

Exploring the Microfoundations of Open Innovation: Insights from the Italian SME-Startup Collaborative Landscape

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Abstract: Small and medium-sized enterprises (SMEs) and innovative startups play a crucial role in driving economic growth and technological advancement. Open Innovation (OI) has emerged as a key strategy for these firms to access external knowledge and foster collaboration. However, while OI research has largely focused on large corporations or SMEs, limited attention has been given to the microfoundations that shape OI collaborations between SMEs and startups. This study addresses this gap by examining the individual and organizational factors that influence the success or failure of such partnerships. While both SMEs and startups face resource constraints and legitimacy challenges, they differ significantly in their market positioning, operational structures, and strategic priorities. SMEs typically have established industry expertise, stable customer bases, and access to financial resources, yet may struggle with rigid processes and risk aversion. Startups, in contrast, are characterized by agility, innovation-driven mindsets, and exploratory approaches but often lack financial stability, market access, and operational experience. These complementarities present both opportunities and challenges for OI collaborations. Adopting a multiple-case study approach, we analyse seven OI projects in the Italian context, each involving an SME and a startup. Through qualitative interviews and secondary data analysis, we identify key microfoundations that enable or hinder collaboration. Additionally, we introduce a framework to explore how different microfoundations interact, showing that enabling factors can yield mixed or negative outcomes when combined with other elements. This research contributes to the OI literature by providing a nuanced understanding of the micro-level dynamics that shape SME-startup collaborations. The study also offers practical implications for managers and policymakers, emphasizing the need for targeted support mechanisms that facilitate strategic alignment and mitigate potential collaboration frictions.

Keywords: Open Innovation; SMEs; Startup; Microfoundations

1. Introduction

Small and medium-sized firms (SMEs) and startups are pivotal in fostering innovation and stimulating economic growth (Simpson, 2004; Autio, 1997; Pushpanathan and Elmquist, 2022; Deschamps et al., 2013). Open Innovation (OI) facilitates access to external information despite constrained resources (Santoro et al., 2018), while OI research frequently emphasizes small enterprises over new ones (Brunswick and Van de Vrande, 2014). Both face challenges regarding legitimacy and competency (Freel, 2003), whereas startups additionally lack skilled personnel, consistent clientele, and established procedures. Recent research connects human capital to open innovation through microfoundations (Chatenier et al., 2010), although it neglects the distinct requirements of SMEs and startups (Bertello et al., 2021; Corvello et al., 2024). This study investigates seven Italian SME-startup open innovation projects (Bertello et al., 2020), posing the question: "In what manner do microfoundations affect open innovation collaboration between SMEs and startups?"

2. Theoretical Framework

2.1 Open Innovation in SMEs and Startups

Small and medium-sized enterprises (SMEs) are vital drivers of innovation and economic development due to their flexibility and enhanced R&D productivity (Simpson, 2004; Autio, 1997; Audretsch and Vivarelli, 1996). However, limitations in manufacturing, distribution, and marketing often impede the commercialization of their inventions (Freel, 2003). Open Innovation (OI) has emerged as a strategic approach for SMEs to mitigate such constraints by leveraging external knowledge (Santoro et al., 2018). Collaborations with technologically diverse partners strengthen both product and process innovation (Bjerke and Johansson, 2015). Nonetheless, OI adoption introduces challenges: inbound OI may weaken internal technological capabilities, while outbound OI risks transferring key knowledge to competitors (Vanhaverbeke et al., 2002; Fosfuri, 2006). Financial limitations, infrastructure deficits, and partner selection issues also hinder SMEs' full engagement in OI (Bigliardi and Galati, 2016; Guertler and Lindemann, 2016).

Innovative start-ups are increasingly recognized as vital contributors to innovation, thanks to their agility and strong technological foundations enabling rapid development of new offerings (Pushpanathan and Elmquist, 2022; Deschamps et al., 2013). Despite this, research has focused more on established SMEs, overlooking start-

ups' specific challenges (Brunswick and Van de Vrande, 2014). These include limited resources and "liabilities of newness": gaining legitimacy, building stable partnerships, and establishing long-term structures (Elfring and Hulsink, 2003; Gruber and Henkel, 2006; Aldrich and Yang, 2012). OI strategies can ease market entry and support innovative business models (Gruber and Henkel, 2006; Dahlander, 2007). However, partnerships bring substantial transaction and alliance management costs (Colombo et al., 2006). Establishing technological prestige via patents or product launches can enhance legitimacy and visibility (Teece, 1986; Stuart et al., 1999).

