurial experience yielding the largest effect among the four resources. Household income shows no significant association (OR = 0.931, $p > 0.10$). Hypothesis 1 is therefore partially supported, as the human-capital and social-capital components operate as predicted, whereas the financial-capital component does not.

Table 5.4 Results of multilevel mixed-effects ordered logistic regression on innovation novelty (main effects)

Models		(1) Innovation novelty		(2) Innovation novelty	
Variables		Odds Ratio	Std. Err.	Odds Ratio	Std. Err.
Controls (Indiv.)	Age	0.979*	(0.011)	0.977*	(0.011)
	AgeSq	1.000	(0.000)	1.000	(0.000)
	Gender	1.066	(0.044)	1.071	(0.045)
	Creativity	1.383***	(0.093)	1.380***	(0.093)
	CreativMiss	0.777***	(0.050)	0.792***	(0.051)
	HHSize	0.997	(0.012)	1.000	(0.012)
	KnowEnt	1.038*	(0.021)	1.028	(0.021)
	EntpSkill	1.040*	(0.023)	1.038*	(0.023)
Controls (Country)	LnGDPpc	1.443***	(0.118)	1.383***	(0.115)
	GDPGrowth5y	0.979	(0.024)	0.981	(0.025)
	UnemplRate	1.030	(0.021)	1.028	(0.021)
	LnPop	0.996	(0.047)	0.988	(0.047)
Independent (HI)	Education			1.057***	(0.013)
	EntExp			1.262***	(0.070)
	CoOwners			1.038***	(0.010)
	HHIncome			0.931	(0.045)
	σ^2_u (country)	1.204***	(0.068)	1.212***	(0.070)
	Observations	9,642		9,642	
	Countries	47		47	

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: The models were estimated using multilevel mixed-effects ordered logistic regression with random intercepts at the country level. σ^2_u represents the country-level variance component. Year fixed effects are included.

Table 5.5 reports the cross-level interaction estimates. In Model 3, the interaction between individualism and education ($OR = 1.022$, $p < 0.10$) and the interaction between individualism and entrepreneurial experience ($OR = 1.274$, $p < 0.01$) are positive and significant, indicating that the returns to both human-capital components are stronger in more individualist societies. The interactions of individualism with co-ownership ($OR = 1.004$, $p > 0.10$) and with household income ($OR = 1.014$, $p > 0.10$) are not significant. Hypothesis 2 is therefore partially supported: the moderation operates through human capital but not through social or financial capital. In Model 4, the interaction between masculinity and entrepreneurial experience is positive and significant ($OR = 1.160$, $p < 0.05$), while the interactions with education ($OR = 0.997$, $p > 0.10$), co-ownership ($OR = 1.019$, $p > 0.10$), and household income ($OR = 1.013$, $p > 0.10$) are not significant. Hypothesis 3 is therefore partially supported: the amplifying effect of masculinity is confined to entrepreneurial experience.

Model 5 (see Table 5.5) examines power distance. The interaction with education ($OR = 0.965$, $p < 0.01$) and the interaction with entrepreneurial experience ($OR = 0.783$, $p < 0.01$) are negative and significant, indicating that higher power distance attenuates the contribution of both human-capital components to innovation novelty. The interactions with co-ownership ($OR = 0.993$, $p > 0.10$) and household income ($OR = 1.015$, $p > 0.10$) are not significant. Hypothesis 4 is therefore partially

supported: the strongest attenuation is observed for entrepreneurial experience. Model 6 reports the moderating effects of uncertainty avoidance. The interaction with education (OR = 0.973, $p < 0.10$) and the interaction with entrepreneurial experience (OR = 0.812, $p < 0.01$) are negative and significant, paralleling the pattern observed for power distance. The interactions with co-ownership (OR = 0.996, $p > 0.10$) and household income (OR = 1.073, $p > 0.10$) are not significant. Hypothesis 5 is therefore partially supported, again through the human-capital channel.

Table 5.5 Results of multilevel mixed-effects ordered logistic regression on innovation novelty (cross-level moderating effects)

Models		(3) Innovation novelty		(4) Innovation novelty		(5) Innovation novelty		(6) Innovation novelty	
Variables		Odds Ratio	Std. Err.	Odds Ratio	Std. Err.	Odds Ratio	Std. Err.	Odds Ratio	Std. Err.
Controls (Indiv.)	Age	0.978*	(0.011)	0.977**	(0.011)	0.976**	(0.011)	0.978*	(0.011)
	AgeSq	1.000	(0.000)	1.000	(0.000)	1.000	(0.000)	1.000	(0.000)
	Gender	1.071	(0.045)	1.071*	(0.045)	1.069	(0.045)	1.067	(0.045)
	Creativity	1.377***	(0.093)	1.379***	(0.093)	1.377***	(0.093)	1.385***	(0.094)
	CreativMiss	0.783***	(0.051)	0.792***	(0.051)	0.786***	(0.051)	0.797***	(0.051)
	HHSIZE	0.998	(0.012)	0.999	(0.012)	0.998	(0.012)	0.999	(0.012)
	KnowEnt	1.027	(0.021)	1.027	(0.021)	1.030	(0.021)	1.028	(0.021)
	EntpSkill	1.036	(0.023)	1.038*	(0.023)	1.035	(0.023)	1.037*	(0.023)
Controls (Country)	LnGDPpc	1.411***	(0.169)	1.381***	(0.115)	1.397***	(0.152)	1.444***	(0.117)
	GDPGrowth5y	0.982	(0.025)	0.982	(0.025)	0.980	(0.025)	0.982	(0.023)
	UnemplRate	1.031	(0.021)	1.029	(0.021)	1.031	(0.021)	1.022	(0.020)
	LnPop	0.990	(0.051)	0.981	(0.049)	0.989	(0.048)	1.019	(0.048)
Independent	Education	1.074***	(0.016)	1.057***	(0.013)	1.074***	(0.015)	1.064***	(0.014)
	EntExp	1.489***	(0.098)	1.296***	(0.074)	1.400***	(0.086)	1.305***	(0.074)
	CoOwners	1.038***	(0.010)	1.036***	(0.010)	1.037***	(0.010)	1.038***	(0.010)
	HHIncome	0.943	(0.055)	0.933	(0.047)	0.927	(0.049)	0.914*	(0.047)
Cultural moderators	<i>Individualism</i>	0.831*	(0.090)						
	× Education	1.022*	(0.012)						
	× EntExp	1.274***	(0.064)						
	× CoOwners.	1.004	(0.008)						
	× HHIncome	1.014	(0.044)						
	<i>Masculinity</i>			0.971	(0.099)				
	× Education			0.997	(0.014)				
	× EntExp			1.160**	(0.078)				
	× CoOwners.			1.019	(0.013)				
	× HHIncome			1.013	(0.058)				
	<i>Power distance</i>					1.247**	(0.134)		
	× Education					0.965***	(0.013)		
	× EntExp					0.783***	(0.046)		
	× CoOwners.					0.993	(0.009)		
	× HHIncome					1.015	(0.050)		
	<i>Uncertainty avoidance</i>							1.300**	(0.139)
	× Education							0.973*	(0.015)
	× EntExp							0.812***	(0.051)
	× CoOwners.							0.996	(0.010)
	× HHIncome							1.073	(0.060)
σ^2_u (country)		1.212***	(0.071)	1.210***	(0.070)	1.215***	(0.071)	1.172***	(0.060)

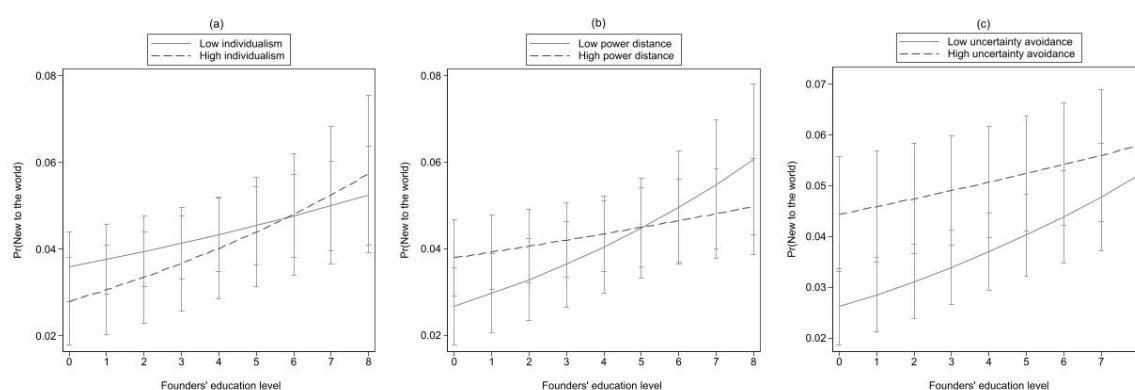
Observations	9,642	9,642	9,642	9,642
Countries	47	47	47	47

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: Models were estimated using multilevel mixed-effects ordered logistic regression with random intercepts at the country level. σ^2_u represents the country-level variance component. Year fixed effects are included.

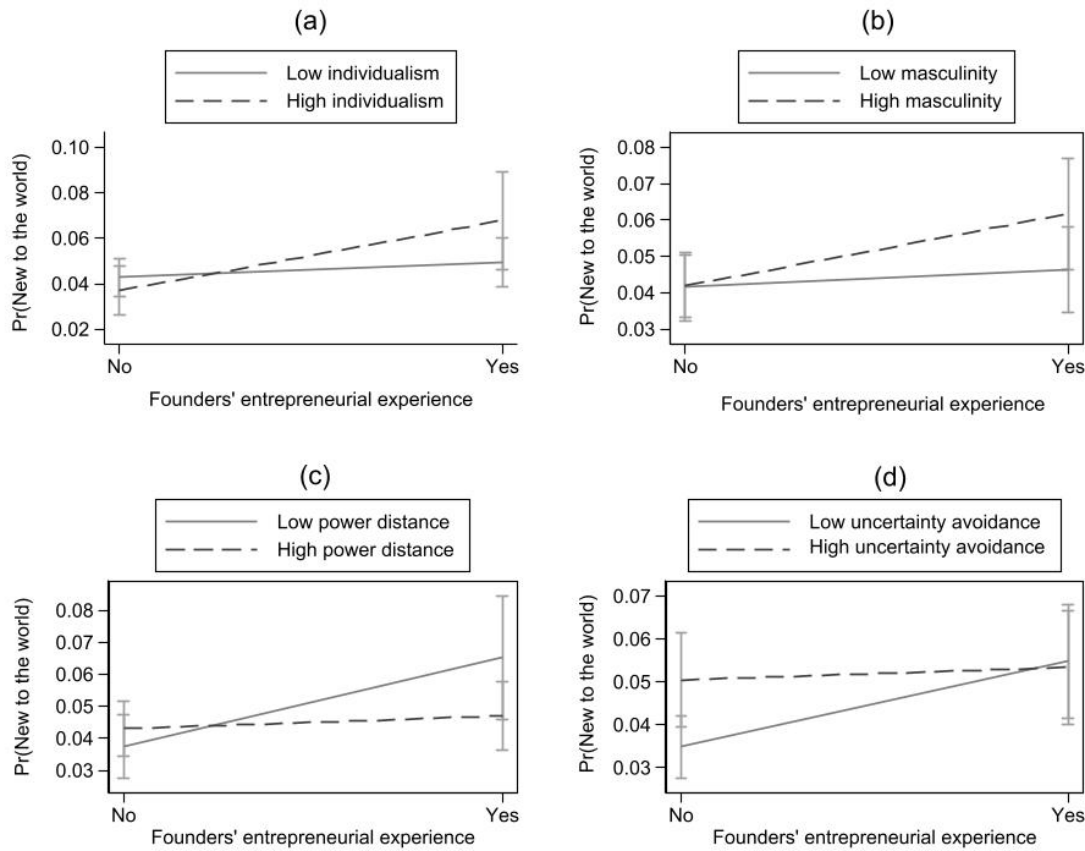
To assess the substantive relevance of the significant cross-level interactions, Figure 5.2 and Figure 5.3 plot the predicted probabilities that a social entrepreneur introduces a product or service in the highest novelty category of the ordinal scale (new to the world), with each cultural dimension evaluated at one standard deviation below and above its mean. The plots indicate that cultural context does not merely shift the predicted probabilities but alters the slope of the returns to human capital. Under high individualism and high masculinity, the gradients of education and entrepreneurial experience steepen markedly, whereas under high power distance and high uncertainty avoidance they flatten considerably. In low-power-distance societies, for instance, entrepreneurial experience is associated with an increase in the predicted probability of new-to-the-world novelty from approximately 0.037 to 0.065, whereas in high-power-distance societies the corresponding change is negligible. In the education panels, the predicted probabilities intersect at approximately short-cycle tertiary education, such that founders with lower educational attainment display higher predicted novelty in high-power-distance and low-individualism contexts, consistent with the positive direct effects of these dimensions reported above. The moderating effects reported in Table 5.5 are therefore substantively meaningful and not only statistically significant, since in some cultural contexts the novelty returns to the most influential individual resource in the sample are attenuated to near zero.

Figure 5.2 Predictive margins of the cultural moderation of founders' education on innovation novelty



Notes: Predicted probabilities of introducing a product or service new to the world, computed for an individual with all covariates held at their sample means and the country-level random intercept set to zero. Education levels follow the UN harmonized classification, ranging from 0 (pre-primary education) to 8 (doctoral or equivalent). Low and high values of each cultural dimension correspond to one standard deviation below and above the mean. Bars represent 95% confidence intervals.

Figure 5.3 Predictive margins of the cultural moderation of founders' entrepreneurial experience on innovation novelty



Notes: Predicted probabilities of introducing a product or service new to the world, computed for an individual with all covariates held at their sample means and the country-level random intercept set to zero. Low and high values of each cultural dimension correspond to one standard deviation below and above the mean. Bars represent 95% confidence intervals.

Several control variables show consistent associations across specifications. Creativity is positively associated with innovation novelty (OR ranging from 1.377 to 1.385, $p < 0.01$). At the country level, log GDP per capita is positively associated with innovation novelty across all specifications (OR ranging from 1.381 to 1.444, $p < 0.01$). The direct effects of the cultural moderators indicate that power distance (OR = 1.247, $p < 0.05$) and uncertainty avoidance (OR = 1.300, $p < 0.05$) are positively associated with the outcome at average resource levels, while individualism (OR = 0.831, $p < 0.10$) shows a marginally negative association and masculinity (OR = 0.971, $p > 0.10$) shows none. The country-level variance component remains significant across all models (σ^2_u ranging from 1.172 to 1.215, $p < 0.01$), confirming the appropriateness of the multilevel specification. Table 5.6 summarizes the empirical results for all five hypotheses.

Table 5.6 Summary of empirical results

	Hypothesis	General Human Capital	Specific Human Capital	Social Capital	Financial Capital	Results
H1	Individual resources are positively associated with innovation novelty among social entrepreneurs	OR = 1.057***	OR = 1.262***	OR = 1.038***	OR = 0.931	Partially supported
H2	Individualism positively moderates the relationship between individual resources and innovation novelty	OR = 1.022*	OR = 1.274***	OR = 1.004	OR = 1.014	Partially supported
H3	Masculinity positively moderates the relationship between individual resources and innovation novelty	OR = 0.997	OR = 1.160**	OR = 1.019	OR = 1.013	Partially supported
H4	Power distance negatively moderates the relationship between individual resources and innovation novelty	OR = 0.965***	OR = 0.783***	OR = 0.993	OR = 1.015	Partially supported
H5	Uncertainty avoidance negatively moderates the relationship between individual resources and innovation novelty	OR = 0.973*	OR = 0.812***	OR = 0.996	OR = 1.073	Partially supported

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: OR = Odds Ratio from multilevel ordered logistic regression.

5.4.1 Robustness checks

As noted in the methodology section, the operationalization of social entrepreneurship adopted here relies on the social- and environmental-impact items introduced in the GEM APS from the 2020/2021 edition onward, for which no standardized classification protocol has yet been established in the recent literature. To assess the sensitivity of the findings to this operational choice, we re-estimated the full set of models under two alternative sample definitions. Appendix D reports a more permissive specification that classifies as social entrepreneurs all TEA respondents scoring either 4 (“somewhat agree”) or 5 (“strongly agree”) on the social- and environmental-impact priority item, expanding the sample to 16,890 founders and thereby including a broader, more hybrid social-entrepreneurship category. Appendix E reports a more restrictive specification that retains the score of 5 and additionally requires the respondent to identify “to make a difference in the world” as an early-stage motive, narrowing the sample to 6,345 founders whose mission orientation is reinforced by an explicit social motive.

The overall pattern of our results is preserved under both alternative samples. The direction and significance of the coefficients for general human capital, specific human capital, and social capital, together with the cross-level interactions involving individualism, power distance, and uncertainty avoidance, remain consistent with those reported in the main analysis, supporting Hypotheses 1, 2, 4, and 5 in the same manner as in the main analysis. Minor variations are confined to individual coefficients and do not alter the main inferences. Under the more permissive specification, financial capital reaches significance with a negative sign ($OR = 0.916$, $p < 0.05$), a result that appears only when more commercially oriented hybrid founders are included in the sample. Under the more restrictive specification, the moderating effect of masculinity shifts from specific human capital (no longer significant) to social capital ($OR = 1.034$, $p < 0.05$), so Hypothesis 3 remains partially

supported through a different moderated relationship, and the moderating effect of uncertainty avoidance on specific human capital attenuates to marginal significance ($OR = 0.882$, $p < 0.10$). Overall, these robustness checks support the main conclusions of the study.

5.5 Discussion and Conclusion

This study examines the relationship between social entrepreneurs' individual-level resources and innovation novelty, and the extent to which this relationship is moderated by the national cultural context in which the venture is embedded. Based on multilevel mixed-effects ordered logistic regression applied to 9,642 social entrepreneurs in 47 countries pooled across the 2021–2023 GEM survey waves, the results reveal a consistent asymmetry across the four resource categories examined. Human capital and social capital are positively associated with innovation novelty, whereas financial capital is not. Cultural moderation operates almost exclusively through human capital: the four Hofstede cultural dimensions condition the returns to education and entrepreneurial experience but leave the returns to social and financial capital largely unaffected.

Among the resources that drive novelty, the strongest association is observed for entrepreneurial experience, followed by education and co-ownership. This ordering is consistent with Becker's (1964) distinction between general and specific human capital and with prior evidence that experience-based forms predict entrepreneurial innovation more strongly than formal credentials alone (Marvel et al., 2016; Unger et al., 2011). In the social domain, prior venture experience equips founders to navigate the tensions between social mission and operational sustainability (Battilana & Lee, 2014), shaping how innovation unfolds (Desa & Basu, 2013), which may explain why the experience association is the most pronounced of the four resources. Co-ownership operates as an internal source of social capital that pools perspectives within the founding team and broadens the range of product ideas the venture can develop, in line with the team-level mechanisms documented for entrepreneurial knowledge access (Klotz et al., 2014).

Our finding that financial capital is not significantly associated with innovation novelty contrasts with the resource-based prediction that financial slack enables the experimentation underlying novel offerings (Nohria & Gulati, 1996). Several considerations help interpret this departure for the social entrepreneurship setting. First, evidence from social ventures indicates that resource-constrained founders draw on bricolage, the recombination of resources at hand, to advance novel social solutions independently of the financial slack that classical resource-based logic emphasizes (Desa & Basu, 2013). Under this logic, financial endowment is not the binding constraint on novel ideation in mission-driven ventures, and its variation does not translate into variation in the novelty of offerings. Second, socially oriented entrepreneurs face restricted access to financial resources relative to commercially oriented counterparts (Austin et al., 2006; Lumpkin et al., 2013), and the mission-priority sample isolates founders for whom this asymmetry is most pronounced, such that the

variation in personal financial endowment within this population may be both compressed and decoupled from product novelty. Third, household income captures personal economic standing rather than venture-level financial resources, and the conversion of personal wealth into product novelty is plausibly weaker than the conversion of personal knowledge or networks. Brieger and De Clercq (2019), drawing on earlier GEM data, report that the contribution of personal financial capital to socially oriented outcomes is conditional on cultural context rather than uniform, lending further support to the view that financial endowment operates differently in social than in commercial entrepreneurship.

The cultural moderation pattern underscores the centrality of human capital. Across the four cultural dimensions examined, moderation effects converge on education and entrepreneurial experience, while co-ownership and financial capital remain unaffected. Power distance and uncertainty avoidance attenuate the returns to both human capital components, in line with Shane's (1993) cross-national evidence that hierarchical and ambiguity-averse contexts dampen the autonomy and experimentation through which knowledge is converted into novel offerings. Individualism amplifies these returns, as anticipated by accounts that link individualist norms to variety generation and tolerance for deviation (Taylor & Wilson, 2012; Tiessen, 1997). Masculinity amplifies only the entrepreneurial-experience component, an outcome consistent with the long-standing observation that the masculinity–innovation link has been less consistent than the links involving the other Hofstede dimensions (Shane, 1993). The asymmetric institutional contingency within human capital is also notable. Entrepreneurial experience is the most context-dependent of the four resources, attenuated more sharply by power distance and uncertainty avoidance and amplified more strongly by individualism than education is, suggesting that the practical know-how acquired through prior venture activity is more sensitive to surrounding cultural conditions than the codified knowledge acquired through formal schooling.

A further pattern merits attention. Power distance and uncertainty avoidance, evaluated at average resource levels, show positive direct associations with innovation novelty, a result that runs against Shane's (1993) cross-national finding that these dimensions are associated with lower national rates of innovation. One interpretation is consistent with prior work on social entrepreneurship in restrictive cultural contexts, which posits that existing power structures create opportunities for social ventures through institutional voids that generate unmet demand for novel social solutions (Mair & Martí, 2009). A parallel logic plausibly extends to high uncertainty avoidance, where the institutional preference for predictability can heighten the salience of social needs left unaddressed by conventional commercial provision. Under this institutional-voids interpretation, the same cultural conditions that attenuate the conversion of individual resources into novelty also raise the demand

on social ventures to introduce new offerings, such that the two effects can coexist without contradiction.