2.2 OI Microfoundations

OI's microfoundations stress organizational and personal factors influencing innovation potential and openness. Important human capital traits are adaptability, leadership, entrepreneurial attitudes, and techno-business thinking (Chatenier et al., 2010). Chesbrough (2003) underlined the movement of highly educated professionals. Intellectual stimulation and extrinsic incentives like career progress (Benkler, 2017; Ghezzi et al., 2018) are among the motivating factors. T-shaped knowledge, different social networks, and problem-solving experience (Jeppesen and Frederiksen, 2006; Dahlander and Frederiksen, 2012) further increase innovation potential. In SMEs, OI is guided in great part by CEO qualities including entrepreneurial orientation, patience, and education—entrepreneurial orientation, patience, and education—entrepreneurial orientation, patience. In start-ups, entrepreneurs' objectives, perceived behavioural control, and social conventions define partnership decisions (Corvello et al., 2024); internal attitudes and external forces influence openness (Simon et al., 2019).

Research on Open Innovation (OI) collaborations between SMEs and start-ups remains relatively underdeveloped, despite their strong potential rooted in complementary strengths (Bianchi et al., 2010a). SMEs possess in-depth local market knowledge and robust regional networks, which can help start-ups overcome early-stage barriers like limited legitimacy and access to critical stakeholders (Bhidé, 1999). In return, start-ups contribute advanced technologies and agile innovation processes, offering critical support to SMEs navigating digital transformation and maintaining global competitiveness (Ayala et al., 2017; Cavallo et al., 2021). These partnerships foster mutual learning and innovation synergies (Bleeke and Ernst, 1991; Harrigan, 1986; Sarkar et al., 2001). Italy presents a compelling case, with SMEs comprising 78.7% of the national workforce and producing 68.1% of total value added (Bertello et al., 2020). Legislative support, such as Decree Law 179/12, has encouraged the emergence of innovative start-ups (Troise et al., 2022). Yet, existing literature often examines either the SME or the start-up perspective in isolation. For instance, Corvello et al. (2024) examined start-up incentives to work with big businesses, whereas Bertello et al. (2021) examined SME capacities for participating in OI. This disjointed perspective ignores the relationship between start-ups' agility and SMEs' absorptive capacity, which is essential for productive cooperation (Cohen and Levinthal, 1990; Bogers et al., 2017b). Cultural mismatches—where start-ups' adaptable, informal nature may clash with SMEs' structured and risk-averse environments (Brunswick and Vanhaverbeke, 2015)—as well as resource asymmetries, such as disparities in funding, expertise, and market access (Laursen and Salter, 2006), are some of the ongoing obstacles to these collaborations. To close this gap, the current study explores, using the following research question as a guide, the microfoundations supporting successful SME–startup collaboration in OI projects: "In what manner do microfoundations affect open innovation collaboration between SMEs and startups?"

3. Methodology

To explore the collaborative dynamics between SMEs and startups in Open Innovation (OI), this study adopts a qualitative, multiple-case methodology. The case study approach is particularly valuable for capturing the complexity of OI in real-world contexts, offering rich, contextualized insights (Eisenhardt, 1989). By employing a multiple-case design, the study enhances the robustness of findings through replication logic and reduces the influence of researcher bias (Eisenhardt & Graebner, 2007). The analysis centers on SME–startup partnerships, treated as dyadic units to facilitate comparative investigation across cases. This nested structure enables both depth and contrast, helping to surface patterns and divergences in innovation strategies—an important contribution given the limited empirical research in this area (Eisenhardt & Graebner, 2007). Analytical procedures include both within-case and cross-case analysis to uncover nuanced practices at the individual partnership level and synthesize broader trends (Miles, 1994).

3.1 Data Collection

Primary data were gathered through semi-structured interviews with managers, founders, and other stakeholders involved in innovation. Conducted mainly via web meetings for convenience, interviews averaged

45 minutes and explored OI partnerships' origins, management, outcomes, and challenges (Vanhaverbeke et al., 2012). The flexible format encouraged open sharing while ensuring comparability. Each interview covered two sections: (1) the collaboration's formation, motivations, and roles; and (2) outcomes, team structure, success factors, and encountered challenges. Supplementary data were drawn from company websites, internal documents, and industry reports. Follow-up interviews were conducted when new themes emerged. Purposeful sampling was applied to select SMEs (fewer than 250 employees and turnover below €50 million; Scuotto et al., 2017) and startups, defined as "temporary organizations looking for a repeatable and scalable business model" (Blank, 2010). From 15 eligible cases, 7 were selected, resulting in 18 interviews—consistent with sample sizes recommended for theoretical saturation in qualitative research (Eisenhardt, 1989).

3.2 Data Analysis

A case-by-case content analysis was performed on interview transcripts to identify microfoundations influencing OI partnerships. The first phase, open coding, extracted specific concepts from data, capturing organizational practices and strategic behaviours. These were grouped into second-order themes to reveal cross-case patterns (Clark et al., 2010), which were then organised into aggregate dimensions: enabling and limiting microfoundations (Silva et al., 2021). Enabling microfoundations facilitated partnership success, while limiting ones represented constraints. The framework from Barrett and Tsekouras (2022) guided clustering microfoundations by their source—SME, startup, or joint actions. Some microfoundations matched existing literature; others were novel. Cross-case analysis further refined classifications to deepen understanding, a step not needed in within-case analysis due to fewer observations.

3.3 Case Description

Table 1

I	Case I involved Startup A, an organic agricultural producer in Bergamo, partnering with SME I, a marketing consultancy. The goal was to boost market visibility via an omnichannel strategy, including sports partnerships. Success was driven by personal ties and trust but ended after a year due to funding and shifting priorities.
II	Case II featured SME II, a waste container manufacturer, collaborating with Startup B, an IoT smart waste management firm. The integration of IoT sensors into SME II's products was mutually beneficial, supported by strong interpersonal relations. Challenges stemmed from Startup B's limited business management experience and occasional generational friction.
III	Case III connected Startup C, a Milan-based textile startup innovating with marble powder, with SME III, a family-owned yarn dyeing firm. Initiated through a mutual contact and public grant funding, the collaboration led to a new patent despite technical challenges, enabled by regular communication and shared sustainability goals.
IV	Case IV described SME IV, an outdoor awnings manufacturer, partnering with Startup D, specialists in AI and IoT for industrial optimization. Starting with a fabric recognition system, the partnership expanded to a B2B client portal. The collaboration thrived on shared innovation goals and SME IV's preference for agile startup partners.
V	Case V involved SME V, an antivibration engineering firm, and Startup E, a university spin-off developing metamaterial-based acoustic control. Facilitated by a university hub, the partnership produced several projects but struggled in cost-sensitive markets. Strong personal ties sustained ongoing cooperation.
VI	Case VI focused on Startup F, an exoskeleton developer, working with SME VI, an assembly service provider. SME VI helped scale prototypes to production, overcoming Startup F's initial cost-cutting focus on favour of quality, which was critical for wearable tech success.
VII	Case VII detailed Startup G, an IoT antimog mask innovator, collaborating with SME VII, a respiratory equipment manufacturer. Initiated academically, SME VII supported product refinement, scaling, and regulatory compliance. Cultural clashes arose between SME VII's structured style and Startup G's iterative approach.

4. Findings

4.1 Startup Microfoundations

Early recognition or funding was pivotal in building trust with SMEs. Public funding in Case I-A validated the startup and lowered collaboration barriers, while awards in Cases III-C and V-E enhanced legitimacy. However, recognition alone did not guarantee sustained success. Alignment between startup innovations and SME strategic needs was crucial. In Cases II-B and V-E, startup technologies closely matched SME demands, particularly in digital and engineering solutions, driving collaboration initiation. Regarding behaviours, founders in Cases I-A, II-B, and III-C showed openness to partnership, aiming to improve offerings via feedback and

network access. Yet, resource constraints often limited sustained involvement. Delays by SMEs in Cases I-A, III-C, and VI-F stalled momentum, underscoring startups' dependence on ongoing SME engagement. Founder commitment—resilience and steady involvement—in Cases I-A, III-C, and V-E maintained trust despite funding shortages. In Case IV-D, startup adaptability to SME operational needs was key, but the lack of structured management and financial planning gaps in Cases I-A, II-B, and VI-F caused friction and timeline disruptions, requiring SME guidance.