5.5.1 Theoretical implications

The findings problematize the assumption of resource universality that underlies the extension of the resource-based view to the individual entrepreneur (Alvarez & Busenitz, 2001). Financial capital, the resource that the organizational slack literature places at the center of the experimentation argument (Nohria & Gulati, 1996), shows no significant association with innovation novelty in any cultural configuration examined, and no cultural moderator restores the prediction in particular settings. This null aligns with the foundational characterization of social entrepreneurs as agents who pursue opportunities without being bound by the resources they currently control (Dees, 1998). It is equally consistent with the bricolage account in which novel social solutions emerge from recombining what is at hand rather than from financial slack (Desa & Basu, 2013). For the social entrepreneurship setting, the resource-based proposition that more resources translate into better outcomes therefore requires qualification at the level of the resource type, not merely of magnitude.

The findings also extend human capital theory by documenting differential institutional contingency across the components of founders' knowledge endowment, a refinement that simultaneously qualifies cross-cultural arguments about innovation. Becker's (1964) general/specific distinction, prominently applied in entrepreneurship research by Davidsson and Honig (2003), has organized prior work on the magnitude of returns to each component; the cultural contingency of these returns, however, has been treated as essentially uniform. Unger et al. (2011) called for contextual moderators of the human capital–outcome relationship, and the present results extend that call by showing that education and entrepreneurial experience differ not only in baseline magnitude but also in the degree of their cultural contingency, whereas co-ownership and financial capital remain culturally inert. This selectivity also bears on cross-cultural innovation arguments (Hayton et al., 2002; Shane, 1993), which are more accurately stated at the resource–outcome pairing level than at the entrepreneur level, since cultural conditions shape outcomes through specific mechanisms rather than uniformly across individuals.

For the social entrepreneurship literature, the cultural moderation pattern informs the hybrid logic that distinguishes mission-driven ventures from commercial ones (Battilana & Lee, 2014; Santos, 2012). The cultural conditions that elevate the salience of unmet social needs and open space for social ventures, particularly high uncertainty avoidance (Sahasranamam et al., 2021), simultaneously dampen the conversion of founders' human capital into novel offerings. The same institutional context that motivates social entrepreneurial activity therefore constrains the innovativeness of its outputs, a tension that the open social innovation perspective accommodates by relocating the source

of novelty from the individual founder to the orchestration of distributed actors (Pacheco et al., 2025), and that warrants direct empirical examination in subsequent work.

5.5.2 Practical and policy implications

Financial transfers to individual social entrepreneurs are not, on this evidence, a productive instrument for innovation novelty, and the null association is robust across cultural configurations. Programs that solely direct grants, micro-credit, or competitive cash awards to individual founders in expectation of innovative offerings should anticipate limited returns from this type of support. Combining financial provision with the human-capital and team-formation components for which the evidence shows positive returns is better aligned with the resource–outcome configuration observed here, and accelerators or incubators that already supply mentoring, training, and team-composition services have reason to weight these components more heavily when innovation novelty is the program goal.

Experience-based interventions, the most consequential individual-level driver, are also the most context-contingent. In high-power-distance and high-uncertainty-avoidance contexts, the returns to entrepreneurial experience are sharply attenuated, indicating that mentor-pairing programs and peer-experience exchanges in such settings will yield diminishing returns unless complemented by structural elements that counteract hierarchical conformity and risk aversion. Such elements might include regulatory sandboxes, protected pilot environments, and horizontal peer-to-peer formats that lower the cultural cost of deviating from established practice. Formal education, by contrast, preserves a positive baseline across the cultural range examined, which makes it a more transferable instrument for multilateral organizations and bilateral donors operating across heterogeneous institutional settings, even where its magnitude is moderated.

These differences in institutional contingency also bear on cross-country benchmarking. A program reporting strong outcomes in a low-power-distance, low-uncertainty-avoidance country may not replicate with similar success in a high-power-distance, high-uncertainty-avoidance country, and comparative evaluative frameworks that ignore which resources the program supplies risk attributing failure to design weakness when the underlying issue is contextual mismatch. The same configuration also implies a deeper structural constraint. Where power distance and uncertainty avoidance are high, the institutional voids that elevate demand for novel social offerings (Mair & Martí, 2009) coexist with cultural conditions that direct entrepreneurial efforts through social rather than individual capital (Sahasranamam et al., 2021), meaning that individual-level provision alone is unlikely to be sufficient, and collective mechanisms such as cooperative platforms, sector-wide associations, and the public orchestration of multi-actor problem-solving plausibly play a larger role in innovation in these settings.

5.5.3 Limitations and future research

This study has several limitations that suggest directions for future research. First, the pooled cross-sectional design, while mitigated by year fixed effects and the multilevel specification, constrains causal identification. Although reverse causality is unlikely because formal education and prior venture experience temporally precede current venture decisions, unobserved traits beyond the available controls (such as cognitive styles or risk tolerance) may simultaneously condition resource endowments and innovation outcomes. Future research could employ longitudinal designs tracking cohorts of social entrepreneurs across founding and scaling stages, or instrumental-variable approaches exploiting exogenous variation in educational access or entrepreneurial entry, to strengthen causal inference.

Second, the GEM operationalization of individual resources, though standard in cross-national research, is coarse in several respects. Entrepreneurial experience is captured through a binary indicator of business discontinuance in the past 12 months, which registers recent exits but leaves portfolio and habitual entrepreneurs without a recent discontinuance unobserved. Financial capital is proxied by a household-income tercile rather than venture-level slack, and social capital by the founding team's internal co-ownership rather than external network ties. The dependent variable itself rests on founders' perceived market novelty along a four-point ordinal scale that indexes the geographic reach of an offering rather than its novelty content directly, and does not capture objective novelty or downstream social impact. Future research drawing on primary surveys with granular resource attributes, or triangulating perceptual novelty with objective product characteristics and beneficiary-reach indicators, could sharpen identification of the underlying effects.

Third, the operationalization of culture through Hofstede et al.'s (2010) framework, though widely adopted, presents several limitations. Cultural scores are aggregated at the country level, treating culture as internally uniform and masking subnational heterogeneity that is especially pronounced in large or multicultural polities. Indeed, such subnational variation can moderate the returns to founders' human capital (Capelleras et al., 2019), yet harmonized regional indicators are unavailable across the 47 sampled countries. Furthermore, the four Hofstede dimensions examined here do not exhaust the set of relevant informal institutions, and constructs grounded in different theoretical logics may capture aspects beyond this framework. The dimensions are further modeled independently to address multicollinearity among the scores, which precludes configurational analyses through which they may jointly shape innovation outcomes. Future research could deploy configurational methods such as fuzzy-set Qualitative Comparative Analysis (fsQCA), integrate subnational measures of regional entrepreneurial culture (e.g., Capelleras et al., 2019), or test the cross-level moderation using complementary cultural indices.

Fourth, although the empirical design identifies consistent cross-level moderation, the mechanisms through which cultural dimensions attenuate or amplify the resource-innovation relationship remain theoretically proposed rather than directly observed. Power distance and uncertainty avoidance, for instance, may attenuate human-capital returns through suppressed experimentation, reduced horizontal knowledge exchange, or redirected effort toward incremental solutions, and the present design does not discriminate among these channels. A related gap concerns the Open Social Innovation perspective motivating part of the theoretical tension (Pacheco et al., 2025), which emphasizes the orchestration of distributed actors and collective problem-solving, whereas the GEM survey captures only founder-level and founding-team resources at the individual level. Future research employing qualitative process tracing, multi-informant case designs, or dedicated OSI-sensitive instruments could specify how each cultural dimension bears on each resource type and how external collective orchestration reshapes the link between individual resources and innovation.

Fifth, the analytical sample is restricted in two respects that condition the scope of the findings. The identification of social entrepreneurs applies a strict threshold (the highest score on the social-priority item) which isolates mission-primary founders consistent with prior GEM-based work (Lepoutre et al., 2013) but aggregates heterogeneous venture subtypes likely to exhibit distinct innovation dynamics, including work-integration social enterprises, environmental ventures, and community-development organizations (Defourny & Nyssens, 2017). The sample is further restricted to early-stage entrepreneurs within the 42-month TEA window, excluding established social enterprises for which accumulated routines, legitimacy, and team-level capabilities may alter the role of founder resources (Zahra et al., 2006). Future research could compare cultural moderation patterns across social-venture subtypes and contrast early-stage with established ventures to delineate the boundary conditions of these findings.

Chapter 6

Organizational Policies and Environmental Innovation: The Mediating Role of Environmental Partnerships

6 Organizational Policies and Environmental Innovation: The Mediating Role of Environmental Partnerships^{*}

6.1 Introduction

Chapters 4 and 5 analyzed the individual-level determinants of OSI, first isolating founders' human capital and its dependence on organizational form, and then extending the analysis to the broader resource bundle of the social entrepreneur and the moderating role of national cultural dimensions. This chapter shifts the level of analysis to the established firm, examining organizational policies as determinants of environmental innovation and the mediating role of cross-sector partnerships, one of the collaborative mechanisms that OSI presupposes at the organizational level.

With global greenhouse gas emissions reaching a record 57.7 billion tons of CO₂ equivalent in 2024 (United Nations Environment Programme, 2025), firms in industries such as manufacturing, retail, and food production face increasing pressure to meet regulatory requirements and stakeholder expectations amid climate challenges. In this context, environmental innovation contributes not only to mitigating environmental impacts but also to achieving operational efficiency, cost reductions, and improved financial performance (Farza et al., 2021; Heras-Rosas et al., 2026; Vasileiou et al., 2022; Wedari et al., 2023; Xie et al., 2022). While extant research has primarily examined the direct links between various innovation modes and environmental outcomes (Chistov et al., 2021; Rehman et al., 2021; Russo Spina & Di Paola, 2020), much less is known about the indirect mechanisms that foster environmental innovation. Understanding these mechanisms helps bridge the gap between innovation drivers and outcomes by moving beyond the assumption of linear relationships. One such indirect mechanism involves legitimization strategies (Scherer et al., 2013), which can be activated, for example, through firms' adoption of organizational policies that signal conformity with societal norms and regulatory expectations (Suchman, 1995). These policies can enhance firms' perceived appropriateness as collaboration partners, thereby expanding their access to potential partners (Dacin et al., 2007; Rizzuni et al., 2026). To address this gap, this study analyzes whether organizational policies influence environmental innovation indirectly through their effects on environmental partnerships.

As environmental challenges increasingly demand cross-sector responses that exceed any single organization's capacity (Li & Zhang, 2026; Rondinelli & London, 2003), and consistent with the collaborative approaches underlying open social innovation research (Pacheco et al., 2025), understanding the indirect mechanisms that foster environmental innovation becomes critical. At the macro-level, research has clarified the ways in which policy instruments drive green innovation

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through channels such as environmental disclosure, instrument synergies, institutional substitution dynamics, and differential effects across policy designs between developed and emerging markets (Gebhardt et al., 2026; Lapologang & Zhao, 2023; Liao, 2018; Miroshnychenko et al., 2026). At the firm level, evidence indicates that heterogeneous stakeholder pressures steer differentiated innovation strategies depending on stakeholder salience and investment horizons (Cheng et al., 2025; Dong et al., 2026; Yue et al., 2025). Despite this progress, existing models remain anchored in direct policy–innovation and stakeholder–innovation pathways, treating legitimation as a uniform mechanism that does not differentiate collaborative outcomes by stakeholder orientation.

To examine this mediation mechanism, this study distinguishes between organizational policies (Six & Sorge, 2008) oriented toward different stakeholder groups. Specifically, we examine mediation patterns across three relevant stakeholder-oriented policy categories: human rights-oriented, consumer-oriented, and market-oriented policies. Human rights-oriented policies focus on demonstrating commitment to employees and communities through ethical labor practices and workplace standards (del-Castillo-Feito et al., 2022; Wettstein, 2015). Consumer-oriented policies demonstrate care for consumer welfare beyond the point of sale through product safety and responsible marketing practices (Cope et al., 2010; van Dijk et al., 2008). Market-oriented policies establish conduct standards for fair competition and business ethics (Elmawazini et al., 2022; Yu et al., 2024). Despite these distinctions, empirical evidence regarding whether partnerships mediate policy effects differently across these policy categories remains lacking.

We apply the causal mediation framework developed by Valeri and VanderWeele (2013), which accommodates exposure–mediator interactions within a counterfactual approach, to panel data (2014–2024) comprising 3,372 firm-year observations from consumer sector firms sourced from the London Stock Exchange Group (LSEG) Workspace database. Results reveal distinct patterns across policy categories: an indirect-only effect for human rights-oriented policies, both direct and indirect effects for consumer-oriented policies, and no significant mediation for market-oriented policies. Additionally, sector-specific analyses show that the partnership-mediated mechanism operates within consumer discretionary firms but not within consumer staples firms. These findings suggest that legitimation signals function more effectively when directed toward socially proximate stakeholders, such as employees and consumers, who share direct relationships with the firm, rather than toward distant market actors governed by competition policies. This pattern aligns with evidence that socially proximate stakeholders exert a stronger influence on firms’ sustainable behavior than distant regulatory actors (Ernst et al., 2022). This relational proximity, however, requires stakeholder attention and scrutiny to generate effective legitimation, and such scrutiny varies with sector visibility.

This study makes distinct contributions to the environmental innovation and organizational legitimacy literature. First, we contribute to environmental innovation research by integrating legitimacy theory (Suchman, 1995) with the institutional approach (North, 1990). Specifically, we examine the indirect pathway through which organizational policies, differentiated by the proximity of the stakeholder audience they address, function as legitimation signals that attract cross-sector partnerships for tackling environmental challenges. Previous research has examined direct policy–innovation (Elmawazini et al., 2022) and partnership–innovation relationships (Chistov et al., 2021) without theorizing the conditions under which specific policy signals differentially activate partnership formation. Moreover, recent work on responsibility signals in alliance formation has examined signal valence (Yu et al., 2025) and institutional contingencies (Wang et al., 2023) rather than how signals targeting distinct stakeholder audiences generate different collaborative pathways to innovation. Our findings address this gap by demonstrating that the innovation effects of organizational policies operate through partnership formation when these policies target socially proximate stakeholders. This finding extends current theory by revealing that legitimation effectiveness depends on stakeholder proximity: human rights and consumer policies generate partnership-mediated innovation, while broad market policies do not.

Second, we advance the understanding of collaborative environmental innovation by identifying differential mediation mechanisms across policy categories. Prior research has examined partnerships as channels for external knowledge sourcing in environmental innovation (Ghisetti et al., 2015) and has conceptually distinguished competency-oriented from legitimacy-oriented alliances (Lin & Darnall, 2015), but has not empirically tested which specific policy signals activate partnership-mediated innovation pathways. Our results show that partnership formation responds selectively to specific legitimation signals. By demonstrating complete mediation for human rights-oriented policies versus no mediation for market-oriented policies, we reveal that social responsibility signals attract innovation-enhancing partners, whereas regulatory compliance signals do not. This evidence indicates that certain policy signals fail to shape perceptions in ways that foster cross-sector collaboration, thereby underscoring the need to target the types of legitimacy cues that effectively mobilize partners.

Third, we support theoretical propositions linking stakeholder proximity to “corporate environmental legitimacy” (Rizzuni et al., 2026, p. 12) and extend their application to innovation outcomes. Specifically, the findings indicate that the legitimacy conferred by socially proximate stakeholders is a necessary condition for mobilizing partnership-mediated innovation, whereas the broad compliance signals characteristic of distant market actors fail to trigger this collaborative mechanism, as they lack the stakeholder attention required to activate effective legitimation.

The remainder of the chapter is organized as follows. Section 6.2 provides the conceptual framework and reviews the literature to develop our hypotheses. Section 6.3 details the methodology, including models, data, and variables. Section 6.4 presents the empirical results and robustness tests. Finally, Section 6.5 draws conclusions, discusses implications, identifies limitations, and suggests future research directions.

6.2 Theoretical Background and Hypotheses

6.2.1 Environmental innovation and environmental partnerships

The growing interest in reducing organizations' environmental impact has led to a proliferation of concepts related to environmental innovation. The literature includes terms such as “eco-innovation” and “green innovation” that are often used interchangeably with environmental innovation (Schiederig et al., 2012). Depending on the perspective adopted, these concepts may differ in their focus on the innovation object, degree of novelty, stage of the process, or similar characteristics (Díaz-García et al., 2015). For this study, we adopt the term environmental innovation in line with recent research (Chen et al., 2026; Liao et al., 2025). Environmental innovation is broadly defined as “new or modified processes, techniques, practices, systems and products to avoid or reduce environmental harms” (Beise & Rennings, 2005, p. 6).

Analyzing environmental innovation determinants, Bossle et al. (2016) identify external factors (regulatory pressures, normative pressures, market demand, cooperation, and technology) and internal factors (efficiency, managerial environmental concerns, environmental capability, and human resources). Similarly, Liao and Liu (2021) classify determinants into four categories: policy factors (environmental regulations, government subsidies), market factors (customer demand, market concentration), resource capacity factors (knowledge sources, technological capabilities, organizational performance, environmental management systems), and organizational characteristics. These reviews provide evidence of previous empirical research on partnerships, both in a broad sense of cooperation (Bossle et al., 2016) and in a specific sense through external knowledge sourcing, also referred to as open eco-innovation (Ghisetti et al., 2015). Furthermore, regardless of the particular cooperation type examined, previous studies have suggested a positive relationship between external collaboration approaches and environmental innovation (Bitencourt et al., 2020; Cainelli et al., 2015; De Marchi, 2012; Doran & Ryan, 2016; Horbach, 2008).

Following Stadtler and Lin (2019) and Ullah et al. (2022), we define environmental partnerships as collaborative initiatives between firms and cross-sector partners (non-governmental organizations [NGOs], governments, and supra-governmental organizations, among others) focused on addressing environmental issues. Although this notion can be traced back decades to industrialization processes (Poncelet, 2001), recent approaches such as Open Social Innovation have highlighted the diversity of models and initiatives for orchestrating cross-sector collaborations (Pacheco et al., 2025). More

specifically, Ullah et al. (2022) demonstrate a direct positive relationship between environmental partnerships and environmental innovation in the context of developing countries. This relationship can be explained in part through Chesbrough's (2003b) open innovation framework, whereby environmental partnerships facilitate access to diverse external knowledge that would otherwise be unavailable internally. Consistent with this logic, collaborations with secondary stakeholders, including civil society organizations and environmental groups, have been found to be particularly associated with eco-innovation outcomes (Ozdemir et al., 2023). Consequently, this inflow of knowledge and additional resources enhances firms' ability to develop environmental innovations, particularly in contexts where such innovations require heterogeneous expertise (Mariani et al., 2022).

6.2.2 Organizational policies and environmental partnerships

Following Perrow (1961), Six and Sorge (2008), and Mert et al. (2025), we define organizational policies as deliberately designed rules, governance mechanisms, and principles that shape individual behavior and collective action to achieve corporate goals and meet societal expectations. To frame our understanding of the mediating role of environmental partnerships in the relationship between organizational policies and environmental innovation, we draw on two complementary theoretical perspectives, namely the institutional approach and legitimacy theory. These frameworks have previously been employed to examine environmental innovation and its determinants (e.g., Garrone et al., 2018; Ren et al., 2022; Truong & Berrone, 2022) and are particularly suited to our research because the institutional approach accounts for why organizations design policies in response to external pressures, while legitimacy theory explains how the adoption and disclosure of such policies enable organizations to attract cross-sector partners (Lee et al., 2026; Riandita, 2022). Individually, neither perspective accounts for why legitimization signals differ in their partnership-generating capacity across different stakeholder audiences. Together, however, these perspectives underpin the prediction that organizational policies, through the legitimacy they confer, facilitate the formation of environmental partnerships that in turn enhance environmental innovation.

Consistent with the approach adopted in Chapter 5, we build on the institutional approach (North, 1990), which posits that organizational behavior is shaped by formal rules of both national (laws and regulations) and international (human rights conventions) origin, establishing the general minimum framework for organizational operation. Accordingly, organizations design their policies in response to institutional pressures, aligning their practices with the regulatory frameworks and industry norms of the environment in which they operate (Roxas, 2022). While some of these policies represent mandatory regulatory responses, others reflect voluntary adoption that exceeds legal minimums. Although informal institutions such as culturally embedded norms and values also shape organizational behavior (North, 1990), the policy variables examined here operationalize formalized

commitments that respond primarily to regulatory and normative frameworks. Regardless of this distinction, the signaling effect relevant to our study operates through the formalization and public disclosure of policies rather than through legal obligation *per se*. That is, by formalizing and disclosing their policies, organizations signal conformity with societal expectations, thereby establishing the basis for legitimacy claims within their institutional context.

Building on this institutional foundation, we outline the legitimation process linking policy adoption to environmental partnerships. Following Suchman (1995), we understand legitimacy as a generalized perception that organizational actions are desirable, proper, or appropriate within socially constructed systems of norms, values, and beliefs. We distinguish between legitimacy as this generalized perception and legitimation as the active process through which organizations gain, maintain, or repair such perceptions. Legitimacy, so defined, constitutes a critical resource that not only enhances organizational survival (Baum & Oliver, 1991; Singh et al., 1986) but also enables organizations to attract alliance partners and complementary resources (Dacin et al., 2007; Spanuth & Urbano, 2024). We argue that the adoption of organizational policies functions as a key legitimation mechanism. By formalizing and disclosing policies aligned with institutional expectations, organizations enhance their perceived appropriateness as partners for environmental initiatives, given that both internal and external stakeholders observe these actions and form legitimacy judgments accordingly (Ruef & Scott, 1998; Suchman, 1995).

Depending on their focus, organizational policies vary in their scope of application. They may have broad scope, for example, when targeting stakeholders such as markets, customers, and society. Conversely, they may exhibit a narrower scope of application when addressing a smaller subset of stakeholders, such as employees or shareholders. In the context of this study, these so-called niche policies (Poček et al., 2024) would typically focus on the organization's internal workforce and directly affect employees' human rights at work by regulating their employment status and relationships through issues such as employee health and safety, minimum wage, and working hours (e.g., decent work as defined by International Labour Organization human rights standards).

This distinction in stakeholder targeting reflects a clear difference in policy orientation: externally oriented policies govern firm behavior toward outside actors (i.e., customers, competitors, markets), whereas internally oriented policies primarily govern employees' human rights. Although both types of policies respond to institutional pressures, they target different legitimacy audiences. Externally oriented policies signal conformity with market regulations and consumer protection standards, whereas internally oriented policies, despite governing employment relations, serve as critical signals to partners who particularly value evidence of respect for human rights and social responsibility when selecting collaborators.

Building on this distinction, we analyze organizational policies according to their orientation toward human rights (internal), consumer (external), or market (external) stakeholders (see Figure 6.1). We study these three policy categories because each targets distinct legitimacy audiences whose evaluations influence partnership formation differently, depending on evaluators' capacity to observe, verify, and act upon organizational signals (Bitektine, 2011; Suchman, 1995). Proximate audiences, such as employees and consumers, possess direct observational access to organizational conduct, which renders policy signals more verifiable and, consequently, more credible as bases for partnership selection. In contrast, distant audiences, such as competition authorities and market regulators, evaluate policies through aggregate conformity indicators that lack the relational specificity needed to differentiate genuine commitment from symbolic adoption. Accordingly, human rights-oriented policies signal to civil society and labor advocates; consumer-oriented policies signal to end-users and protection regulators; market-oriented policies signal to competition authorities. This analytical structure enables us to examine whether environmental partnerships differentially mediate policy effects on innovation across varying levels of evaluator proximity, a distinction not addressed in prior classifications that group policy factors alongside resource capacity and organizational characteristics (Liao & Liu, 2021).

Human rights-oriented policies align with formal institutions mandating ethical standards such as workers' rights and equality (Wettstein, 2015). These policies reflect normative alignment (Scott, 2013) with institutionalized expectations while simultaneously signaling commitment to ethical principles that transcend national boundaries (Boyle, 2012). Although internally focused, these policies operationalize democratic governance principles through formalized worker representation structures, thereby enhancing firms' legitimacy among external actors (del-Castillo-Feito et al., 2022). Environmental NGOs and research institutions screen for evidence of internal democratic practices (often disclosed in companies' annual reports) when selecting collaboration partners, viewing such policies and their disclosure as indicators of stakeholder engagement capacity, legitimacy, and credible sustainability commitment (Boiral et al., 2015; Friske et al., 2023; Ruef & Scott, 1998). Accordingly, recent empirical evidence indicates that workplace inclusion policies oriented toward human rights enhance environmental performance partly through environmental innovation (Demiralay et al., 2025). Indeed, Ernst et al. (2022) find that proximate employee pressures enhance sustainability outcomes, whereas distant regulatory pressures diminish them. Consistent with these findings, evidence from the green human resource management literature indicates that employee-oriented sustainability practices mediate the relationship between leadership commitment and green innovation outcomes (Singh et al., 2020). Therefore, we pose the following hypothesis:

Hypothesis 1: The adoption of human rights-oriented policies promotes environmental partnerships and subsequently enhances environmental innovation.

Whereas narrow, or niche, policies typically focus on the organization's internal workforce, broader-scope policies target the organization's external audiences. External stakeholder-oriented organizational policies encompass those that directly or indirectly affect external parties such as consumers, suppliers, and competitors. These policies can be examined through stakeholder theory (Freeman, 2010), which emphasizes the importance of attending to the interests of all groups or individuals affected by firms' actions. Complementarily, stakeholder salience theory (Mitchell et al., 1997) posits that stakeholders possessing greater power, legitimacy, and urgency generate stronger evaluative pressure on organizations. From an institutional perspective, firms also adopt organizational policies in response to formal institutions, specifically the regulations of the countries in which they operate. This response relates to the sanctioning mechanisms embedded in formal institutions, which penalize organizational behavior contrary to formal rules and can result in the loss of both financial resources and reputation. Indeed, pressures to align with externally oriented market and customer-related formal rules stem from multiple stakeholders who demand different bases of legitimacy, including legal conformity, cultural congruence, and alignment with shared cognitive schemas, thereby exposing the organization to normative pressures. Here, we focus on two sets of externally oriented organizational policies driven by formal institutions and normative pressures, namely those related to customers and those related to markets.

Consumer-oriented policies operationalize risk management capabilities through formalized product quality control, hazard mitigation, and transparent labeling (Cope et al., 2010; van Dijk et al., 2008). Moreover, these policies respond to formal institutions regulating consumer protection. Consumer activism increasingly targets environmental and human-rights misconduct, pressuring firms to formalize responsible conduct toward consumers (Narayanan & Singh, 2025). Consequently, these mechanisms provide verifiable evidence of organizational capacity to manage complex regulatory requirements, a screening criterion employed by prospective environmental partners to assess collaboration risks and capabilities (Héroux & Roussy, 2020; Melander, 2018). Additionally, fair-trade policies, marketing practices, and organizational transparency can strengthen consumer attitudes and green purchase intentions (e.g., Nekkumud et al., 2022), which in turn signals commitment to ethical business practices. By doing so, organizations build a favorable reputation for responsible engagement, which strengthens their standing as environmental partners and helps foster innovation (Melander, 2017). Consistent with this logic, empirical evidence indicates that customer Environmental, Social, and Governance (ESG) discourse power can effectively enhance supplier green innovation through green cognitive, behavioral, and management convergence (Wang et al., 2025). Therefore, we pose the following hypothesis:

Hypothesis 2: The adoption of consumer-oriented policies promotes environmental partnerships and subsequently enhances environmental innovation.

Market-oriented policies codify governance mechanisms for market integrity and intellectual property protection, thereby addressing specific transaction hazards in environmental collaborations (Elmawazini et al., 2022; Telg et al., 2023). These policies enhance legitimacy among competition authorities and prospective collaborators (Doh et al., 2017), becoming a strategic resource for attracting environmental partnerships in contexts where institutional weakness heightens partner selection uncertainties (Ma et al., 2021). Anti-bribery and business ethics policies exemplify measures that complement fair competition standards by establishing transparent operational frameworks that reduce risks of opportunistic behavior. As market-oriented policies diffuse and become institutionalized, they shift from voluntary signals to expected partnership prerequisites (Altura et al., 2021), thereby reducing the policy uncertainty that otherwise delays environmental investments (Kyaw, 2022). Given the high asset specificity of environmental innovations, which require joint research and development investments with uncertain appropriability, such policies establish ex-ante safeguards that enable deeper knowledge exchange between partners (Yu et al., 2024). Based on these considerations, we pose the following hypothesis:

Hypothesis 3: The adoption of market-oriented policies promotes environmental partnerships and subsequently enhances environmental innovation.

As discussed above, organizational policies function as signals whose perceived legitimating power, specifically their credibility, depends on observability and evaluator scrutiny (Forcadell et al., 2023). Drawing on prior research distinguishing between high- and low-proximity stakeholders based on their evaluative capacity (Finch et al., 2015; Schons & Steinmeier, 2016), we define stakeholder proximity as the intensity of evaluative attention that legitimacy audiences direct toward organizational conduct. This construct builds on the notion that social proximity, rooted in relational embeddedness, shapes how stakeholders perceive and respond to organizational behavior (Lähdesmäki et al., 2019). It further implies that legitimation is an audience-selective process whereby the same organizational signal can generate different legitimacy evaluations depending on the evaluator's relational position. Rather than serving as an independent variable in our model, stakeholder proximity provides the theoretical rationale for examining sector type as a boundary condition of the mediated pathway, capturing the degree to which stakeholders are positioned to observe, interpret, and respond to organizational policy signals.

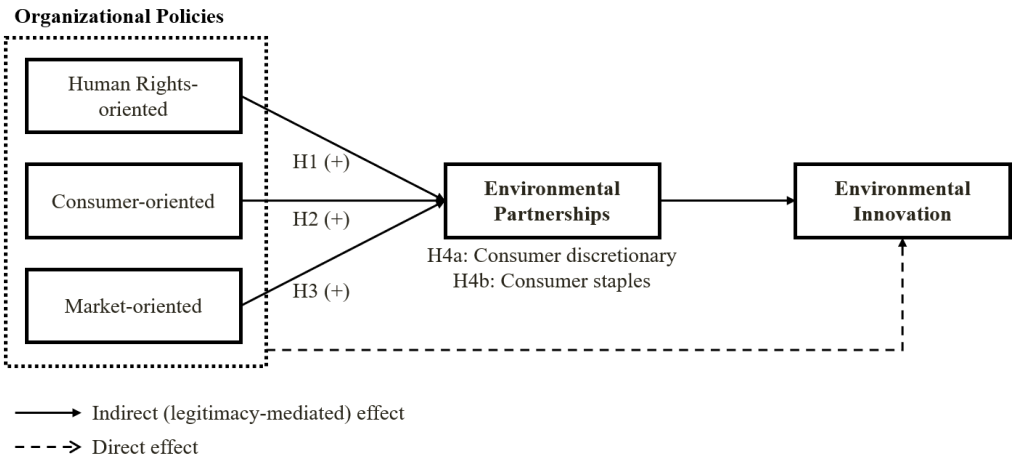
Prior research establishes that attention and visibility intensify stakeholder scrutiny, fundamentally affecting both evaluators' legitimacy judgments and the behavior of evaluated actors (Bitektine, 2011; Cheng et al., 2025; He et al., 2024; Jin et al., 2024; Suddaby et al., 2017). Legitimacy

evaluators hold heterogeneous expectations shaped by contextual characteristics (Lamin & Zaheer, 2012), particularly sector visibility, with regulatory pressures proving especially salient in environmentally visible contexts (Baah et al., 2020). Therefore, firms with highly visible activities and significant social impact face greater legitimacy needs, as stakeholders more closely monitor their alignment with societal expectations (Dacin et al., 2007; Yu et al., 2017). For instance, discretionary sectors, especially consumer-facing and controversial industries (Forcadell et al., 2023), are characterized by high product visibility to end consumers and contested social outputs, which attract heightened scrutiny and consumer activism (Narayanan & Singh, 2025). Conversely, staple sectors serving functional necessity-driven demand have lower end-consumer visibility and thus reduced stakeholder attention (Pollach & Schaper, 2023), thereby operating under attenuated evaluator scrutiny. Although these sectors differ across multiple dimensions including regulatory exposure and product differentiation, the legitimation mechanism under examination depends on whether policy signals are sufficiently observed and evaluated by external audiences (Bitektine, 2011; Lamin & Zaheer, 2012) to generate partner-attracting legitimacy. In summary, when evaluator attention and scrutiny are high, formal policies generate sufficient perceived legitimacy to activate the partnership-innovation pathway. Conversely, when monitoring is attenuated, partnerships may form through alternative mechanisms bypassing policy-based signaling. Therefore, we pose the following hypotheses:

Hypothesis 4a: For consumer discretionary firms, environmental partnerships mediate the relationship between organizational policies (i.e., human rights-oriented, consumer-oriented, and market-oriented) and environmental innovation.

Hypothesis 4b: For consumer staples firms, environmental partnerships do not mediate the relationship between organizational policies (i.e., human rights-oriented, consumer-oriented, and market-oriented) and environmental innovation.

Figure 6.1 Conceptual model



6.3 Methodology

6.3.1 Data source and sample

We collected data from the London Stock Exchange Group (LSEG) Workspace database (formerly Refinitiv Eikon), which aggregates and processes ESG data from corporate reports, regulatory filings, and media sources worldwide. We specifically filtered for firms within the consumer discretionary and consumer staples sectors, as defined by the Global Industry Classification Standard (GICS), that reported information on our analytical variables. Characterized by pronounced inter-firm innovation transfers, these sectors provide an appropriate empirical context for testing partnership-mediated mechanisms (Costantini et al., 2017) and encompass a diverse range of companies across subsectors such as manufacturing, retail, and food production, which have direct environmental footprints and varying potential for environmental innovation. The analytical sample was constructed by sequentially excluding observations with incomplete data on the analytical variables and firms lacking within-firm variation in the mediator and then computing Mundlak within-group means for the correlated random effects (CRE) specification (see Table 6.1). The final sample comprises 454 listed companies spanning an eleven-year period from 2014 to 2024, covering 45 countries and resulting in an unbalanced panel of 3,372 firm-year observations. This database was selected because it constitutes one of the most widely utilized data sources in sustainability and environmental innovation research (e.g., Albitar, Al-Shaer, et al., 2023; Orazalin & Mahmood, 2021; Ullah et al., 2022).

Table 6.1 Sample construction process

Stage	Firms	Firm-year observations
Initial panel	2,080	22,880
Complete cases on analytical variables	1,829	10,635
Final sample (mediator variation)	454	3,372

6.3.2 Measures

6.3.2.1 Dependent variable

Prior research has examined environmental innovation through multiple approaches including inputs, processes, products, and proxies such as patents (Cheng & Shiu, 2012). Following Albitar, Borgi, et al. (2023) and Konadu et al. (2022), we operationalize the dependent variable as the LSEG ESG Environmental Innovation score ranging from 0 to 100, which “reflects a company’s capacity to reduce the environmental costs and burdens for its customers, thereby creating new market opportunities through new environmental technologies and processes, or eco-designed products” (LSEG, 2024, p. 29).

6.3.2.2 Independent variables

The independent variables consist of three composite indices measuring organizational policies related to transnational company agreements and standards as cataloged by the International Labour Organization and the European Commission (2019). These indices, constructed from ESG policy data (LSEG, 2024), are composed of binary organizational policy indicators where each component variable takes a value of 1 if companies report adopting the respective policy and 0 otherwise. While regulatory requirements vary across the 45 countries in our sample, these indicators capture formalized policy commitments regardless of specific jurisdictional mandates.

Each index is calculated as the arithmetic mean of three component policies, ranging from 0 to 1, reflecting the proportion of adopted policies within each respective domain. The three independent variables are (1) the human rights-oriented index, comprising human rights policy, forced labor policy, and child labor policy, which captures companies' commitment to ensuring respect for fundamental human rights and protecting vulnerable workers across their operations; (2) the consumer-oriented index, consisting of fair-trade policy, customer health and safety policy, and responsible marketing policy, which measures companies' adoption of policies that protect consumer welfare, ensure product safety, and promote responsible market practices; and (3) the market-oriented index, encompassing fair competition policy, anti-bribery policy, and business ethics policy, which assesses companies' commitment to maintaining market integrity through codes of conduct that promote competitive fairness and prevent corruption (LSEG, 2024).

6.3.2.3 Mediating variable

The environmental partnerships variable is binary, equal to 1 if companies report partnerships or initiatives with specialized NGOs, industry organizations, or governmental or supragovernmental organizations focused on addressing environmental issues, as defined in the LSEG Workspace data dictionary. This variable reflects the cross-sectoral collaborative relationships that have been identified as fundamental to Open Social Innovation approaches (Pacheco et al., 2025). In prior empirical studies examining direct relationships, Su et al. (2024) incorporate it as part of an index measuring environmental management practices related to firm profitability, while Ullah et al. (2022) use this variable as a control in environmental innovation research adopting an institutional approach. Consistent with these precedents, our model focuses on whether firms establish formalized cross-sectoral environmental collaborations, which constitute the theoretically relevant condition for the legitimization mechanism under examination.

6.3.2.4 Control variables

In testing our conceptual model, we control for three groups of variables identified in prior research as potential determinants of environmental innovation: firm size and financial performance, board characteristics, and the existence of environmentally related committees. First, variables related to

organizational size and financial characteristics, such as the number of employees, total assets, total debt divided by total capital, and return on equity, have been found to influence environmental innovation (Albitar, Al-Shaer, et al., 2023; Nadeem et al., 2020; Ullah et al., 2022). Additionally, prior literature has considered the relationship between environmental innovation and various board characteristics (Albitar, Al-Shaer, et al., 2023; Nadeem et al., 2020; Orazalin & Mahmood, 2021; Ullah et al., 2022), including the total number of members, proportion of independent directors, proportion of female directors, and proportion of board members with industry experience. Finally, consistent with prior research (Nadeem et al., 2020; Palea et al., 2024), we control for whether firms have environmental or Corporate Social Responsibility (CSR) committees. Table 6.2 provides a comprehensive summary of all variables employed in this study, including their operational definitions and corresponding LSEG Workspace item codes.

Table 6.2 Description of variables

Variable	Variable label	Description	LSEG item code
Dependent			
Environmental innovation	<i>EnvInnov</i>	A score for environmental innovation that “reflects a company’s capacity to reduce the environmental costs and burdens for its customers, thereby creating new market opportunities through new environmental technologies and processes, or eco-designed products”; ranges from 0 to 100	(ENPIDP019)
Independent			
Human rights-oriented	<i>HR-Oriented</i>	A score reflecting a company’s adoption of human rights-oriented policies, based on corporate reporting of three organizational policies (Human Rights Policy, Forced Labor Policy, Child Labor Policy); ranges from 0 to 1	(SOHRDP0105, SOHRDP0104, SOHRDP0103)
Consumer-oriented	<i>Cons-Oriented</i>	A score reflecting a company’s adoption of consumer-oriented policies, based on corporate reporting of three organizational policies (Fair Trade Policy, Customer Health & Safety Policy, Responsible Marketing Policy); ranges from 0 to 1	(SOPRDP015, SOPRDP012, SOPRDP014)
Market-oriented	<i>Mkt-Oriented</i>	A score reflecting a company’s adoption of market-oriented policies, based on corporate reporting of three organizational policies (Fair Competition Policy, Anti-Bribery Policy, Business Ethics Policy); ranges from 0 to 1	(SOPRDP0121, SOBCDP0103, SOBCDP0101)
Mediator			
Environmental partnerships	<i>EnvPartner</i>	A binary variable for environmental partnerships that is “equal to 1 if companies report partnerships or initiatives with specialized NGOs, industry organizations, or governmental or supra-governmental organizations that are focused on addressing environmental issues”; ranges from 0 to 1	(ENERDP070)
Control			
Number of employees	<i>LnEmployees</i>	Natural logarithm of the total number of employees	(WC07011)
Firm size	<i>LnSize</i>	Natural logarithm of total assets	(WC02999)
Leverage	<i>Leverage</i>	Total debt divided by total capital (%)	(WC08221)
Return on equity	<i>ROE</i>	Return on equity (%)	(WC08301)
Board size	<i>BoardSize</i>	Total number of board members	(CGBSDP060)

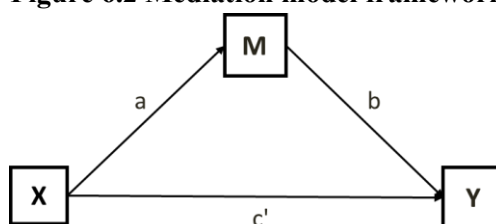
Board independence	<i>BoardIndep</i>	Proportion of independent board members (%)	(CGBSO07V)
Board gender diversity	<i>BoardFemale</i>	Proportion of female board members (%)	(CGBSO03V)
Board industry experience	<i>BoardSkills</i>	Proportion of board members with industry experience (%)	(CGBSO04V)
Environmental management team	<i>EnvTeam</i>	A binary variable for environmental team	(ENRRDP004)
CSR committee	<i>CSRComm</i>	A binary variable for CSR committee or team	(CGVSDP005)

6.3.3 Estimation

Given the panel structure of our data, we employ the causal mediation approach developed by Valeri and VanderWeele (2013), which extends classical mediation analysis to accommodate exposure–mediator interactions within a counterfactual framework (Robins & Greenland, 1992). Unlike the traditional Baron and Kenny (1986) approach, this framework provides formal definitions of natural direct and indirect effects that allow for proper total effect decomposition even when the exposure and the mediator interact in their effect on the outcome (VanderWeele, 2010). This approach has been applied across diverse research settings, including entrepreneurship (Klyver et al., 2020), agricultural economics (Lin et al., 2022), and financial risk analysis (De Novellis et al., 2024).

As depicted in Figure 6.2, the natural direct effect (NDE) captures the policy’s influence on environmental innovation through pathways other than partnerships (path c'), while the natural indirect effect (NIE) captures the portion of the effect operating through the partnership mechanism (paths $a \times b$). The total effect (TE) decomposes additively as $TE = NDE + NIE$, a property that holds even in the presence of exposure–mediator interaction (Valeri & VanderWeele, 2013). Identification of these effects requires standard no-unmeasured-confounding assumptions conditional on measured covariates (VanderWeele & Vansteelandt, 2009). To address these conditions, we include firm fixed effects to absorb time-invariant unobserved heterogeneity, year fixed effects to control for common temporal shocks, and a comprehensive set of time-varying controls. All policy indices are lagged by one year to mitigate reverse causality and simultaneity concerns. Although observational panel designs cannot fully eliminate endogeneity bias, the combination of firm and year fixed effects with lagged policy indices reduces the primary identification threats in this setting. This approach is consistent with established mediation research practice (e.g., Kumar & Operti, 2025; Qiu et al., 2020).

Figure 6.2 Mediation model framework



The estimation requires two regression models corresponding to the continuous outcome and binary mediator case in the appendix of Valeri and VanderWeele (2013). The mediator model specifies the binary environmental partnership variable using logistic regression.

$$\text{logit } P(\text{ENV\_PARTNER}_{i,t} = 1) = \beta_0 + \beta_1 \cdot L\_POLICY_{i,t-1} + \beta'_2 \cdot X_{i,t} + \tau_t$$

This model is estimated using a correlated random effects specification (Wooldridge, 2019), which includes within-firm means of all time-varying covariates as additional regressors to control for time-invariant unobserved heterogeneity while avoiding the incidental parameters problem of fixed-effects logistic regression. The outcome model specifies the environmental innovation score as a linear function of the lagged policy index, the mediator, and their interaction.

$$\begin{aligned} \text{ENV\_INNOV}_{i,t} &= \theta_0 + \theta_1 \cdot L\_POLICY_{i,t-1} + \theta_2 \cdot \text{ENV\_PARTNER}_{i,t} + \theta_3 \\ &\cdot (L\_POLICY_{i,t-1} \times \text{ENV\_PARTNER}_{i,t}) + \theta'_4 \cdot X_{i,t} + \alpha_i + \tau_t \\ &+ \varepsilon_{i,t} \end{aligned}$$

This model is estimated via within-firm fixed-effects linear regression. The interaction term θ_3 captures the extent to which the policy effect on innovation depends on partnership status, and vice versa. The Hausman test ($p < 0.001$) confirms the appropriateness of fixed effects over random effects for this specification. Cluster-robust standard errors at the firm level are employed throughout to account for potential heteroskedasticity and serial correlation within firms. Given that the three policy indices are bounded between 0 and 1 and that the mediator is a binary variable, these predictors enter the models without transformation. In contrast, continuous controls are log-transformed where appropriate, consistent with standard econometric guidelines for functional form (Wooldridge, 2010).