Table 2: Startup Antecedent

Enabling	Limiting
1. External Validation and Credibility - Publicly Funded Startups - Winner of a funded contest	1. Resource Constraints Limited Financial and Operational Resources Available to the Startup
2.Strategic Exploration of Emerging Technologies - Startup Founder's Novel Approach and Pioneering Vision - Interest in Exploring New Technologies and Sectors	
3.Openness to Innovation-Oriented Collaborations Willingness of Startup Founder to Engage with Other Small Entities	

Table 3: Startup Behaviour

Enabling	Limiting
1. Startup Founder Commitment Persistent Effort and Dedication by the Startup Founder	1. Limited Business Management Experience - Misalignment in Investment Priorities - Inadequate Prioritization of Strategic Focus Areas - Underestimation of Qualitative and Coordinative Challenges - Lack of Understanding of Business Processes
2.Startup Founder Flexibility Ability to Rapidly Adapt to Project-Specific Requirements	

4.2 SMEs Microfoundations

From the SME side, antecedents acted as enablers and barriers. In Case V-E, the SME proactively sought external partners aligned with its innovation strategy, showing deliberate openness. SME managers in Cases II-B, III-C, and V-E provided startups with informal insights on technical norms, regulations, and product-market fit, helping with adaptation. SME resource commitment was critical: in Case II-B, the CEO approved the collaboration and allocated funding, stabilizing the startup's environment. However, commitment was inconsistent; in Cases III-C and IV-D, competing priorities and limited managerial capacity caused delays and stalled progress.

Table 4: SME Antecedent

Enabling	Limiting
1. Active Pursuit of Collaborations for Innovation - SME Managers' Receptiveness to Technological Innovation - Intentional Search for Collaboration with Startups	1. Capacity Constraints High Workload Impacting the Availability for New Projects
1. SME Managers' Expertise Extensive SME Managers' Expertise in the Sector	

Table 5: SME Behaviour

Enabling	Limiting
1. SME CEO's Resources Involvement - Commitment to Process Optimization and Quality Improvement - SME CEO Involvement in Startup Investment - Investment in a Patent	

4.3 Joint Action Microfoundations

In Case I-A, prior professional familiarity reduced the time to establish working terms. Similarly, in III-C, trust built through mutual acquaintances eased adjustments during difficulties, and IV-D's pre-existing relationship helped set early expectations. These informal networks lowered uncertainty and lent credibility, enabling focus on operational goals without lengthy trust-building. Interaction quality influenced progress. In III-C, the relationship was described as "familial," based on personal compatibility rather than formality. In I-A, IV-D, and V-E, shared values about business goals and decision-making fostered cohesion, making partnerships more resilient. Teams adapted to challenges rather than withdrawing. However, tensions arose when goals diverged. In VI-F, the startup's rapid innovation focus clashed with the SME's cost containment priority, causing friction. In II-B, misaligned timelines and investment expectations led to coordination breakdown, limiting continuity.

Table 6: Joint Action Antecedent

Enabling	Limiting
2. Established Personal Networks - Trust Established Through Previous Personal Relationships - Initial Contact Facilitated by a Mutual Connection	

Table 7: Joint Action Behaviour

Enabling	Limiting
3. Personal Compatibility Development of Strong, Familial-Like Relationships	4. Priority Divergence Challenges in Aligning Communication
5. Shared Vision and Values Alignment of Vision and Objectives	

These variations informed the framework (Figure 1), which maps microfoundation interactions instead of 5abelling them strictly as enablers or barriers. A configuration that supports progress in one context may hinder it in another. Colour coding highlights outcomes: green for positive, yellow for mixed, red for negative, and white for no interaction. The framework captures how elements combine or clash within collaborations without fixed behavioural classifications.