Using the estimated coefficients from both models, the natural effects are computed at the observation level following the closed-form expressions for the continuous outcome–binary mediator case (Valeri & VanderWeele, 2013), as follows.

$$NDE_i = \{\theta_1 + \theta_3 \cdot P(M_i = 1 | a^*, c_i)\} \cdot (a - a^*)$$

$$NIE_i = \{\theta_2 + \theta_3 \cdot a\} \cdot \{P(M_i = 1 | a, c_i) - P(M_i = 1 | a^*, c_i)\}$$

where $P(M_i = 1 | a, c_i)$ denotes the predicted probability of partnership from the mediator model, and $P(M_i = 1 | a^*, c_i)$ is the corresponding counterfactual probability. The contrast compares full policy adoption ($a = 1$) with no adoption ($a^* = 0$) within each policy domain, and population-average effects are obtained by averaging across all firm-year observations. This procedure is implemented separately for each of the three policy indices to examine distinct mediating pathways.

Statistical inference relies on a nonparametric bootstrap with 5,000 replications using cluster resampling at the firm level (Cameron et al., 2008). Both models are re-estimated and effects recomputed on each resampled panel. Mediation is supported when the percentile-based 95% confidence interval for the NIE excludes zero (MacKinnon et al., 2004). When the NIE is significant and the NDE is not, the evidence suggests that the effect operates primarily through the indirect pathway; when both are significant, the effect operates through both the mediated pathway and other channels (VanderWeele, 2015).

6.4 Results

Table 6.3 Descriptive statistics and correlation matrix presents correlations and descriptive statistics for all variables. The environmental innovation score averages 28.567, and environmental partnerships are observed in 49.5% of the firm-year observations. Pairwise correlations among the variables remain below conventional thresholds, with the exception of the two firm-size proxies (number of employees and total assets), whose high correlation is expected given their conceptual overlap. Among the independent variables, the largest correlation is 0.317 (between the human rights-oriented index and the market-oriented index), indicating no multicollinearity concerns. This assessment is confirmed by variance inflation factor (VIF) diagnostics: the maximum value across all substantive variables is 2.67, well below the conventional threshold of 10 (Ryan, 1997), and the mean VIF is 2.01. Table 6.4 shows the distribution of the 3,372 firm-year observations from the consumer discretionary (2,130) and consumer staples (1,242) sectors over the 2015–2024 period.

Table 6.3 Descriptive statistics and correlation matrix

	Variables	Mean	Std. dev.	Min	Max
1	EnvInnov	28.567	31.005	0	99.81
2	Cons-Oriented	0.255	0.231	0	1
3	Mkt-Oriented	0.744	0.368	0	1
4	HR-Oriented	0.679	0.394	0	1
5	EnvPartner	0.495	0.5	0	1
6	LnEmployees	9.367	1.504	4.585	14.291
7	LnSize	15.127	1.37	9.537	20.253
8	Leverage	0.347	0.24	0	1.297
9	ROE	0.204	3.941	-17.07	225.737
10	BoardSize	9.747	2.863	3	26
11	BoardIndep	0.587	0.235	0	1
12	BoardFemale	0.236	0.146	0	0.778
13	BoardSkills	0.52	0.202	0	1
14	EnvTeam	0.513	0.5	0	1
15	CSRComm	0.717	0.45	0	1

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1														
2	0.150*	1													
3	0.080*	0.066*	1												
4	0.320*	0.270*	0.317*	1											
5	0.231*	0.172*	0.149*	0.314*	1										

6	0.189*	0.201*	0.027	0.081*	0.047*	1										
7	0.277*	0.198*	0.055*	0.147*	0.086*	0.767*	1									
8	0.003	0.059*	0.131*	0.049*	0.057*	0.220*	0.224*	1								
9	0	-0.02	0.015	0.009	0.012	0.011	0.022	0.063*	1							
10	0.157*	0.142*	0.119*	0.099*	0.038*	0.282*	0.336*	0.102*	0.016	1						
11	-0.042*	-0.076*	0.406*	0.076*	0.058*	-0.031	-0.029	0.142*	0.03	-0.103*	1					
12	0.064*	0.061*	0.324*	0.290*	0.168*	-0.104*	-0.114*	0.146*	0.02	-0.002	0.454*	1				
13	-0.001	-0.031	-0.105*	-0.114*	0.067*	-0.016	0.025	-0.166*	-0.002	-0.095*	-0.093*	-0.172*	1			
14	0.235*	0.240*	0.191*	0.330*	0.230*	0.143*	0.176*	0.014	-0.02	0.109*	-0.02	0.089*	0.014	1		
15	0.282*	0.278*	0.133*	0.407*	0.308*	0.079*	0.118*	0.037*	0.004	0.110*	-0.009	0.180*	0.013	0.398*	1	

* p < 0.05

Note: Year dummies are not included in this table.

Table 6.4 Number of observations by subsector and year

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Consumer discretionary	128	154	173	198	219	237	251	263	273	234	2,130
Consumer staples	76	88	102	113	125	139	149	156	158	136	1,242
Total	204	242	275	311	344	376	400	419	431	370	3,372

Note: 2014 omitted due to t-1 lags of independent variables

Table 6.5 presents the mediator model estimates, and Table 6.6 presents the outcome model estimates for each policy index. Across all three outcome models, the exposure–mediator interaction term is not statistically significant ($p > 0.10$), indicating that the controlled direct effect and the natural direct effect do not substantially differ across policy types.

In the mediator model, human rights-oriented policies significantly predict environmental partnerships (Model 1: $\beta = 0.826$, $p < 0.01$). In the outcome model (Model 4), when both the policy index and the mediator are included alongside their interaction, environmental partnerships show a significant positive association with environmental innovation ($\theta_2 = 7.575$, $p < 0.01$), while the direct policy coefficient is only marginally significant ($\theta_1 = 3.817$, $p < 0.10$), and the exposure–mediator interaction term is not statistically significant ($\theta_3 = -3.840$, $p > 0.10$). Bootstrap analysis with 5,000 cluster-level replications (see Table 6.7) reveals a significant natural indirect effect ($b = 0.645$, standard error (SE) = 0.273, 95% confidence interval (CI): [0.110, 1.180]). Because the percentile-based confidence interval excludes zero, this result indicates that human rights-oriented policies influence environmental innovation through the environmental partnerships pathway. The natural direct effect is not statistically significant ($b = 2.427$, 95% CI [-1.207, 6.062]), suggesting no evidence of an effect operating through channels other than environmental partnerships. The total effect does not reach statistical significance ($b = 3.072$, 95% CI [-0.563, 6.707]); however, mediation can be present even without a significant total effect in cases of inconsistent mediation (Valeri & VanderWeele, 2013). Notwithstanding this caveat, the mediation analysis results for human rights-oriented policies support Hypothesis 1, as the significant NIE confirms that the effect operates through the environmental partnership pathway. The proportion mediated is not reported because the

total effect does not reach statistical significance, rendering this ratio unreliable (MacKinnon et al., 1995).

The mediation analysis for consumer-oriented policies reveals a significant effect in the mediator model (Model 2: $\beta = 2.138$, $p < 0.01$) and a significant total effect on environmental innovation ($b = 11.431$, 95% CI [2.263, 20.600]). In the outcome model (Model 5), both environmental partnerships ($\theta_2 = 5.846$, $p < 0.01$) and the direct policy effect ($\theta_1 = 10.591$, $p < 0.05$) remain significant, with a non-significant interaction term ($\theta_3 = -3.320$, $p > 0.10$). Bootstrap analysis (see Table 6.7) reveals a statistically significant natural indirect effect ($b = 1.478$, $SE = 0.496$, 95% CI [0.506, 2.451]), indicating that consumer-oriented policies influence environmental innovation through the environmental partnerships pathway. The natural direct effect is also statistically significant ($b = 9.953$, 95% CI [0.908, 18.999]), indicating that these policies additionally affect environmental innovation through channels other than environmental partnerships. These results support Hypothesis 2. The proportion mediated (NIE/TE) indicates that 12.9% of the total effect of consumer-oriented policies on environmental innovation is transmitted through the environmental partnerships pathway.

The mediation analysis results for market-oriented policies do not support Hypothesis 3. Bootstrap analysis (see Table 6.7) reveals no significant natural indirect effect for these policies ($b = 0.565$, $SE = 0.381$, 95% CI [-0.181, 1.311]), as the confidence interval includes zero. Market-oriented policies show neither a significant total effect on environmental innovation ($b = 1.905$, 95% CI [-3.153, 6.963]) nor a significant relationship with environmental partnerships in the mediator model (Model 3: $\beta = 0.689$, $p > 0.10$). Consequently, despite environmental partnerships maintaining their positive association with environmental innovation in the outcome model (Model 6: $\theta_2 = 6.337$, $p < 0.01$), the non-significant natural indirect effect provides no evidence of mediation through this pathway for market-oriented policies.

Table 6.5 Regression estimates for environmental partnerships (mediator model)

	Model 1	Model 2	Model 3
	HR-Oriented	Consumer-Oriented	Market-Oriented
HR-Oriented _{t-1} (H1)	0.826*** (0.305)		
Consumer-Oriented _{t-1} (H2)		2.138*** (0.651)	
Market-Oriented _{t-1} (H3)			0.689 (0.442)
<i>Controls</i>			
LnEmployees	0.221 (0.338)	0.275 (0.331)	0.264 (0.330)
LnSize	1.412*** (0.418)	1.380*** (0.416)	1.423*** (0.416)
Leverage	0.181 (0.817)	0.185 (0.821)	0.111 (0.802)
ROE	0.008 (0.006)	0.009 (0.007)	0.009 (0.007)
BoardSize	0.025 (0.059)	0.028 (0.059)	0.029 (0.058)
BoardIndep	0.723 (0.932)	0.708 (0.936)	0.862 (0.935)
BoardFemale	0.009 (1.088)	0.094 (1.093)	0.180 (1.090)
BoardSkills	1.840*** (0.627)	1.865*** (0.630)	1.852*** (0.622)
EnvTeam	1.308*** (0.270)	1.298*** (0.263)	1.331*** (0.262)

	Model 1	Model 2	Model 3
CSRComm	1.240*** (0.271)	1.247*** (0.271)	1.275*** (0.269)
Constant	-3.835*** (1.174)	-4.336*** (1.158)	-4.318*** (1.153)
Observations	3,372	3,372	3,372

* p < 0.10, ** p < 0.05, *** p < 0.01

Notes: Cluster-robust standard errors in parentheses. CRE logit. Within-firm means included but not shown. Year fixed effects included.

Table 6.6 Regression estimates for environmental innovation (outcome model)

	Model 4	Model 5	Model 6
	HR-Oriented	Consumer-Oriented	Market-Oriented
HR-Oriented _{t-1} (H1)	3.817* (2.295)		
Consumer-Oriented _{t-1} (H2)		10.591** (5.082)	
Market-Oriented _{t-1} (H3)			1.931 (2.886)
<i>Mediator and interaction</i>			
EnvPartner	7.575*** (1.847)	5.846*** (1.574)	6.337*** (2.327)
Policy _{t-1} × EnvPartner	-3.840 (2.429)	-3.320 (5.196)	-1.547 (2.901)
<i>Controls</i>			
LnEmployees	2.882 (1.896)	3.176* (1.901)	2.974 (1.925)
LnSize	1.258 (1.986)	1.330 (1.968)	1.579 (2.023)
Leverage	0.094 (4.596)	-0.119 (4.552)	-0.197 (4.556)
ROE	0.070*** (0.024)	0.074*** (0.025)	0.074*** (0.024)
BoardSize	-0.262 (0.349)	-0.271 (0.346)	-0.259 (0.353)
BoardIndep	1.762 (5.397)	1.596 (5.299)	2.268 (5.374)
BoardFemale	-3.502 (6.275)	-3.812 (6.304)	-3.336 (6.293)
BoardSkills	5.602 (3.502)	5.619 (3.495)	5.493 (3.509)
EnvTeam	4.075*** (1.552)	4.020*** (1.538)	4.257*** (1.534)
CSRComm	4.097** (1.682)	4.060** (1.696)	4.295** (1.691)
Constant	-35.067 (28.054)	-39.413 (27.484)	-41.177 (28.431)
Observations	3,372	3,372	3,372

* p < 0.10, ** p < 0.05, *** p < 0.01

Notes: Cluster-robust standard errors in parentheses. Within-firm fixed effects. Year fixed effects included.

Additionally, several control variables show consistent relationships across the models. In the outcome models (see Table 6.6), return on equity shows a small but statistically significant positive association with environmental innovation (θ ranging from 0.070 to 0.074, $p < 0.01$). The presence of environmental management teams (θ ranging from 4.020 to 4.257, $p < 0.01$) and CSR committees (θ ranging from 4.060 to 4.295, $p < 0.05$) is consistently associated with higher environmental innovation scores. In the mediator models (see Table 6.5), firm size as measured by total assets (β ranging from 1.380 to 1.423, $p < 0.01$), the proportion of board members with industry experience (β ranging from 1.840 to 1.865, $p < 0.01$), environmental management teams (β ranging from 1.298 to 1.331, $p < 0.01$), and CSR committees (β ranging from 1.240 to 1.275, $p < 0.01$) significantly predict the likelihood of environmental partnership engagement.

Table 6.8 shows sector-specific mediation patterns for consumer discretionary firms ($n = 2,130$). The bootstrap confidence intervals reveal that for human rights-oriented policies, the natural indirect effect is statistically significant (NIE = 0.799, 95% CI [0.037, 1.562]), while the natural direct effect is not (NDE = 2.342, 95% CI [-2.385, 7.070]), indicating that the effect operates through the

environmental partnership pathway. For consumer-oriented policies, both the natural indirect effect (NIE = 1.638, 95% CI [0.394, 2.881]) and the natural direct effect (NDE = 13.354, 95% CI [2.217, 24.490]) are statistically significant, indicating that the effect operates both through environmental partnerships and through other channels. The proportion mediated indicates that 10.9% of the total effect is transmitted through the environmental partnerships pathway. For market-oriented policies, the natural indirect effect is not statistically significant (NIE = 0.419, 95% CI [−0.591, 1.430]), providing no evidence of mediation. These patterns mirror the full-sample results and provide evidence that the partnership-mediated mechanism for human rights-oriented and consumer-oriented policies operates within the consumer discretionary sector, partially supporting Hypothesis 4a.

Table 6.7 Mediation results for full sample (H1–H3)

Policy Index	Total Effect			Natural Direct Effect			Natural Indirect Effect			Mediation Evidence
	b	Std. Err.	95% CI	b	Std. Err.	95% CI	b	Std. Err.	95% CI	
Human rights-oriented (H1)	3.072	1.855	(−0.563, 6.707)	2.427	1.854	(−1.207, 6.062)	0.645	0.273	(0.110, 1.180)	Indirect only
Consumer-oriented (H2)	11.431	4.678	(2.263, 20.600)	9.953	4.615	(0.908, 18.999)	1.478	0.496	(0.506, 2.451)	Both direct and indirect
Market-oriented (H3)	1.905	2.581	(−3.153, 6.963)	1.340	2.566	(−3.689, 6.370)	0.565	0.381	(−0.181, 1.311)	No evidence

Notes: Bootstrap with 5,000 cluster-level replications. Percentile-based 95% confidence intervals.

Table 6.9 presents results for the consumer staples sector (n = 1,242). The bootstrap confidence intervals reveal no significant natural indirect effects for any of the three policy types: human rights-oriented policies (NIE = 0.397, 95% CI [−0.237, 1.030]), consumer-oriented policies (NIE = 1.128, 95% CI [−0.319, 2.574]), and market-oriented policies (NIE = 0.465, 95% CI [−0.432, 1.361]). Because all confidence intervals include zero, these results provide no evidence that the partnership-mediated pathway operates within the consumer staples sector, supporting Hypothesis 4b. Table 6.10 summarizes the empirical findings for all four hypotheses.

Table 6.8 Mediation results for consumer discretionary sector firms (H4a)

Policy Index	Total Effect			Natural Direct Effect			Natural Indirect Effect			Mediation Evidence
	b	Std. Err.	95% CI	b	Std. Err.	95% CI	b	Std. Err.	95% CI	
Human rights-oriented	3.142	2.453	(−1.665, 7.949)	2.342	2.412	(−2.385, 7.070)	0.799	0.389	(0.037, 1.562)	Indirect only
Consumer-oriented	14.991	5.79	(3.643, 26.340)	13.354	5.682	(2.217, 24.490)	1.638	0.634	(0.394, 2.881)	Both direct and indirect
Market-oriented	4.312	3.087	(−1.737, 10.362)	3.893	3.131	(−2.244, 10.029)	0.419	0.516	(−0.591, 1.430)	No evidence

Notes: Bootstrap with 5,000 cluster-level replications. Percentile-based 95% confidence intervals.

Table 6.9 Mediation results for consumer staples sector firms (H4b)

Policy Index	Total Effect			Natural Direct Effect			Natural Indirect Effect			Mediation Evidence
	b	Std. Err.	95% CI	b	Std. Err.	95% CI	b	Std. Err.	95% CI	
Human rights-oriented	4.398	2.797	(-1.084, 9.879)	4.001	2.821	(-1.529, 9.530)	0.397	0.323	(-0.237, 1.030)	No evidence
Consumer-oriented	2.704	6.739	(-10.506, 15.913)	1.576	6.758	(-11.670, 14.821)	1.128	0.738	(-0.319, 2.574)	No evidence
Market-oriented	-2.398	4.105	(-10.442, 5.647)	-	4.019	(-10.740, 5.016)	0.465	0.458	(-0.432, 1.361)	No evidence

Notes: Bootstrap with 5,000 cluster-level replications. Percentile-based 95% confidence intervals.

Table 6.10 Summary of empirical results

Hypotheses	Evidence	Results
H1 The adoption of human rights-oriented policies promotes environmental partnerships and subsequently enhances environmental innovation.	Significant indirect effect through partnerships.	Supported
H2 The adoption of consumer-oriented policies promotes environmental partnerships and subsequently enhances environmental innovation.	Significant indirect and direct effects.	Supported
H3 The adoption of market-oriented policies promotes environmental partnerships and subsequently enhances environmental innovation.	No significant effects.	Not supported
H4a For consumer discretionary firms, environmental partnerships mediate the relationship between organizational policies and environmental innovation.	Significant indirect effects for human rights- oriented and consumer-oriented policies only.	Partially supported
H4b For consumer staples firms, environmental partnerships do not mediate the relationship between organizational policies and environmental innovation.	No significant indirect effects.	Supported

6.4.1 Robustness checks

To validate our findings, we replicated the mediation analysis using the Baron and Kenny (1986) three-step procedure, which has been widely employed in management and innovation research (e.g., Martínez-Alonso et al., 2025; Miremadi et al., 2023; Qiu et al., 2020). This approach estimates the total effect of each policy index on environmental innovation (path c), the effect on the mediator (path a), and the direct effect controlling for the mediator (path c'). The indirect effect is computed as the product of coefficients ($a \times b$). Because this specification employs linear probability models for the binary mediator within a fixed-effects framework, it does not require within-firm variation in the mediator variable. This yields an expanded sample of 10,635 firm-year observations (1,829 firms). Statistical inference relies on a nonparametric bootstrap with 5,000 cluster-level replications (Cameron et al., 2008). Mediation is deemed significant when the percentile-based 95% confidence interval for the indirect effect excludes zero (MacKinnon et al., 2004).

The results for the full sample (see Appendix F) are consistent with our main findings. Human rights-oriented policies show a significant indirect effect ($b = 0.41$, 95% CI [0.120, 0.701]) consistent with

complete mediation, consumer-oriented policies exhibit a significant indirect effect ($b = 0.735$, 95% CI [0.140, 1.329]) consistent with partial mediation, and market-oriented policies show no significant mediation ($b = 0.138$, 95% CI [-0.197, 0.474]). The sectoral analyses for consumer discretionary firms (see Appendix G) and consumer staples firms (see Appendix H) similarly confirm the patterns observed in the primary analysis, with significant indirect effects for human rights-oriented and consumer-oriented policies in the consumer discretionary sector and no mediation in the consumer staples sector.

6.5 Discussion and Conclusion

This study examines whether environmental partnerships mediate the effects of organizational policies on environmental innovation using panel data from 454 consumer sector firms spanning 2014–2024. Our results reveal differential mediation patterns: an indirect-only effect for human rights-oriented policies, direct and indirect effects for consumer-oriented policies, and no evidence of mediation for market-oriented policies. These findings suggest that legitimization signals function more effectively when directed toward socially proximate stakeholders who share direct relationships with firms rather than toward more distant regulatory audiences.

The indirect-only effect for human rights-oriented policies indicates that these policies influence environmental innovation exclusively through partnership formation. Despite their internal orientation toward employee welfare, human rights-oriented policies serve as signals that attract environmental partners, given that NGOs and other collaborators screen for evidence of ethical labor practices when selecting potential allies (Ullah et al., 2022). We extend this finding by showing that the legitimacy conferred by such policies enables partnership formation, which in turn drives environmental innovation. For firms, this implies that adopting human rights-oriented policies without actively pursuing partnerships is unlikely to yield environmental innovation gains, since partnership formation constitutes the sole operative pathway. In contrast, consumer-oriented policies reveal dual pathways to environmental innovation, as direct and indirect effects are both statistically significant. Consumer-oriented policy signals thus operate through multiple channels, generating environmental innovation both internally (through product safety and quality improvements) and externally (through collaborative relationships). This pattern may reflect the dual role of consumer-oriented policies in operational risk management and stakeholder engagement.

The absence of a significant indirect effect for market-oriented policies suggests that broad regulatory compliance signals fail to mobilize cross-sector collaborations for innovation. These null findings align with Haack and Rasche's (2021) paradox perspective, according to which market-oriented policies may gain acceptance through accessible compliance requirements but fail to signal the substantive commitment that environmental partners seek. Additionally, the temporal structure of our one-year lag specification may partly account for these results, as market-oriented policies may

require longer maturation periods to build trust and credibility with environmental partners (Liu et al., 2021). Whereas human rights-oriented and consumer-oriented policies generate more immediately recognizable legitimacy signals, market-oriented policies addressing competition and anti-bribery may require extended field-level diffusion before becoming effective partnership facilitators (Altura et al., 2021).

The subsector analysis reveals that environmental partnerships do not mediate the relationship between organizational policies and environmental innovation for consumer staples firms, supporting Hypothesis 4b. This null mediation pattern across all three policy types contrasts with the consumer discretionary results (Hypothesis 4a) and reveals a boundary condition: legitimization signals require stakeholder attention to function effectively. Consumer staples firms operate in low-visibility contexts characterized by necessity-driven demand and standardized products, which attenuate stakeholder scrutiny and thereby weaken the signaling mechanism through which policies attract environmental partners. Importantly, partnerships retain their positive effects on environmental innovation when present, indicating that mediation failure stems from the inability of policies to attract partners in low-attention environments rather than from diminished partnership effectiveness. These sectoral differences could alternatively reflect differences in regulatory intensity or business model characteristics. However, if regulatory exposure were the primary driver, market-oriented policies should exhibit mediation in the more heavily regulated subsector, yet they show no mediation in either context. Similarly, the persistence of partnership effectiveness in both subsectors weakens business model explanations, localizing the failure in the signaling stage. Consumer-facing industries characterized by high product visibility and stakeholder activism likely amplify legitimization effects (Adomako & Tran, 2025), whereas contexts characterized by attenuated consumer scrutiny may require alternative mechanisms for partnership formation.

6.5.1 Theoretical implications

Our differential mediation patterns suggest that signaling effectiveness hinges on stakeholder proximity, conceptualized as closeness to the evaluating audience (Spanuth & Urbano, 2024), rather than on regulatory breadth. Signals aimed at stakeholders possessing power, legitimacy, and urgency (Mitchell et al., 1997; Suchman, 1995) are more likely to trigger partnership formation, whereas broad market-compliance signals fail to activate this collaborative mechanism. These results also reveal a boundary condition for the institutional approach (North, 1990). Although alignment with formal institutions explains policy adoption across all three categories, such institutional conformity does not predict effectiveness in generating collaborations. Rather, institutional conformity appears necessary but insufficient for partnership formation, consistent with evidence that regulative institutions require complementary normative and cultural-cognitive legitimation to be effective (Urbano et al., 2026).

These findings extend legitimacy theory (Suchman, 1995) by demonstrating that signaling effectiveness varies systematically with the proximity of the evaluating audience. This pattern reveals what Suddaby et al. (2017) characterize as legitimacy-as-process, whereby legitimation occurs through interactive mechanisms between organizations and evaluating audiences. Because these audiences differ in their capacity to verify organizational signals depending on their relational position, the same policy can generate divergent legitimacy outcomes. In this regard, the exclusively indirect pathway observed for human rights-oriented policies underscores the centrality of collaborative mechanisms for internally oriented policy signals, as their innovation effect depends entirely on the legitimation–partnership channel.

Beyond direct policy–innovation relationships examined in previous research (Elmawazini et al., 2022), our mediation framework reveals that certain policies require collaborative channels to generate innovation effects. This finding extends the open innovation framework (Chesbrough, 2003b) by identifying organizational policy adoption as a previously unexplored antecedent of external knowledge acquisition. Whereas open innovation presupposes that collaborative relationships exist, our results demonstrate that specific legitimacy cues are required to activate these mechanisms. This supports the notion that firms can leverage internally oriented policies to build their perceived worthiness as alliance partners (Dacin et al., 2007), thereby attracting environmental collaborators through the legitimation process rather than through direct resource provision.

6.5.2 Practical and policy implications

These findings carry implications for both environmental and innovation policy design. The absence of mediation for market-oriented policies suggests that regulatory frameworks emphasizing competition compliance and anti-corruption standards, while valuable for market integrity, may prove insufficient for stimulating environmental innovation through collaborative channels. Conversely, the significant mediation effects for human rights-oriented and consumer-oriented policies indicate that governments seeking to promote green innovation may achieve greater impact by incentivizing the adoption of labor standards and consumer protection measures through instruments such as tax credits for certified ethical labor practices, preferential access to green finance for firms meeting consumer welfare benchmarks, or supply chain due diligence requirements that reward formalized human rights commitments. Sustainable finance frameworks and ESG assessment criteria could similarly weight these stakeholder-proximate policies more heavily when evaluating firms' environmental innovation potential.

Innovation grant programs and public procurement frameworks could incorporate formal human rights and consumer welfare policies as eligibility or evaluation criteria. Governments may also establish matching programs that connect firms demonstrating strong stakeholder engagement records with environmental NGOs and research institutions seeking corporate partners. The

differential mediation patterns across consumer discretionary and consumer staples sectors further suggest that such instruments may prove more effective in high-visibility industries, where stakeholder scrutiny amplifies legitimation signals. In low-visibility sectors, by contrast, policy interventions may need to facilitate environmental partnership formation directly (for instance, through sector-specific intermediary platforms or mandatory environmental collaboration disclosure requirements) rather than relying on firm-level policy signals to attract collaborators. These interventions present implementation challenges, particularly verification difficulties that could invite symbolic rather than substantive policy adoption. Such challenges warrant careful program design and monitoring mechanisms.

6.5.3 Limitations and future research

This study has several limitations that suggest directions for future research. First, while fixed-effects specifications and lagged independent variables mitigate endogeneity, residual concerns remain. Time-varying confounders, such as leadership transitions or strategic reorientations, could simultaneously influence policy adoption, partnership formation, and innovation outcomes. Similarly, environmental partnerships may be co-determined with innovation, and persistently innovative firms may both attract partners and adopt policies, generating selection dynamics that lagged specifications attenuate but do not eliminate. Future research could employ instrumental variable approaches or difference-in-differences designs exploiting exogenous regulatory shocks to strengthen causal identification.

Second, our reliance on binary operationalizations introduces measurement limitations along multiple dimensions. The environmental partnerships variable may obscure heterogeneity in collaboration intensity, mechanisms, duration, and quality, which could affect mediation strength. Future research leveraging Open Social Innovation approaches (Pacheco et al., 2025) could explore whether partnerships employing exploration-oriented orchestration models mediate policy effects differently than those using empowerment-oriented models. Similarly, although the policy indices partially address binary measurement concerns by aggregating three component indicators into a continuous composite, these variables capture formal adoption but cannot distinguish substantive implementation from symbolic adoption, which constitutes a distinction central to legitimacy theory. Relatedly, our composite indices do not differentiate between mandatory regulatory compliance and voluntary adoption exceeding legal minimums across the countries in our sample. Subsequent studies could investigate whether voluntary adoption moderates the partnership-mediated pathway, as partners may differentially value policies signaling genuine commitment over baseline compliance. Additionally, triangulating ESG data with primary data collection or employing process tracing methods could directly test whether partners explicitly evaluate policies during partner selection.

Third, the unbalanced panel structure, although providing broad coverage, may introduce selection effects if firm entry and exit correlate with unmeasured innovation determinants. However, the use of lagged independent variables and fixed-effects specifications mitigates these concerns, and the consistency of patterns across multiple policy types strengthens confidence in the core findings. Additionally, our sample of LSEG-covered listed firms exhibits selection toward larger, more transparent organizations. These findings may not generalize to small- and medium-sized enterprises or private firms facing distinct legitimation dynamics and resource constraints. Fourth, our consumer sector sample limits generalizability to contexts with high stakeholder visibility. Indeed, the subsector analysis demonstrates that mediation patterns vary substantially even within the consumer sector, as legitimation effectiveness depends on the intensity of stakeholder scrutiny. These within-sector differences suggest that extrapolation to other sectors requires careful consideration of each sector's stakeholder dynamics, visibility conditions, and predominant legitimation channels. Future research should test whether legitimation-based mediation mechanisms operate in low-visibility business-to-business (B2B) industries or extractive sectors where regulatory scrutiny, rather than consumer activism, predominates. Moreover, direct measurement of stakeholder evaluative attention through survey instruments or media salience indicators would allow for more precise identification of the mechanisms underlying sectoral differences, beyond the categorical sector comparison employed here.

Fifth, although we frame our findings through legitimacy theory, alternative mechanisms warrant consideration. For example, from a resource-based perspective (Barney, 1991), firms capable of adopting formal policies may also possess complementary resources that independently facilitate partnerships and innovation, potentially confounding the legitimation pathway. Moreover, our mediation design captures the statistical pathway from policies through partnerships to innovation but does not directly observe the legitimation process, which is inferred from differential mediation patterns rather than measured through direct indicators of perceived legitimacy. Future research employing process tracing or survey measures of perceived organizational legitimacy could both distinguish legitimation from resource-based explanations and examine how legitimacy evaluations operate within partnership formation.

Sixth, this study is constrained by the variables available in the LSEG Workspace database, limiting exploration of additional organizational moderating factors. The consistent relationships observed for several control variables suggest that human capital and corporate governance mechanisms may moderate partnership-mediated pathways, warranting further investigation. Additionally, the LSEG Environmental Innovation score aggregates input-, process-, and product-level outcomes into a single composite measure (LSEG, 2024). Although this operationalization is consistent with prior research (Albitar, Borgi, et al., 2023; Konadu et al., 2022) and captures the overall environmental innovation

capacity of firms, it does not allow for the identification of the specific innovation dimensions through which legitimization mechanisms operate. For instance, the partnership-mediated pathway may more strongly influence process-oriented innovations, where collaborative knowledge exchange is directly relevant, than product-level eco-design outcomes. Future research employing disaggregated innovation measures could provide more granular evidence on these differentiated mediation pathways.

Seventh, our within-firm specification absorbs time-invariant country characteristics but cannot capture how institutional factors moderate mediation pathways across contexts. Although the sample spans 45 countries with diverse levels of economic development, the number of firms per country limits the feasibility of regional or development-level subsample analyses with sufficient statistical power. Institutional arrangements may produce distinct sustainability effects depending on the context (Maaßen et al., 2025). For example, informal institutions such as cultural dimensions may condition the effectiveness of corporate sustainability commitments in generating environmental innovation across countries (Ullah et al., 2022). Future research employing multilevel designs or focusing on specific institutional contexts could examine these moderating mechanisms and their boundary conditions.

Chapter 7

General Conclusions

7 General Conclusions

7.1 Main Conclusions

The main objective of this thesis was to analyze the determinants of Open Social Innovation (OSI) across multiple levels of analysis. OSI is conceptualized as the orchestration of distributed actors (Gegenhuber & Mair, 2024) around shared social or environmental purposes, and its ecosystem logic spans individual, organizational, and institutional levels rather than a single one. Because no single framework addresses all three levels, we draw on human capital theory (Becker, 1964) and the resource-based view of the individual entrepreneur (Alvarez & Busenitz, 2001) at the micro level; the institutional approach (North, 1990), emphasizing informal institutions (Hofstede et al., 2010), at the macro level; and the hybrid organizing (Battilana & Lee, 2014) and legitimacy literatures (Suchman, 1995) at the meso level. We apply each framework where it is theoretically most appropriate, jointly delineating the multilevel structure of OSI determinants.

Our central finding is that OSI determinants do not operate uniformly. They are asymmetric across resource types, conditional on organizational and institutional contexts, and selective with respect to the partnership signals that prompt collaboration. In Chapter 2, we consolidate a fragmented literature into an ecosystem-based approach organized around antecedents, processes, relationships, and consequences, demonstrating that OSI bridges firm-centric open innovation with social innovation while moving beyond traditional sector-based identities through functional roles. In Chapter 3, we provide the theoretical justification for this ecosystem perspective by demonstrating that four structural requirements of complex social problems jointly demand a multi-stakeholder configuration: distributed agency, constitutive framing, temporal orchestration, and cross-phase scaling. Our empirical analysis subsequently tests, at the micro and meso levels, where the determinants of OSI-relevant processes and outcomes operate within this multi-stakeholder configuration.

Across the three empirical chapters, we identify a consistent cross-level asymmetry: experience-based human capital and stakeholder-proximate organizational policies directly predict OSI-relevant outcomes, whereas formal education, financial capital, and market-oriented policies exhibit effects only under specific enabling conditions, or fail to produce significant effects. Specifically, in Chapter 4, we find that founders' specific human capital, operationalized as managerial experience, predicts OSI orientation across 11,953 early-stage social ventures. Conversely, general human capital, operationalized as formal education, exerts no significant direct effect and becomes a significant predictor only when the venture adopts a for-profit form. Furthermore, in Chapter 5, we extend this asymmetry to the broader resource bundle among 9,642 social entrepreneurs nested in 47 countries. Human capital and social capital, operationalized as co-ownership, positively predict product

innovation novelty, whereas financial capital, operationalized as household income, shows no significant association with the outcome. Finally, in Chapter 6, we extend this pattern to the organizational level. In a panel of 454 consumer-sector firms across 45 countries, human rights-oriented and consumer-oriented policies foster cross-sector environmental partnerships and translate into environmental innovation through an indirect-only or complementary mediation pathway; market-oriented policies, by contrast, do not activate the partnership mechanism.

These mechanisms are, moreover, highly contingent upon boundary conditions. For instance, the effect of founders' general human capital observed in Chapter 4 is conditional on profit orientation: education translates into OSI orientation in for-profit ventures but not in nonprofits. The effect of human capital in Chapter 5 is conditional on national culture: individualism amplifies the returns to both education and entrepreneurial experience, whereas power distance and uncertainty avoidance attenuate them. Social and financial capital, by contrast, remain unmoderated by cultural dimensions. Similarly, the effect of organizational policies in Chapter 6 is conditional on sectoral visibility: the partnership-mediated pathway operates in the highly scrutinized consumer discretionary sector but does not hold in the lower-visibility consumer staples sector. Consequently, context is not a peripheral factor that modulates effect sizes; rather, it conditions whether OSI determinants operate.

Viewed through the institutional approach (North, 1990), these boundary conditions point to a consistent pattern in how formal and informal institutions enable or constrain OSI across the levels of analysis examined. Informal institutions condition the conversion of individual resources at the macro level, as the cultural moderation documented in Chapter 5 demonstrates. The meso-level conditions examined in Chapters 4 and 6, namely the resource acquisition pressures and stakeholder expectations attached to organizational form (Townsend & Hart, 2008) and the evaluator scrutiny that sector visibility attracts (Bitektine, 2011; Suchman, 1995), in turn determine whether latent resources and policy signals exert any effect. Formal institutions, by contrast, are held constant by design rather than modeled directly, most explicitly through the country fixed effects in Chapter 6; their enabling or constraining role therefore delimits the scope of our findings and motivates part of the future research outlined in Section 7.3.

Collectively, findings refine three assumptions in adjacent literatures. First, we qualify the transferability of commercial open innovation models to social settings, demonstrating that the credentials and signaling mechanisms that drive collaboration in firm-centric research (Bogers et al., 2017; Chesbrough, 2003a) do not operate symmetrically across organizational forms in social ventures. Second, we qualify the proposition that resource endowments translate uniformly into innovation outcomes, by establishing differential institutional contingencies across human capital components and by documenting a non-significant association between personal financial capital and innovation novelty in social entrepreneurs. Third, we challenge the institutional assumption that

policy adoption suffices to confer legitimacy by showing that institutional alignment activates the partnership-mediated pathway only when stakeholder proximity and evaluator scrutiny are present. The overall implication is that the inputs, returns, and signals of commercial open innovation cannot be transferred to OSI settings under uniform cross-domain assumptions. Finally, Table 7.1 summarizes the main findings of the study.

Table 7.1 Thesis summary and main results

Chap.	Theoretical framework(s)	Variables	Method and data	Main results
2	Open innovation; Social innovation; Systems theory.	Not applicable (Systematic literature review).	Method: SLR (PRISMA) combining bibliometric mapping (co-citation/co-occurrence networks) and content analysis. Data: 115 peer-reviewed WoS Core Collection articles up to Aug 2024.	Consolidates fragmented OSI literature into an ecosystem-based intellectual map across micro, meso, and macro levels. Proposes a role-based ecosystem framework that transcends rigid sector-based identities, classifying collaborative initiatives into exploration- and empowerment-oriented models.
3	Open social innovation	Not applicable (Conceptual theory adaptation).	Not applicable (Conceptual theory adaptation).	Conceptualizes OSI as a distinct multi-stakeholder configuration that simultaneously satisfies four structural requirements of complex problems: distributed agency, constitutive framing, temporal orchestration, and cross-phase scaling. Sharpens conceptual boundaries by demonstrating that adjacent phenomena only fulfill subsets of these requirements.
4	Human capital theory	IVs: General HC (education); Specific HC (managerial experience). DV: OSI orientation (joint probability of open and innovation orientation). Moderator: Profit orientation (for-profit vs. nonprofit).	Method: Bivariate probit model with maximum likelihood estimation and average marginal effects. Data: 11,953 early-stage social ventures across 157 countries (2013–2019, GALI database).	Specific human capital exhibits a direct positive effect on OSI orientation, whereas general human capital yields no significant main effect. However, profit orientation positively moderates the effect of general human capital: formal education becomes a significant antecedent of collaborative orientation exclusively in for-profit ventures, functioning as a latent resource activated by market-signaling mechanisms.
5	Resource-based theory (individual-level); Institutional approach (informal institutions).	IVs: General HC (education); Specific HC (entrepreneurial experience); Social capital; Financial capital. DV: Innovation novelty. Moderators: Individualism, Masculinity, Power distance, Uncertainty avoidance.	Method: Multilevel mixed-effects ordered logistic regression with cross-level interactions. Data: 9,642 social entrepreneurs nested in 47 countries (2021–2023, GEM & Hofstede).	Human and social capital positively predict innovation novelty, while financial capital yields no significant effect. Cultural moderation is highly asymmetric: individualism amplifies human capital returns, whereas power distance and uncertainty avoidance severely attenuate them. Crucially, the effects of social and financial capital remain institutionally invariant, demonstrating that individual resources do not translate into novelty uniformly.

6	Legitimacy theory; Institutional approach.	IVs: Org. policies (Human rights, Consumer, Market indices). DV: Environmental innovation. Mediator: Environmental partnerships. Moderator: Sector visibility (Discretionary vs. Staples).	Method: Causal mediation framework (Valeri & VanderWeele, 2013) via fixed-effects linear and correlated random-effects logistic regressions. Data: 3,372 firm-year observations from 454 consumer-sector firms in 45 countries (2014–2024, LSEG database).	Human rights policies yield an indirect-only effect on environmental innovation, while consumer policies exhibit complementary mediation through cross-sector partnerships. Market-oriented policies have no effect. Furthermore, these mediation pathways operate exclusively under intense scrutiny (high-visibility discretionary sector) and vanish in low-visibility contexts. Consequently, institutional conformity alone is insufficient; rather, legitimation requires stakeholder proximity.
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Notes: IV, independent variable; DV, dependent variable; SLR, systematic literature review; GALI, Global Accelerator Learning Initiative; GEM, Global Entrepreneurship Monitor; LSEG, London Stock Exchange Group; HC, human capital.

Three main conclusions follow from this thesis. The first is that OSI is best understood as an ecosystem-based organizing form whose theoretical foundation rests on the structural requirements of complex social problems rather than on extensions of focal-organization logic, a position the conceptual chapters theoretically defend, and the empirical chapters subsequently operationalize across multiple levels of analysis. The second is that the micro and meso determinants of these collaborative outcomes are conditional and asymmetric, such that policies and programs designed under uniform assumptions about resources, signals, and forms are likely to be misaligned with the contexts they target. The third is that OSI cannot be fully understood through isolated theoretical lenses, since its core dynamics emerge across levels of analysis. As examined in this thesis, these articulations involve the distinct mechanisms that link individual founders to organizational forms, resources to cultural environments, and policies to sectoral visibility.

7.2 Implications

This thesis offers several theoretical contributions that fall into two complementary categories. The first category addresses the OSI literature directly and advances scholarship beyond the focal-organization framing of Chesbrough and Di Minin (2014). In Chapter 2, we consolidate the fragmented OSI literature into an ecosystem-based framework organized around antecedents, processes, relationships, and consequences. In Chapter 3, we ground this ecosystem lens in the structural requirements of complex social problems rather than in descriptive catalogues of actors or role typologies. The second category refines established theoretical frameworks across the empirical chapters. In Chapter 4, we extend the hybrid organizing literature (Battilana & Lee, 2014; Townsend & Hart, 2008) by identifying a mechanism through which profit orientation activates latent founder resources, providing the market-based signaling structures that traditional nonprofit forms lack. In Chapter 5, we extend human capital theory (Becker, 1964) by identifying differential institutional contingencies across its components, with the specific component exhibiting greater cultural contingency than the general (formal-education) component. Within the same chapter, we further

develop the resource-based view of the individual entrepreneur (Alvarez & Busenitz, 2001) along two dimensions, resource type and institutional context, demonstrating that the translation of individual resource bundles into innovation outcomes is heterogeneous and culturally contingent. At the organizational level, in Chapter 6, we show that legitimacy, as theorized by Suchman (1995), is contingent on audience proximity rather than operating as a uniform mechanism. Consequently, organizational policy adoption functions as an antecedent of external knowledge acquisition rather than as a broad legitimization signal.

Our methodological implications follow from each empirical design. In Chapter 2, we provide a replicable template for emerging fields by combining bibliometric mapping with multilevel qualitative content analysis. In Chapter 4, we jointly estimate the probability of openness and innovation orientation through a bivariate probit specification. This approach operationalizes OSI orientation as a joint probability not previously employed in OSI research, exploiting GALI's pre-decision observation window to mitigate the selection bias that typically affects accelerator and open-innovation studies. Furthermore, in Chapter 5, we jointly model individual and country-level variance through a multilevel mixed-effects ordered logistic regression with cross-level interactions on a three-category ordinal novelty variable. This design enables large-scale cross-national testing of social innovation hypotheses previously examined with smaller or localized datasets. Finally, in Chapter 6, we adapt the Valeri and VanderWeele (2013) causal mediation framework to panel data with a binary mediator and continuous outcome through a correlated random-effects logit specification with Mundlak within-group means. This procedure offers a model for partnership-mediated analyses that improves upon the linear three-step approach (Baron & Kenny, 1986) prevailing in entrepreneurship mediation research.

Additionally, our empirical findings carry several practical implications. Accelerators, incubators, and other intermediaries that select early-stage social ventures should prioritize founders' specific human capital over formal educational credentials in their evaluation criteria, particularly for nonprofit applicants. Impact investors, in turn, can treat management experience as a useful indicator when assessing the likelihood that early-stage teams will engage in OSI. Accelerators and incubators should also prioritize support for team formation, including arrangements that broaden co-ownership, over direct financial transfers to founders. Because ventures with three or more founders exhibit higher OSI orientation than solo-founder ventures, entrepreneurship support organizations could foster networking among prospective founders prior to venture creation. The observed gender disparity in OSI orientation also warrants targeted measures within accelerator programs, such as dedicated cohorts for women-led social ventures and a systematic review of selection criteria for potential bias. For philanthropic funders, the positive association between grant receipt and OSI engagement suggests that grant allocation could be coordinated with accelerator participation,

whether through dedicated funding lines or by prioritizing applicants prepared to engage in collaborative initiatives.

Policymakers, philanthropies, and multilateral organizations operating across cultural contexts should account for the institutional contingency of program resources when comparing social entrepreneurship support across countries. Specifically, experience-based interventions such as mentoring yield weaker outcomes in high-power-distance and high-uncertainty-avoidance environments unless paired with structural elements that lower the cultural cost of deviating from established practice, including regulatory sandboxes, protected pilot environments, and horizontal peer-to-peer formats. Conversely, education-based programs retain a positive baseline effect across the cultural ranges examined and are therefore the more transferable intervention. Comparative evaluative frameworks that overlook which resources a program supplies risk attributing failure to programmatic flaws when the underlying issue is contextual mismatch. In such settings, collective mechanisms such as cooperatives and sector-wide associations may account for a larger share of innovation activity than individual-level provision alone.

At the organizational level, when evaluating a firm's potential for collaborative environmental innovation, ESG raters, sustainable finance analysts, and corporate sustainability officers should assign greater importance to stakeholder-proximate policies than to generic market-oriented compliance signals. Policy instruments that operationalize this distinction include tax credits conditional on certified labor standards, preferential access to green finance for firms meeting consumer welfare criteria, and supply chain due diligence requirements that reward formalized human rights commitments. Innovation grant programs and public procurement frameworks could similarly incorporate human rights and consumer welfare policies among their eligibility criteria. In low-visibility sectors such as consumer staples, public agencies seeking environmental innovation outcomes should rely on direct firm-NGO matching, sector-specific intermediaries, or mandatory disclosure of environmental collaborations rather than on signaling mechanisms that depend on stakeholder scrutiny. Because these instruments raise verification challenges that may invite symbolic rather than substantive adoption, their design warrants careful monitoring.

7.3 Limitations and Future Research

Finally, this subsection identifies the principal limitations of the thesis, together with the research directions they suggest. The first limitation concerns the operationalization of OSI itself. The empirical chapters approximate OSI through indirect proxies rather than through direct observation of the multi-stakeholder ecosystem configuration theorized in Chapter 3, so the four structural requirements (distributed agency, constitutive framing, temporal orchestration, and cross-phase scaling) remain theoretically articulated but empirically untested. Longitudinal ecosystem studies that combine process tracing with initiative-level social-network analysis across comparable cases

would test whether these requirements are jointly satisfied in practice and how role distributions evolve over an initiative's life cycle. Such testing is essential, since OSI's defining theoretical claim, that the simultaneous satisfaction of these four requirements distinguishes the phenomenon from adjacent forms of innovation, can only be evaluated at the ecosystem level. A second, related limitation concerns broader measurement constraints across our empirical analyses, since several core constructs are operationalized through proxies constrained by the availability of secondary databases. Future research could address these gaps jointly by employing primary surveys that triangulate granular resource attributes with objective product and beneficiary-reach indicators, utilizing panel data to capture partnership intensity and disaggregated innovation types, and integrating configurational methods (such as fsQCA) with subnational cultural and tight-loose indices.

A third limitation concerns the uneven treatment of macro-level institutions across the study. For example, Chapter 5 incorporates informal institutions through Hofstede's cultural dimensions but does not test formal ones, while Chapter 6 includes country fixed effects, which by construction preclude the estimation of macro-institutional moderators of the partnership-mediated pathway. Cross-national multilevel work integrating formal institutional measures (such as rule of law, intellectual-property regimes, and social-economy regulation) with informal institutional variation would extend the cross-level moderation logic of Chapter 5 to the firm-level mediation logic of Chapter 6 and address the macro-level gap identified in Chapter 3. More broadly, our empirical design applies micro, meso, and macro frameworks in parallel rather than jointly; consequently, three-level models that combine individual founders, organizational forms, and national institutions would establish whether the asymmetric effects of resources observed across the analyses reflect cumulative or independent contingencies.

A fourth limitation concerns the literature base of Chapter 2, which is restricted to peer-reviewed articles indexed in the Web of Science (WoS) Core Collection and published in English. Although this strategy maximizes the retrieval of high-impact work within a stable scientific record, it underrepresents OSI initiatives developed outside Anglophone management scholarship. Systematic reviews drawing on databases beyond WoS and on non-English literatures would test the applicability of the conceptual map to OSI initiatives disseminated through other scholarly channels.

Beyond these conceptual concerns, our empirical analyses share two methodological limitations regarding inference. First, none of the models conclusively establishes causality. Chapters 4 and 5 are cross-sectional, and although Chapter 6 mitigates time-invariant unobserved heterogeneity through year fixed effects and Mundlak within-group means, time-varying confounders (such as evolving founder networks, leadership transitions, or unobserved strategic repositioning) cannot be ruled out. Longitudinal cohort designs that track social ventures across formation and scaling stages,

combined with instrumental-variable approaches exploiting exogenous variation in profit orientation (Chapter 4) or in policy adoption (Chapter 6), would strengthen identification. Second, the mediation in Chapter 6 is statistically inferred rather than directly observed. The Valeri and VanderWeele (2013) decomposition formally estimates natural direct and indirect effects but cannot capture the sociocognitive legitimacy evaluations through which prospective partners decide to engage with a focal firm. Process-tracing studies and primary surveys of NGO and consortium decision-makers centered on firm-level decisions to enter cross-sector environmental partnerships would allow researchers to observe these legitimization evaluations directly.

A final, overarching research direction concerns the behavioral mechanisms underlying the asymmetries documented throughout this study. Our empirical analyses allow inference, but not direct observation, of why specific human capital has stronger effects than general human capital, why stakeholder-proximate policies engage the partnership pathway whereas market-oriented policies do not, and why personal financial slack decouples from novelty in mission-primary settings. For instance, vignette experiments on partner differentiation across policy signals, qualitative process tracing of how managerial experience translates into orchestration capacity, and behavioral studies of the decoupling between mission primacy and financial slack would identify the cognitive, relational, and institutional micro-foundations of these patterns. This direction is critical, since OSI's claim to depart from commercial open innovation rests precisely on these asymmetries, whose behavioral foundations remain unexamined.

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Appendices

Appendices

Appendix A Open Social Innovation articles included in the systematic literature review

Authors and publication year	Article title	Article type	Methodology	Social issues	Objective of the study	Main findings
Abd Rashid, N. K.; Lani, M. N.; Ariffin, E. H.; Mohamad, Z.; Ismail, I. R. (2024)	Community engagement and social innovation through knowledge transfer: micro evidence from Setiu fishermen in Terengganu, Malaysia	Empirical	Mixed Methods	Broad-spectrum	To examine the impact of university-community engagement and knowledge transfer on the Setiu fishing community in Malaysia.	Knowledge transfer of entrepreneurial skills transformed the community to be more resilient and competitive through bonding, bridging, and linkages of university-community-government partnership.
Acebo, E.; Miguel-Davila, J.; Nieto, M. (2021)	External stakeholder engagement: complementary and substitutive effects on firms' eco-innovation	Empirical	Quantitative	Environmental	To investigate complementary and substitutive effects of collaboration with different external stakeholders on firms' eco-innovation.	Simultaneous collaboration with scientific partners, suppliers, and customers generates partial complementary effects on eco-innovation. Customer-collaboration with scientific partners or supplier-collaboration produces partial substitutive effects.
Adomako, S.; Nguyen, N. P. (2024)	Collaborative entrepreneurship and social innovation performance: effects of institutional support and social legitimacy	Empirical	Quantitative	Broad-spectrum	To examine the effect of collaborative entrepreneurship on social innovation performance and introduce boundary conditions of this relationship.	Collaborative entrepreneurship positively influences social innovation performance. Institutional support and social legitimacy moderate this relationship, amplifying the effect at high levels of social legitimacy.
Adomako, S.; Tran, M. D. (2022)	Environmental collaboration, responsible innovation, and firm performance: the moderating role of stakeholder pressure	Empirical	Quantitative	Environmental	To investigate the impact of environmental collaboration on firm performance through responsible innovation.	Environmental collaboration influences responsible innovation, with stakeholder pressure moderating this relationship. Responsible innovation mediates the relationship between environmental collaboration and firm performance.
Akasaka, F.; Mitake, Y.; Watanabe, K.; Tsutsui, Y.; Shimomura, Y. (2023)	Development of a self-assessment tool for the effective management of living labs	Conceptual		Broad-spectrum	To develop a self-assessment tool to support effective management of Living Lab projects.	The developed tool effectively identifies points for improvement and facilitates introspective reflection on Living Lab projects.
Alcalde-Heras, H.; Carrillo, F. C. (2023)	Exploring the impact of collaboration on eco-innovation in smes: a contribution to the business modes of innovation framework	Empirical	Quantitative	Environmental	To investigate how small and medium-sized enterprises (SMEs) can effectively collaborate for eco-innovation using the business modes of innovation framework.	DUI-vertical collaboration positively affects eco-product and eco-process innovations. DUI-horizontal collaboration is most effective for overall eco-innovation. STI collaboration positively affects eco-product innovation. The study highlights the importance of targeted collaboration for specific eco-innovation goals.

Authors and publication year	Article title	Article type	Methodology	Social issues	Objective of the study	Main findings
Allal-Cherif, O.; Guijarro-Garcia, M.; Ulrich, K. (2022)	Fostering sustainable growth in aeronautics: open social innovation, multifunctional team management, and collaborative governance	Empirical	Qualitative	Environmental	To demonstrate how open social innovation projects led by multifunctional teams contribute to sustainable value creation and growth.	Turning strategic suppliers into long-term partners and collaborating with diverse organizations is important. Business leaders should aim for market disruption to implement sustainable processes and products.
Altuna, N.; Contri, A. M.; Dell'Era, C.; Maccarrone, P. (2015)	Managing social innovation in for-profit organizations: the case of Intesa Sanpaolo	Empirical	Qualitative	Broad-spectrum	To examine how for-profit organizations can develop capability to manage social innovation projects.	Identifies three managerial antecedents for superior social innovation ability: integrating CSR into business strategy, structurally separating social innovation activities, and applying open innovation principles
Alves, H. (2013)	Co-creation and innovation in public services	Conceptual		Broad-spectrum	To discuss how co-creation within service-dominant logic may contribute to innovation in public sector organizations.	Co-creation can help overcome challenges of scarce resources and multiple stakeholders in public sector innovation by maintaining citizen consensus
Anthony, B. (2024)	The role of community engagement in urban innovation towards the co-creation of smart sustainable cities	Literature Review		Broad-spectrum	To advocate for community engagement as a key driver for urban innovation towards smart sustainable cities.	The study presents a model specifying factors influencing community engagement for smart sustainable city development. It provides recommendations on how community engagement can help achieve resilient, technologically-driven cities.
Babu, M. M.; Dey, B. L.; Rahman, M.; Roy, S. K.; Alwi, S. F. S.; Kamal, M. M. (2020)	Value co-creation through social innovation: a study of sustainable strategic alliance in telecommunication and financial services sectors in Bangladesh	Empirical	Qualitative	Broad-spectrum	To analyze value co-creation through sustainable strategic alliance in Bangladesh.	Highlights drivers of strategic alliance leading to value co-creation; suggests alliance constitutes service-ecosystem facilitating social innovation
Herrera, M. E. B. (2016)	Social innovation for bridging societal divides: process or leader? a qualitative comparative analysis	Empirical	Qualitative	Broad-spectrum	To develop frameworks for understanding role of social innovation in bridging societal divides and role of bridging leaders.	Process variables appear most in configurations achieving positive outcomes; formal authority and influence play roles in success configurations
Barrett, G.; Dooley, L. (2024)	Open social innovation in response to grand challenges: promotor influence as change agent	Empirical	Qualitative	Health	To explore the promotor role(s) and interventions in managing temporary organizations for open social innovation in response to grand challenges.	Promotors play a central role in leveraging open social innovation projects. Management routines such as communicating needs, adopting project management practices, and coordinating partners are important for nurturing objective achievement.

Authors and publication year	Article title	Article type	Methodology	Social issues	Objective of the study	Main findings
Battisti, S. (2019)	Digital social entrepreneurs as bridges in public-private partnerships	Empirical	Qualitative	Broad-spectrum	To develop a new model identifying key roles in the innovation process by analyzing public-private partnership projects.	The social entrepreneur acts as a bridge between innovation managers and technology-reflective individuals. Reflective people such as young couples with kids, elderly, or millennials are fundamental for impact creation.
Belyaeva, Z.; Shams, S. M. R.; Santoro, B. (2020)	Unpacking stakeholder relationship management in the public and private sectors: the comparative insights	Literature Review		Broad-spectrum	To discuss current knowledge on stakeholder relationship management and highlight future research opportunities.	The paper presents future research opportunities concerning the wide spectrum of stakeholder relationship management in corporate governance, CSR, entrepreneurship, and open innovation/open social innovation.
Bentzen, T. (2022)	Continuous co-creation: how ongoing involvement impacts outcomes of co-creation	Empirical	Qualitative	Broad-spectrum	To develop continuity perspective on patterns of involvement in co-creation.	Continuous, high-level involvement strengthens outcomes in terms of innovation, ownership of solutions, and trust development
Cai, W.; Gu, J.; Wu, J. (2023)	The effect of corporate social responsibility on open innovation: the moderating role of firm proactiveness	Empirical	Quantitative	Broad-spectrum	To investigate the effects of business and philanthropic corporate social responsibility (CSR) on open innovation and the moderating role of firm proactiveness.	Business and philanthropic CSR positively affect open innovation. Proactiveness weakens the effect of business CSR but strengthens the effect of philanthropic CSR on open innovation. Open innovation increases firm innovation and financial performance.
Callagher, L.; Korber, S.; Siedlok, F.; Elsahn, Z. (2022)	Metaorganizing collaborative innovation for action on grand challenges	Empirical	Qualitative	Environmental	To explore how agricultural cooperatives act as metaorganizations to facilitate collaborative innovation and sustainable transitions.	Cooperatives stimulate awareness of environmental challenges, orchestrate collaborative solutions, and coordinate diffusion of novel practices across the institutional field.
Cambra-Fierro, J. J.; Lopez-Perez, M. E.; Melero-Polo, I.; Perez, L.; Tejada-Tejada, M. (2024)	Smart innovations for sustainable cities: insights from a public-private innovation ecosystem	Empirical	Qualitative	Broad-spectrum	To present aspects of the #eCity-Sevilla project as a case of a sustainable public-private innovation ecosystem.	The study identifies project stakeholders and their relationships using the Quintuple Helix model. It demonstrates how public-private partnerships can create sustainable urban innovation ecosystems.
Carayannis, E. G.; Grigoroudis, E.; Stamati, D.; Valvi, T. (2021)	Social business model innovation: a quadruple/quintuple helix-based social innovation ecosystem	Conceptual		Broad-spectrum	To propose an ecosystem approach for social business models based on quadruple/quintuple helix innovation models.	The proposed framework helps study the role, nature, and dynamics of social co-opetitive fractal ecosystems. Targeted open innovation is a key element for social business model innovation.

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Carida, A.; Colurcio, M.; Melia, M. (2022)	Digital platform for social innovation: insights from volunteering	Empirical	Qualitative	Broad-spectrum	To explore how digital platforms foster the development of successful social innovation practices.	Digital platforms can drive social innovation at a scale and pace previously unimaginable, facilitating the coordination of innovation among multiple stakeholders.
Cassetta, E.; Dileo, I.; Pini, M. (2023)	Linking external collaborations, eco-innovation and sustainable growth. an empirical analysis on the italian manufacturing firms	Empirical	Mixed Methods	Environmental	To analyze relationships between eco-innovation and business performance, exploring the role of external collaborations.	Supply-chain and quadruple helix collaborations moderate the relationship between eco-innovation and business performance. Different types of collaborations benefit process and product eco-innovations differently.
Catala, B.; Savall, T.; Chaves-Avila, R. (2023)	From entrepreneurial and innovation ecosystems to the social economy ecosystem	Empirical	Qualitative	Broad-spectrum	To conceptualize social economy enterprise ecosystems and provide empirical evidence from two cases.	Social economy ecosystems are characterized by a balance between economic and social value creation, collective social entrepreneurship, and specific institutional components. Axiological, cognitive and institutional elements enable social value creation and scaling up of the social economy model.
Chalmers, D. (2013)	Social innovation: an exploration of the barriers faced by innovating organizations in the social economy	Conceptual		Broad-spectrum	To critically review extant literature on social innovation and propose a model of 'open' social innovation.	The paper proposes a model of open social innovation and raises questions about the efficacy of localism policy measures. It highlights operational obstacles faced by small resource-constrained organizations in social innovation.
Chang, C. H. (2019)	Do green motives influence green product innovation? the mediating role of green value co-creation	Empirical	Quantitative	Environmental	To explore the effect of green motives on green product innovation performance through green value co-creation in Taiwanese manufacturing companies.	Moral motives are stronger drivers than instrumental and relational motives. Instrumental and moral motives positively affect green product innovation performance. No positive associations found between relational motives, green co-production, green value-in-use, and green product innovation performance.
Christopoulos, T. P.; Verga Matos, P.; Borges, R. D. (2023)	An ecosystem for social entrepreneurship and innovation: how the state integrates actors for developing impact investing in portugal	Empirical	Qualitative	Broad-spectrum	To explore how state intervention in cooperation with civil society actors led to impact investing field emergence for social entrepreneurship and innovation.	The study reveals a state struggling to involve the private sector in providing resources. New entrepreneurs face difficulties meeting legal requirements. Intermediaries contribute to reducing complexities but struggle to find their place in the field.

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Ciasullo, M. V.; Troisi, O.; Grimaldi, D. (2020)	Multi-level governance for sustainable innovation in smart communities: an ecosystems approach	Empirical	Qualitative	Broad-spectrum	To analyze TrentoSmartCity project to redefine Trento as smart community using ecosystems approach.	Develops theoretical framework identifying main drivers for sustainable growth in smart communities; highlights need for meta-level governance
Cillo, V.; Borin, E.; Thomas, A.; Chaturvedi, A.; Faggioni, F. (2023)	The role of crowdfunding in endorsing responsible open innovation for shared value co-creation: a systematic literature review	Literature Review		Broad-spectrum	To investigate the intersection between crowdfunding, open innovation, and responsible innovation.	The scientific literature on crowdfunding's role in endorsing responsible open innovation for shared value co-creation appears fragmented. Several emerging trends and research gaps are identified.
Citroni, S. (2015)	Civic events in a dynamic local field. the role of participation for social innovation	Empirical	Qualitative	Social integration and cohesion	To analyze how civic events relate to local field transformations and social innovation.	Pro-active public participation in event development processes is required to trigger social innovation; patterns of event development impact field-relevant implications
Colovic, A.; Caloffi, A.; Rossi, F. (2022)	Crowdsourcing and covid-19: how public administrations mobilize crowds to find solutions to problems posed by the pandemic	Empirical	Qualitative	Broad-spectrum	To examine how public administrations have used crowdsourcing to find solutions to problems posed by the COVID-19 pandemic.	A conceptual typology of crowdsourcing challenges based on openness and collaboration with the crowd is proposed. Crowdsourcing has been instrumental in promoting open innovation and service co-creation.
Cortese, D.; Civera, C.; Casalegno, C.; Zardini, A. (2024)	Transformative social innovation in developing and emerging ecosystems: a configurational examination	Empirical	Qualitative	Social integration and cohesion	To determine which combination of characteristics turns local smallholder coffee farmers into autonomous partners and catalysts for spreading social innovation initiatives locally.	Stakeholder empowerment, cooperative strategic posturing, knowledge transfer, and local knowledge exchange are necessary conditions within the ecosystem to create local autonomy as an antecedent for transformative social innovation.
Cosimato, S.; Di Paola, N.; Vona, R. (2024)	Digital social innovation: how healthcare ecosystems face covid-19 challenges	Empirical	Qualitative	Health	To examine digital social innovation in healthcare ecosystems facing COVID-19 challenges.	Digital platforms boost multi-actor interactions for finding innovative solutions to emergent social issues. Ecosystems demonstrate the ability to reshape themselves in response to crises.
Davies, G. H.; Roderick, S.; Huxtable-Thomas, L. (2019)	Social commerce open innovation in healthcare management: an exploration from a novel technology transfer approach	Empirical	Qualitative	Health	To explore the emergence of social commerce innovation in healthcare management through the AgorIP open innovation approach.	Findings reflect dynamics and constraints in healthcare innovation, with innovations showing segmentation across geographic, demographic, and disease-sufferer groups. The AgorIP initiative is presented as a space to observe open innovation of social commerce within the health sector.

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De Silva, M.; Khan, Z.; Vorley, T.; Zeng (Maggie), J. (2020)	Transcending the pyramid: opportunity co-creation for social innovation	Empirical	Qualitative	Broad-spectrum	To understand how social enterprises with partners co-create opportunities to generate social and economic value across pyramid.	Identifies supply-side and demand-side opportunity co-creation processes; co-created opportunities address BOP issues and meet TOP needs
De Silva, M.; Wright, M. (2019)	Entrepreneurial co-creation: societal impact through open innovation	Empirical	Qualitative	Broad-spectrum	To understand how and why co-creation by actors generates different types of social value.	Develops propositions on how profit orientation and key resource contributions of entrepreneurs co-identifying opportunities impact nature of social value generated
Desmarchelier, B.; Djellal, F.; Gallouj, F. (2020)	Mapping social innovation networks: knowledge intensive social services as systems builders	Empirical	Qualitative	Broad-spectrum	To examine role of knowledge intensive social services (KISS) in creating social innovation networks.	KISS act as systems builders creating growing social innovation networks; networks can become more robust through interaction with other networks
Desmarchelier, B.; Djellal, F.; Gallouj, F. (2021)	Which innovation regime for public service innovation networks for social innovation (psinsis)? lessons from a european cases database	Empirical	Qualitative	Broad-spectrum	To examine how Public Service Innovation Networks for Social Innovations (PSINSIs) fit into entrepreneurial and routinized innovation regimes.	PSINSIs exhibit diverse variations of entrepreneurial and routinized regimes, including different forms of social entrepreneurship and configurations of the routinized regime.
Dezi, L.; Pisano, P.; Pironti, M.; Papa, A. (2018)	Unpacking open innovation neighborhoods: the milieu of the lean smart city	Empirical	Qualitative	Broad-spectrum	To analyze mechanisms of innovative milieu in smart cities environments.	Lean approach enables faster and more effective smart city project implementation; involving stakeholders improves ability to engage citizens and companies
Dionisio, M.; De Vargas, E. R. (2022)	Integrating corporate social innovations and cross-collaboration: an empirical study	Empirical	Qualitative	Broad-spectrum	To analyze the integration of corporate social innovations and cross-collaboration.	A new spectrum between social and commercial business models and their relationships with governments and civil society is proposed. Stakeholder action promotes impactful results beneficial for business and society.
Dzandu, M. D.; Pathak, B. (2021)	DIY laboratories, their practices, and challenges - a systematic literature review	Literature Review		Broad-spectrum	To understand the state-of-the-art of DIY laboratories through a systematic literature review.	DIY laboratories are driven by personal motivation and the desire to create businesses. Key challenges include economic and marketing factors. Strategies for innovation diffusion include social networking and partnerships with larger firms.
Edeh, J.; Vincens, J. P. (2024)	External knowledge and eco-innovation: evidence from small and medium-sized enterprises	Empirical	Quantitative	Environmental	To examine how different external knowledge sources affect eco-innovation of SMEs in developing economies.	External knowledge from suppliers positively affects eco-product and eco-process innovations. Customer knowledge affects eco-product innovation. Competitor knowledge contributes to eco-process innovation. Knowledge from scientific organizations

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						positively relates to both eco-product and eco-process innovations.
Edwards-Schachter, M. E.; Matti, C. E.; Alcantara, E. (2012)	Fostering quality of life through social innovation: a living lab methodology study case	Empirical	Qualitative	Broad-spectrum	To present an exploratory case study of social innovation using Living Lab methodology to address the gap between elderly people's needs and business opportunities.	Living Labs are useful instruments to detect community needs, improve local development, and support and integrate technological and social innovations in policies and local governance processes.
Eseonu, T. (2022)	Co-creation as social innovation: including hard-to-reach' groups in public service delivery	Empirical	Qualitative	Broad-spectrum	To identify conditions facilitating public sector organizations' use of inclusive co-creation for social innovation.	Key conditions include commitment to inclusion of minoritized groups, active strategies for encouraging participation, and providing an environment for substantive contributions by sharing power.
Fabrizi, A.; Guarini, G.; Meliciani, V. (2018)	Green patents, regulatory policies and research network policies	Empirical	Quantitative	Environmental	To analyze impact of regulation policies and research network policies on environmental innovation.	Both market-based regulation and participation in research networks positively affect environmental innovation; the two policy tools have complementary effects
Fait, M.; Magni, D.; Perano, M.; Farina; Briamonte, M.; Sasso, P. (2023)	Grassroot processes of knowledge sharing to build social innovation capabilities	Empirical	Quantitative	Broad-spectrum	To identify the relation between knowledge management practices and improvement of social innovation capabilities.	Knowledge-sharing enablers (intrinsic and extrinsic socially driven motivations) positively relate to knowledge-sharing behaviors and social innovation capabilities.
Fayard, A. L. (2024)	Making time for social innovation: how to interweave clock time and event time in open social innovation to nurture idea generation and social impact	Empirical	Qualitative	Broad-spectrum	To examine how organizations interweave clock time and event time in designing open innovation challenges to foster idea generation and support social impact.	Three practices are identified: mapping, stretching, and squeezing time. These practices help engage participants and sponsors, and allow participants to implement ideas. The study demonstrates how organizations can intentionally use time to nurture collaborative innovation and yield sustainable social impact.
Galdini, R.; De Nardis, S. (2023)	Urban informality and users-led social innovation: challenges and opportunities for the future human centred city	Empirical	Qualitative	Social integration and cohesion	To investigate how informal urban actions foster social cohesion and innovation in spatial planning.	Informal urban actions promote social innovation through collective action and stakeholder empowerment. The transformative power of innovation acts as a mechanism for social change in designing future human-centered cities.

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Gegenhuber, T.; Mair, J. (2024)	Open social innovation: taking stock and moving forward	Conceptual		Broad-spectrum	To trace the evolution of open social innovation (OSI) and specify design dimensions for effective orchestration of collaboration and coordination.	The paper proposes a shift from an organization-centric view (OSI 1.0) to a multi-stakeholder, cross-sectoral perspective (OSI 2.0). It outlines key areas for future research in open social innovation.
Gegenhuber, T.; Mair, J.; Luehrsen, R.; Thaeter, L. (2023)	Orchestrating distributed data governance in open social innovation	Empirical	Qualitative	Broad-spectrum	To investigate the challenges in organizing effective distributed data governance in open social innovation projects.	A framework consisting of openness, accountability, and power dimensions is proposed for inquiring into the effectiveness of distributed data governance in open social innovation projects.
Ghisetti, C.; Marzucchi, A.; Montresor, S. (2015)	The open eco-innovation mode. an empirical investigation of eleven european countries	Empirical	Quantitative	Environmental	To investigate effects of knowledge sourcing on environmental innovations of firms.	Knowledge sourcing positively impacts environmental innovation performance; broad sourcing strategy shows diminishing returns; absorptive capacity generally helps firms leverage external knowledge
Gibbon, J.; Rutter, N. (2022)	Social enterprise in prisons: enabling innovation and co-creation	Empirical	Qualitative	Social integration and cohesion	To explore how social enterprise enables opportunities for social innovation and co-creative practices in prisons.	Trust, time, and experience influence the development of prosocial relationships underpinning co-creative innovation, organizational culture change, and wider societal support.
Gonzalez-Moreno, A.; Triguero, A.; Saez-Martinez, F. J. (2019)	Many or trusted partners for eco-innovation? the influence of breadth and depth of firms' knowledge network in the food sector	Empirical	Quantitative	Environmental	To examine influence of breadth and depth of firms' knowledge network on eco-innovation in food sector.	Finds inverted U-shape for breadth of external sources; deep relationships important especially for eco-process innovations; learning effect appears
Grama-Vigouroux, S.; Saidi, S.; Uvarova, I.; Cirule, I.; Sellami, M. (2023)	Drivers and barriers of national innovation ecosystems for implementing sustainable development goals: a latvian case study	Empirical	Qualitative	Broad-spectrum	To examine the drivers and barriers of implementing Sustainable Development Goals in national innovation ecosystems.	Drivers such as legislative compliance, eco-innovations, cross-sector cooperation, and talent pools are hindered by barriers including lack of networking skills, institutional voids, and academic rigidity. Sustainable innovation is hindered by lack of resources and openness.
Hagedoorn, J.; Haugh, H.; Robson, P.; Sugar, K. (2023)	Social innovation, goal orientation, and openness: insights from social enterprise hybrids	Empirical	Quantitative	Broad-spectrum	To explore relationships between commercial, social, and environmental goal orientation and social innovation performance in social enterprise hybrids.	Commercial and social goal orientation positively relate to social innovation performance. External knowledge sources strengthen these relationships for commercial and social goal orientation.
Haikio, L. (2012)	From innovation to convention: legitimate citizen participation in local governance	Empirical	Qualitative	Social integration and cohesion	To analyze how empirical studies on local sustainable development planning and new public management practices construct legitimate citizen participation.	Scientific texts construct justifications for citizen participation that reproduce a discursive structure marginalizing citizen participation and excluding citizens' views. Discursive structures of

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						legitimate citizen participation support conventional governing practices and hinder innovative practices in local governance.
Hansen, A. V.; Fuglsang, L.; Gallouj, F.; Scupola, A. (2022)	Social entrepreneurs as change makers: expanding public service networks for social innovation	Empirical	Qualitative	Broad-spectrum	To investigate the role of social entrepreneurs in enabling public sector innovation networks.	Social entrepreneurs from outside the public sector can push the boundaries of public sector services and expand public innovation networks.
Hardyman, W.; Garner, S.; Lewis, J. J.; Callaghan, R.; Williams, E.; Dalton, A.; Turner, A. (2022)	Enhancing public service innovation through value co-creation: capacity building and the innovative imagination'	Empirical	Qualitative	Broad-spectrum	To explore how service-dominant logic contributes to understanding social innovation and co-creation processes in public services.	Adopting a service ecosystems perspective enhances understanding of learning, knowledge exchange, experimentation, and value co-creation in public service innovation projects.
Hofman, P. S.; Blome, C.; Schleper, N. (2020)	Supply chain collaboration and eco-innovations: an institutional perspective from china	Empirical	Quantitative	Environmental	To explore the impact of supply chain collaboration on eco-innovations in Chinese manufacturing supplier firms.	Community pressure positively affects supplier collaboration, leading to enhanced process eco-innovation. Market pressure enhances customer collaboration but does not reinforce product eco-innovation. Regulatory pressures do not impact supplier or customer collaboration for innovation.
Hong, S. G.; Lee, D. H. (2023)	Development of a citizen participation public service innovation model based on smart governance	Conceptual		Broad-spectrum	To develop and evaluate a smart governance-based public service innovation model (SG-PSIM) combining intelligent technology and co-creation.	The SG-PSIM can effectively collect citizen opinions and provide opportunities for active participation in public service policy development. The model is demonstrated through four case studies.
Jamieson, D.; Martin, M. (2022)	New development: supporting co-creation processes through modelling	Conceptual		Broad-spectrum	To introduce novel modelling approaches to support co-creation of service innovation in social contexts.	The proposed tools support stakeholders' reflection on social, ethical, moral, organizational, and technical challenges of sustainable and effective services.
Jarmai, K.; Vogel-Poeschl, H. (2020)	Meaningful collaboration for responsible innovation	Empirical	Qualitative	Broad-spectrum	To identify success factors and challenges for meaningful collaboration in responsible innovation.	Key factors include competent process preparation and facilitation, investment of time and effort for mutual understanding, development of trustful relationships, and willingness to implement changes resulting from collaboration.

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Juusola, K.; Venkitachalam, K.; Kleber, A. (2024)	Knowledge sharing in open social innovation for sustainable development: evidence from rural social enterprises	Empirical	Qualitative	Poverty and inequality	To explore the use of knowledge sharing in delivering open social innovation solutions for sustainable development in rural Indian social enterprises.	Knowledge sharing is used differently across three stages of open social innovation: ideating and prototyping, experimenting and business development, and expanding market opportunities. Social enterprises act as orchestrators and open systems that evolve through these processes.
Kallio, K.; Lappalainen, I. (2015)	Organizational learning in an innovation network enhancing the agency of public service organizations	Empirical	Qualitative	Poverty and inequality	To examine collaborative service development in public-private citizen innovation networks as organizational learning process.	Illustrates how and what was learned in complex network settings; public service organization began perceiving itself as active agent enhancing collaboration
Khan, S.; Rehman, S.; Nasir, A. (2023)	Investigating the factors affecting green innovation of service sector: a moderated mediation model	Empirical	Quantitative	Environmental	To explore the role of green motive and green dynamic capabilities in green innovation through green value co-creation, and investigate top management support as a moderator.	Top management support strengthens the mediation framework of green motive, green dynamic capabilities, green value co-creation, and green innovation. All hypotheses related to direct and indirect associations were statistically significant.
Kher, R.; Yang, S.; Newbert, S. L. (2023)	Accelerating emergence: the causal (but contextual) effect of social impact accelerators on nascent for-profit social ventures	Empirical	Quantitative	Broad-spectrum	To explore whether social impact accelerators help for-profit social ventures make the transition from ideas to viable organizations.	Social impact accelerators facilitate new venture emergence, with accelerated ventures raising more financing, earning more revenues, and hiring more employees than unaccelerated counterparts. The effect varies depending on startup age, founding team gender composition, and location.
Kim, Y.; Roh, T.; Boroumand, R. H. (2024)	Resource recombination perspective on open eco-innovation: open innovation type, strategic orientation, and green innovation	Empirical	Quantitative	Environmental	To investigate how open innovation types differ in implementing open eco-innovation strategies and affect green innovation performance.	The study proposes a 2x2 resource recombination framework differentiating four open innovation types. Open innovation type influences strategic orientation, and ambidextrous strategic orientation significantly influences green innovation performance.
Kimpimaki, J. P.; Malacina, I.; Lahdeaho, O. (2022)	Open and sustainable: an emerging frontier in innovation management?	Literature Review		Broad-spectrum	To identify and describe theoretical connections between sustainability and open innovation through bibliometric analysis.	Despite a lack of institutionalized use of sustainability-related keywords, about 9% of sample articles discuss sustainability aspects. The study proposes a multilevel system framework for understanding open and sustainable forms of innovation.

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Kobarg, S.; Stumpf-Wollersheim, J.; Schlagel, C.; Welpe, I. M. (2020)	Green together? the effects of companies' innovation collaboration with different partner types on ecological process and product innovation	Empirical	Quantitative	Environmental	To investigate effect of innovation collaboration with different partner types on ecological process and product innovation.	Collaboration with consumers positively associated with both types; universities/suppliers only with process innovation; customers/competitors not associated with either
Kohler, T.; Chesbrough, H. (2019)	From collaborative community to competitive market: the quest to build a crowdsourcing platform for social innovation	Empirical	Qualitative	Broad-spectrum	To explore dynamics and impact of open social innovation in Fab Labs and makerspaces.	Open approach enables diversity of Fab Labs well-adapted to local needs; identifies main challenges and strategies for long-term sustainability
Kruse, D. J.; Goeldner, M.; Eling, K.; Herstatt, C. (2019)	Looking for a needle in a haystack: how to search for bottom-up social innovations that solve complex humanitarian problems	Empirical	Qualitative	Social development and well-being	To develop theory-guided bottom-up innovation search process for humanitarian problems.	Reveals search process must differ significantly from lead user method; suggests superiority of theory-guided process over non-theory-guided approaches
Lee, E. W. Y.; Restrepo, J. M. (2015)	Institutional embeddedness and the scaling-up of collaboration and social innovation: the case of a hong kong-based international ngo	Empirical	Qualitative	Broad-spectrum	To explore how institutional embeddedness facilitates scaling-up of collaboration and social innovation.	Societal, network and territorial embeddedness dynamically affect each other through actor agency to enable scaling of networks, collaboration and social innovation beyond local level
Leite, E. (2022)	Innovation networks for social impact: an empirical study on multi-actor collaboration in projects for smart cities	Empirical	Qualitative	Broad-spectrum	To investigate factors driving innovation network formation for smart cities and how actors contribute and collaborate.	Innovation networks emerge from both business and social goals. Smart city innovation requires new configurations of public-private and citizen participation, drivers, and resources.
Lhoste, E. F. (2020)	Can do-it-yourself laboratories open up the science, technology, and innovation research system to civil society?	Empirical	Qualitative	Broad-spectrum	To examine the potential for DIY labs to open up research and innovation systems to citizen participation.	Intermediations play a key role in transforming technology-centered into socio-centered DIY labs. Supportive relationships and networking linkages from various stakeholders are needed for successful citizen participation.
Lippolis, S.; Ruggieri, A.; Leopizzi, R. (2023)	Open innovation for sustainable transition: the case of enel 'open power'	Empirical	Qualitative	Broad-spectrum	To propose a model for how open innovation is a catalyst for sustainability in the energy sector.	Open innovation processes support the integration of social, environmental, and economic objectives of companies. The SKIN framework provides a tool to evaluate organizational permeability as a critical success factor for sustainability strategies and innovation.
Logue, D.; Grimes, M. (2022)	Platforms for the people: enabling civic crowdfunding through the cultivation of institutional infrastructure	Empirical	Qualitative	Broad-spectrum	To examine process of social-mission platform creation for enabling cross-sector collaboration.	Exposes dilemmas in navigating user growth; highlights importance of institutional infrastructure in overcoming challenges

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Mariani, L.; Trivellato, B.; Martini, E. (2022)	Achieving sustainable development goals through collaborative innovation: evidence from four European initiatives	Empirical	Qualitative	Broad-spectrum	To explore the roles and mechanisms that collaborating actors enact to facilitate the pursuit of sustainable development through collaborative innovation.	Collaborative innovations contribute to multiple Sustainable Development Goals simultaneously. Non-profit organizations act as metagovernors of collaborative innovation processes, playing roles such as cultural spreaders, enablers, relational brokers, service providers, and influencers.
Marschalek, I.; Blok, V.; Bernstein, M.; Braun, R.; Cohen, J.; Hofer, M.; Seebacher, E.; Daimler, S.; Nieminen, M. V.; Thapa, R. K. (2022)	The social lab as a method for experimental engagement in participatory research	Empirical	Qualitative	Broad-spectrum	To analyze experiences of social labs supporting participatory research in responsible research and innovation.	Social labs allow participation in research and innovation addressing societal challenges. Drivers and barriers of engagement are discussed, with evidence for impacts of experimental engagement on participation.
Martinez-Martinez, A.; Cegarra-Navarro, A.; de Valon, T. (2023)	Active listening to customers: eco-innovation through value co-creation in the textile industry	Empirical	Quantitative	Environmental	To examine how businesses can overcome challenges of sustainable innovation by incorporating green knowledge of customers into value co-creation strategies.	Engaging with customers and addressing their expectations can create green knowledge contributing to both incremental and radical eco-innovation in the textile sector.
Melander, L. (2017)	Achieving sustainable development by collaborating in green product innovation	Literature Review		Environmental	To review literature on external collaborations in green product innovation to investigate drivers, inter-organizational factors, and intra-organizational factors.	The review identifies common collaborators (suppliers and customers), various drivers (economic factors, regulations, customer demand, competitiveness, firm performance), inter-organizational factors (partner selection, relationship management, knowledge access, agreements), and intra-organizational factors (cross-functional collaboration, capabilities, internal practices).
Merlin-Brogniart, C.; Fuglsang, L.; Magnussen, A.; Revesz, E.; Ronning, R.; Rubalcaba, L.; Scupola, A. (2022)	Social innovation and public service: a literature review of multi-actor collaborative approaches in five European countries	Literature Review		Broad-spectrum	To identify major themes of social innovation relating to collaborative governance in five European countries.	Social entrepreneurship emerges as a common theme across countries. The paper provides a mapping of major social innovation themes and discusses their relationship to collaborative governance and national welfare state history.
Moreno-Mondejar, L.; Triguero, A.; Jose Saez-Martinez, F. (2020)	Successful eco-innovators: exploring the association between open inbound knowledge strategies and the performance of eco-innovative firms	Empirical	Quantitative	Environmental	To analyze association between open inbound knowledge strategies and performance of eco-innovative firms in food industry.	Diversity of collaborators and joint adoption of product/process eco-innovations positively associated with high sales growth; inverted U-shaped relationship for external search breadth

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Nesti, G. (2018)	Co-production for innovation: the urban living lab experience	Empirical	Qualitative	Broad-spectrum	To examine whether Urban Living Labs (ULLs) can be conceptualized as a form of co-production and analyze their benefits and drawbacks.	The study does not provide clear main findings in the abstract.
Olsson, A. K.; Bernhard, I.; Arvemo, T.; Lundh, U.; Snis, U. (2021)	A conceptual model for university-society research collaboration facilitating societal impact for local innovation	Empirical	Mixed Methods	Broad-spectrum	To develop work-integrated learning model for university-society research collaboration facilitating societal impact.	Presents conceptual model including elements of continuity, coordination, communication, trust, creativity and co-creation opportunities; identifies short-lag impact as product/process innovations
Ornetzeder, M.; Rohrer, H. (2006)	User-led innovations and participation processes: lessons from sustainable energy technologies	Empirical	Qualitative	Environmental	To evaluate if higher user participation could improve development and dissemination of sustainable energy technologies.	Self-building groups were highly successful in improving and disseminating renewable energy technologies; user involvement can contribute significantly to sustainable innovation
Oskam, I.; Bossink, B.; de Man, A. P. (2021)	Valuing value in innovation ecosystems: how cross-sector actors overcome tensions in collaborative sustainable business model development	Empirical	Qualitative	Broad-spectrum	To uncover processes of developing sustainable business models in innovation ecosystems.	Identifies two patterns of valuing value: collective orchestration and continuous search; describes conditions giving rise to each pattern
Palakshappa, N.; Dodds, S.; Stangl, L. M. (2024)	Understanding sustainable service ecosystems: a meso-level perspective	Empirical	Qualitative	Environmental	To understand how sustainable organizations at the meso level can nurture sustainable service ecosystems for greater well-being outcomes.	Key value co-creation sustainable practices at the meso level include embedding a sustainable ethos, implementing sustainable strategies, and incorporating sustainable communication practices. These practices facilitate the function of service ecosystems to create well-being outcomes.
Piazza, M.; Mazzola, E.; Perrone, G. (2024)	Solvers' participation in crowdsourcing initiatives for social innovation: exploring interactions among motivational forces	Empirical	Quantitative	Broad-spectrum	To understand how different motivations interact with solvers' intention to participate in crowdsourcing for social innovation.	Prosocial motivations positively affect solvers' self-selection. Intrinsic and extrinsic motivations differently moderate the relationship between prosocial motivations and intention to participate.
Randhawa, K.; Wilden, R.; West, J. (2019)	Crowdsourcing without profit: the role of the seeker in open social innovation	Empirical	Qualitative	Broad-spectrum	To examine organizational and project-level choices of government agencies that crowdsource from citizens.	Develops model linking seeker intent and engagement strategies to project team motivation/capabilities, online engagement behaviors, and outcomes; contrasts government and corporate crowdsourcing
Rayna, T.; Striukova, L. (2019)	Open social innovation dynamics and impact: exploratory study of a fab lab network	Empirical	Qualitative	Broad-spectrum	To examine how innovative SDP organizations' interactions with external stakeholders influence social innovation process.	Social innovation emerges from collective, interactive process between SDP organizations and stakeholders across different levels; includes identifying opportunities and scaling solutions

Authors and publication year	Article title	Article type	Methodology	Social issues	Objective of the study	Main findings
Rey-Garcia, M.; Calvo, N.; Mato-Santiso, V. (2019)	Collective social enterprises for social innovation: understanding the potential and limitations of cross-sector partnerships in the field of work integration	Empirical	Qualitative	Broad-spectrum	To understand the sources of competitive advantage of cross-sector partnerships (CSPs) as a strategic option for social innovation.	Results illustrate dynamic interaction between key dimensions shaping CSPs' potential for social innovation. Three types of tensions influence partnership outcomes: hierarchical/horizontal commitment, competition/collaboration, and managerial efficiency/social transformation.
Ricciardelli, A.; Raimo, N.; Manfredi, F. (2020)	Urban civic network as practice of social change and innovation. a case-study analysis	Empirical	Qualitative	Broad-spectrum	To analyze benefits, role of public entities, and strengths of urban civic networks as social innovation practice.	Implementation generates tangible/intangible benefits; local government plays pivotal role; strengths connected to bottom-up approaches enabling knowledge management and collaboration
Roszkowska-Menkes, M. T. (2018)	Integrating strategic csr and open innovation. towards a conceptual framework	Conceptual		Broad-spectrum	To investigate the link between open innovation processes and strategic corporate social responsibility focusing on shared value creation.	The paper identifies four themes describing the relationship between strategic CSR and open innovation. It proposes a conceptual model of open shared value creation process explaining the bidirectional relationship between strategic CSR and open innovation processes.
Sarasini, S. (2015)	(Failing to) create eco-innovation networks: the nordic climate cluster	Empirical	Qualitative	Environmental	To examine factors influencing the failure of an eco-innovation network.	Network failed due to lack of stability, lack of social capital, and inadequate market demands for eco-innovations
Sarma, S.; Sunny, S. A. (2017)	Civic entrepreneurial ecosystems: smart city emergence in kansas city	Empirical	Qualitative	Broad-spectrum	To explore roles of ecosystem actors in creating economic value and solving societal problems through smart cities.	Highlights opportunities and challenges for bottom-up innovation from local entrepreneurs in smart city ecosystems
Schmidhuber, L.; Piller, F.; Bogers, M.; Hilgers, D. (2019)	Citizen participation in public administration: investigating open government for social innovation	Empirical	Quantitative	Broad-spectrum	To investigate motivations affecting participation intensity in open government ideation platforms.	Intrinsic motivation positively associated with producing/consuming content; external regulation negatively related to active contribution but positively to evaluation behavior
Shaheen, I.; Azadegan, A.; Davis, D. F. (2023)	Resource scarcity and humanitarian social innovation: observations from hunger relief in the context of the covid-19 pandemic	Empirical	Qualitative	Broad-spectrum	To identify how humanitarian social enterprises leverage organizational capabilities for developing social innovation under resource scarcity.	Resource availability affects whether enterprises focus on collaborative capabilities or absorptive capacity. Enterprises adjust their approach based on ordinary or extraordinary operating circumstances.

Authors and publication year	Article title	Article type	Methodology	Social issues	Objective of the study	Main findings
Shin, C. (2016)	A conceptual approach to the relationships between the social economy, social welfare, and social innovation	Conceptual		Social development and well-being	To construct a conceptual framework of welfare provision in an open innovation era.	The paper emphasizes the importance of civil society at the local level for igniting social economy through open social innovation. It suggests that endogenous local development is a prerequisite for social economy as a welfare supplier.
Smolka, M.; Boeschen, S. (2023)	Responsible innovation ecosystem governance: socio-technical integration research for systems-level capacity building	Conceptual		Broad-spectrum	To introduce responsible innovation ecosystem governance and propose adaptations of socio-technical integration research for systems-level capacity building.	The paper proposes three adaptations of socio-technical integration research: STIR workshops, multi-stream engagement, and a multi-method research design addressing networked responsibility. These aim to build system-level capacity for responsible innovation governance.
Svensson, P. G.; Hambrick, M. E. (2019)	Exploring how external stakeholders shape social innovation in sport for development and peace	Empirical	Qualitative	Social development and well-being	To examine how innovative Sport for Development and Peace (SDP) organizations' interactions with external stakeholders influence the social innovation process.	Innovative SDP agencies engage in non-financial relationships focusing on collective learning, shared risk, and co-creation of solutions. Social innovation in SDP emerges across different levels from a collective, interactive process between SDP organizations and external stakeholders.
Sweeting, D.; De Alba-Ulloa, J.; Pansera, M.; Marsh, A. (2022)	Easier said than done? involving citizens in the smart city	Empirical	Qualitative	Broad-spectrum	To examine the broader institutions of urban governance within which citizen-oriented smart city activities operate.	When considering citizen participation in smart city activities, closer attention to the institutions representing their context and the extent to which those institutions can be changed is necessary.
Ten Holter, C. (2022)	Participatory design: lessons and directions for responsible research and innovation	Conceptual		Social integration and cohesion	To compare and discuss the literature and practice of participatory design and responsible research and innovation.	Participatory design's understandings of politics and power dynamics, democratization imperative, and project documentation may offer useful considerations for responsible research and innovation.
Tjornbo, O.; McGowan, K. (2022)	A complex-systems perspective on the role of universities in social innovation	Empirical	Qualitative	Broad-spectrum	To identify roles for universities in social innovation based on social innovation scholarship.	Universities have important roles in providing space for discovery, destabilizing dominant systems, supporting niches for idea generation, sustaining shadow networks, and leveraging cross-scale networks to facilitate social innovation growth.
Trischler, J.; Johnson, M.; Kristensson, P. (2020)	A service ecosystem perspective on the diffusion of sustainability-oriented user innovations	Conceptual		Broad-spectrum	To conceptualize diffusion of user innovations from service ecosystem perspective.	Proposes three assumptions to better understand diffusion of sustainability-oriented user innovations; translates into policy

Authors and publication year	Article title	Article type	Methodology	Social issues	Objective of the study	Main findings
						implications and research agenda
Urbinati, A.; Esfandabadi, Z. S.; Petruzzelli, A. M. (2023)	Assessing the interplay between open innovation and sustainability-oriented innovation: a systematic literature review and a research agenda	Literature Review		Environmental	To investigate the relationships between open innovation and sustainability-oriented innovation approaches through a systematic literature review.	The study develops an innovative framework highlighting the main aspects of open sustainable innovation and sustainable open innovation. It identifies open innovation practices enabling sustainability-oriented innovation and contextual factors enabling both practices and strategies.
Van Geenhuizen, M.; Ye, Q. (2014)	Responsible innovators: open networks on the way to sustainability transitions	Empirical	Mixed Methods	Broad-spectrum	To examine how small high-tech companies use open knowledge networks to contribute to sustainability transitions.	Responsible innovation drives openness in knowledge networks; partner diversity negatively affects company growth; focus and selectivity in partnerships are key for influencing socio-technical systems
Vendrell-Herrero, F.; Opazo-Basaez, M.; Maric, J. (2023)	Open and social: portraying the resilient, social and competitive, upcoming enterprise	Empirical	Mixed Methods	Broad-spectrum	To characterize and assess a new type of resilient, socially conscious, and competitive enterprise encompassing open and social innovation.	Open innovation enables a greater understanding of societal needs, making social innovation more effective. Enterprises should share knowledge and resources with wider society to build more equal, resilient, and cohesive societies.
Verleye, K.; Perks, H.; Gruber, T.; Voets, J. (2019)	The long and winding road: building legitimacy for complex social innovation in networks	Empirical	Qualitative	Social development and well-being	To uncover how legitimacy is established when social innovations are developed through interorganizational networks.	Identifies three types of legitimacy, two dominant pattern combinations, and two underlying mechanisms driving the process of establishing legitimacy
Watson, R.; Wilson, H. N.; Smart, P.; Macdonald, E. K. (2018)	Harnessing difference: a capability-based framework for stakeholder engagement in environmental innovation	Literature Review		Environmental	To review literature on stakeholder engagement in environmental innovation and develop a capability-based framework.	The study identifies three levels of capability for stakeholder engagement: operational capabilities, engagement management capabilities, and value framing and systematized learning capabilities. It proposes a framework for open innovation and co-creation in environmental innovation.
Wegner, D.; Hoelsgens, R.; Bitencourt, C. C. (2023)	Orchestrating collaborative networks for social innovation: orchestrators' roles in socially innovative initiatives	Empirical	Qualitative	Broad-spectrum	To analyze how collaborative networks for social innovation are orchestrated and what roles leaders perform to achieve collective goals.	Orchestrators perform several roles, including designing, organizing, integrating, and monitoring. Three new roles emerged: designing, bridging, and legitimizing. Different orchestrators may be required due to collaboration dynamics and specific roles needed.

Authors and publication year	Article title	Article type	Methodology	Social issues	Objective of the study	Main findings
White, C. C. (2014)	An integrative literature review to introduce socio-networked learning: a new theoretical framework for hrd	Literature Review		Broad-spectrum	To introduce a new theoretical framework called socio-networked learning for understanding interdisciplinary learning among cross-sector stakeholders addressing large-scale social issues.	The paper introduces the concept of socio-networked learning as a new model for identifying learning across organizations dedicated to social innovation.
Windrum, P.; Schartinger, D.; Rubalcaba, L.; Gallouj, F.; Toivonen, M. (2016)	The co-creation of multi-agent social innovations a bridge between service and social innovation research	Empirical	Qualitative	Broad-spectrum	To provide framework bridging service innovation and social innovation research.	Multi-agent model of innovation enables synthesis of key concepts in both literatures; examines dynamics of invention and diffusion of social innovations
Windrum, P.; Schartinger, D.; Waring, J. (2018)	Co-creation of social innovations and new professional institutions: diffusion of therapeutic patient education (tpe) for diabetes in austria	Empirical	Qualitative	Health	To examine link between institutional change and development/diffusion of social innovations.	Purposive institutional work is needed to disrupt existing institutions and ensure diffusion of social innovations; professional associations play key role in institutional work
Wu, A. (2023)	Collaborative eco-innovation and green knowledge acquisition: the role of specific investments in chinese new energy vehicle industry	Empirical	Quantitative	Environmental	To examine how enterprises acquire green knowledge in interorganizational cooperative eco-innovations.	Specific investments and collaborative eco-innovation positively affect green knowledge acquisition. High-interaction collaboration modes have stronger effects than low-interaction modes.
Xin, X.; Miao, X.; Cui, R. (2023)	Enhancing sustainable development: innovation ecosystem cooperation, environmental resource orchestration, and disruptive green innovation	Empirical	Quantitative	Environmental	To examine the relationships among innovation ecosystem cooperation and competition, environmental resource orchestration, and disruptive green innovation.	Both innovation ecosystem cooperation and competition positively affect environmental resource orchestration, which in turn positively affects disruptive green innovation. Big data analytics capability moderates the relationship between cooperation and environmental resource orchestration.
Zambrano-Gutierrez, J. C.; Puppim de Oliveira, J. A. (2022)	The dynamics of sources of knowledge on the nature of innovation in the public sector: understanding incremental and transformative innovations in local governments	Empirical	Mixed Methods	Broad-spectrum	To assess the effects of external and internal learning mechanisms on incremental and transformative innovations in local governments.	Diverse cross-sector collaborations increase transformative innovations, while changing administrative routines supports incremental innovation.

Appendix B Results robustness test using multinomial logistic regression models

Models		3) Open/Innovative		4) Open/Innovative		
	Variables	Coeff.	Std. Err.	Coeff.	Std. Err.	
Control	Founders' age	0.970***	(0.009)	0.971***	(0.009)	
	Founders' gender	1.646**	(0.342)	1.628**	(0.338)	
	Venture age	1.150*	(0.085)	1.148*	(0.085)	
	Venture philanthropic support	2.719***	(0.4)	2.741***	(0.403)	
	Venture revenue (IHS)	0.987	(0.015)	0.986	(0.015)	
	<i>Venture's number of founders</i>					
	-Two founders	1.460*	(0.306)	1.426*	(0.299)	
	-Three or more founders	2.509***	(0.501)	2.445***	(0.489)	
	GDP per capita (log)	1.042	(0.044)	1.049	(0.045)	
	Venture sector fixed effects	Yes		Yes		
Year fixed effects	Yes		Yes			
Independent	Founders' education level	H1	1.064	(0.063)	0.771	(0.126)
	Founders' managerial experience	H2	1.993***	(0.338)	3.053*	(1.806)
	Venture's profit orientation	H3	4.208***	(1.086)	0.301	(0.437)
Int.	Founders' education level*profit			H4	1.443**	
	Founders' managerial experience*			H5	0.625	
	Constant		0.008***	(0.006)	0.074*	(0.106)
	Observations		11,953		11953	
	Pseudo R-Squared		15.23%		0.1527	

* p < 0.10, ** p < 0.05, *** p < 0.01

Base model: Social venture Non-Open/Non-Innovative

Appendix C Results robustness test using multinomial logistic regression models with alternative innovation proxy (intellectual property)

Models		5) Open/Innovative		6) Open/Innovative		
Variables		Coeff.	Std. Err.	Coeff.	Std. Err.	
Control	Founders' age	0.987	(0.009)	0.987	(0.009)	
	Founders' gender	1.158	(0.251)	1.153	(0.25)	
	Venture age	1.291***	(0.1)	1.289***	(0.1)	
	Venture philanthropic support	2.436***	(0.378)	2.459***	(0.382)	
	Venture revenue (IHS)	1.029*	(0.016)	1.028*	(0.016)	
	<i>Venture's number of founders</i>					
	-Two founders	1.365	(0.302)	1.331	(0.295)	
	-Three or more founders	2.405***	(0.503)	2.337***	(0.49)	
	GDP per capita (log)	1.073	(0.048)	1.080*	(0.049)	
	Venture sector fixed effects	Yes		Yes		
	Year fixed effects	Yes		Yes		
Independent	Founders' education level	H1	1.04	(0.064)	0.719**	(0.119)
	Founders' managerial experience	H2	1.996***	(0.364)	1.749	(1.036)
	Venture's profit orientation	H3	3.315***	(0.893)	0.104	(0.153)
Int.	Founders' education level*profit			H4	1.523**	
	Founders' managerial experience*			H5	1.139	
	Constant		0.006***	(0.005)	0.115	(0.167)

Observations	11,953	11953
Pseudo R-Squared	15.10%	0.1519

* p < 0.10, ** p < 0.05, *** p < 0.01
Base model: Social venture Non-Open/Non-Innovative

Appendix D Results of robustness test using a permissive operationalization of social entrepreneurship

	Hypothesis	General Human Capital	Specific Human Capital	Social Capital	Financial Capital	Result
H1	Individual resources are positively associated with innovation novelty among social entrepreneurs	OR = 1.049***	OR = 1.306***	OR = 1.042***	OR = 0.916**	Partially supported
H2	Individualism positively moderates the relationship between individual resources and innovation novelty	OR = 1.017**	OR = 1.231***	OR = 1.006	OR = 0.994	Partially supported
H3	Masculinity positively moderates the relationship between individual resources and innovation novelty	OR = 0.998	OR = 1.084*	OR = 1.011	OR = 1.044	Partially supported
H4	Power distance negatively moderates the relationship between individual resources and innovation novelty	OR = 0.970***	OR = 0.818***	OR = 0.993	OR = 1.059	Partially supported
H5	Uncertainty avoidance negatively moderates the relationship between individual resources and innovation novelty	OR = 0.972***	OR = 0.803***	OR = 0.996	OR = 1.040	Partially supported

* p < 0.10, ** p < 0.05, *** p < 0.01

Notes: Observations: 16,890. The sample comprises TEA respondents scoring 4 (“somewhat agree”) or 5 (“strongly agree”) on the social- and environmental-impact priority item. OR = Odds Ratio from multilevel ordered logistic regression.

Appendix E Results of robustness test using a restrictive operationalization of social entrepreneurship

	Hypothesis	General Human Capital	Specific Human Capital	Social Capital	Financial Capital	Result
H1	Individual resources are positively associated with innovation novelty among social entrepreneurs	OR = 1.069***	OR = 1.175**	OR = 1.025**	OR = 0.986	Partially supported
H2	Individualism positively moderates the relationship between individual resources and innovation novelty	OR = 1.034**	OR = 1.220***	OR = 1.013	OR = 0.993	Partially supported
H3	Masculinity positively moderates the relationship between individual resources and innovation novelty	OR = 0.998	OR = 1.085	OR = 1.034**	OR = 0.999	Partially supported
H4	Power distance negatively moderates the relationship between individual resources and innovation novelty	OR = 0.959***	OR = 0.789***	OR = 0.987	OR = 1.018	Partially supported
H5	Uncertainty avoidance negatively moderates the relationship between individual resources and innovation novelty	OR = 0.959**	OR = 0.882*	OR = 0.988	OR = 1.061	Partially supported

* p < 0.10, ** p < 0.05, *** p < 0.01

Notes: Observations: 6,345. The sample comprises TEA respondents scoring 5 (“strongly agree”) on the social- and environmental-impact priority item who additionally reported “to make a difference in the world” as an early-stage entrepreneurial motive. OR = Odds Ratio from multilevel ordered logistic regression.

Appendix F Robustness mediation test results for the full sample (H1–H3)

Policy Index	Total Effect (c)			Direct Effect (c')			Indirect Effect (a×b)			Mediation Type
	b	Std. Err.	95% CI	b	Std. Err.	95% CI	b	Std. Err.	95% CI	
Human rights-oriented (H1)	2.47	1.061	(0.391, 4.549)	2.06	1.055	(−0.009, 4.128)	0.41	0.148	(0.120, 0.701)	Complete
Consumer-oriented (H2)	11.526	2.541	(6.546, 16.505)	10.791	2.496	(5.900, 15.682)	0.735	0.303	(0.140, 1.329)	Partial
Market-oriented (H3)	3.429	1.625	(0.245, 6.614)	3.291	1.625	(0.106, 6.476)	0.138	0.171	(−0.197, 0.474)	No mediation

Notes: Bootstrap with 5,000 cluster-level replications. Percentile-based 95% confidence intervals for indirect effects; 95% CI for total and direct effects based on cluster-robust standard errors. N = 10,635 observations; 1,829 firms.

Appendix G Robustness mediation test results for consumer discretionary sector firms (H4a)

Policy Index	Total Effect (c)			Direct Effect (c')			Indirect Effect (a×b)			Mediation Type
	b	Std. Err.	95% CI	b	Std. Err.	95% CI	b	Std. Err.	95% CI	
Human rights-oriented	1.973	1.255	(−0.487, 4.433)	1.519	1.244	(−0.920, 3.957)	0.455	0.21	(0.043, 0.866)	Complete
Consumer-oriented	10.986	3.249	(4.618, 17.354)	9.814	3.131	(3.678, 15.950)	1.172	0.505	(0.182, 2.163)	Partial
Market-oriented	3.065	1.884	(−0.627, 6.758)	2.943	1.903	(−0.786, 6.673)	0.122	0.255	(−0.378, 0.623)	No mediation

Notes: Bootstrap with 5,000 cluster-level replications. Percentile-based 95% confidence intervals for indirect effects; 95% CI for total and direct effects based on cluster-robust standard errors. N = 6,786 observations; 1,181 firms.

Appendix H Robustness mediation test results for consumer staples sector firms (H4b)

Policy Index	Total Effect (c)			Direct Effect (c')			Indirect Effect (a×b)			Mediation Type
	b	Std. Err.	95% CI	b	Std. Err.	95% CI	b	Std. Err.	95% CI	
Human rights-oriented	3.281	1.872	(−0.388, 6.950)	2.938	1.861	(−0.709, 6.584)	0.344	0.21	(−0.068, 0.755)	No mediation
Consumer-oriented	12.409	4.014	(4.541, 20.277)	12.133	3.998	(4.298, 19.969)	0.275	0.318	(−0.348, 0.898)	No mediation
Market-oriented	4.298	2.859	(−1.304, 8.900)	4.197	2.845	(−1.379, 8.773)	0.101	0.22	(−0.331, 0.532)	No mediation

Notes: Bootstrap with 5,000 cluster-level replications. Percentile-based 95% confidence intervals for indirect effects; 95% CI for total and direct effects based on cluster-robust standard errors. N = 3,849 observations; 648 firms.