		Antecedents				Behaviours			
Startup	SME	Active Pursuit of Collaboration for Innovation (E)	Managers Expertise (E)	Established Personal Networks (E)	Capacity Constraints (L)	Resources Involvement (E)	Personal Compatibility (E)	Shared Vision and Values (E)	Priority Divergencies (L)
Antecedents	External Validation and Credibility (E)								
	Strategic Exploration of Emerging Technology (E)								
	Openness to Innovation-Oriented Collaboration (E)								
	Established Personal Networks (E)								
	Resource Constraints (L)								
Behaviours	Founder Commitment (E)								
	Founder Flexibility (E)								
	Limited Business Management Experience (L)								
	Personal Compatibility (E)								
	Shared Vision and Values (E)								
	Priority Divergencies (L)								

Figure 1: Microfoundations interaction framework

5. Discussion

This research examined how individual and relational microfoundations influence SME–startup collaborations, focusing on the unexplored topic of interactions (Figure 1). While previous studies highlight microfoundations in Open Innovation (Bogers et al., 2017a), the case evidence suggests these elements rarely act alone; their impact depends on interactions within the partnership. An attribute that facilitates collaboration in one context

may hinder it in another, especially when enabling microfoundations coexist with limiting ones, sometimes producing mixed or negative results. Shared vision and values were crucial for partnership stability, particularly under resource or coordination constraints. Alignment around purpose-maintained trust and advanced projects despite difficulties (Cohen & Levinthal, 1990). However, shared values alone could not prevent breakdowns when priorities diverged on timelines, investments, or expectations, often surfacing cultural distance and incompatible problem-solving approaches that reduced cohesion and increased friction (Van de Vrande et al., 2009b). Interpersonal compatibility, especially between founders and SME managers, fostered trust and eased navigation through uncertainty, mitigating the impacts of limited capacity or slow decisions (Felin & Foss, 2005). Yet, trust grounded in personal rapport was insufficient when strategic divergence emerged, straining relationships and halting aligned progress. Established networks lowered collaboration barriers; SMEs familiar with startups or introduced by trusted intermediaries faced reduced risk and quicker resource commitment (Blanka & Traunmüller, 2020). These networks functioned as informal validators, reinforcing startup credibility and mitigating limiting microfoundations such as SME capacity and startup funding constraints. External validation through funding, awards, or endorsements enhanced startup legitimacy, easing SME risk concerns and accelerating early decisions when coupled with engaged SMEs (Walker et al., 1997). Nevertheless, legitimacy alone could not prevent friction when other microfoundations opposed collaboration (Robinson & Stuart, 2007). The primary obstacle was strategic misalignment. Divergent SME and startup priorities weakened the effect of typically supportive microfoundations—trust, expertise, openness—leading to resource misallocation, weakened commitments, and tension (Chesbrough & Brunswicker, 2013). Early detection and resolution of misalignment before resource commitment emerged as vital for sustaining partnership viability.

6. Practical Implications

For SME managers, this research highlights the need for a proactive approach to external collaboration. As Ayala et al. (2017) note, partnerships with startups can effectively address internal technological gaps, but success requires more than opportunity scanning. Top management must acknowledge the strong influence of organizational culture on Open Innovation implementation. In firms lacking a collaborative mindset, even well-aligned partnerships may fail. Innovation-oriented networks and openness to external actors provide a crucial foundation for successful collaborations. Early failures often stem from mismatched expectations; thus, clearly articulating strategic goals early on is essential to align intentions and minimize breakdown risk. Trust-building also plays a subtle but critical role. Startups often need managerial guidance navigating regulatory or market complexities, and managers who offer supportive help rather than mere oversight are more successful in fostering viable joint efforts. When internal capacity is limited, recruiting individuals with complementary expertise can alleviate gaps without overwhelming existing teams. From the startup perspective, founders face distinct challenges. The findings emphasize the importance of evaluating organizational microfoundations before collaboration. This self-assessment identifies strengths and clarifies the type of partner a startup can be. Demonstrating enablers such as openness, flexibility, and long-term commitment enhances credibility, especially valued by SMEs in high-risk environments where trust and adaptability outweigh scale or experience (Low & MacMillan, 1988). However, startups must also address common weaknesses—such as weak financial planning or limited managerial experience—early, either internally or through external support, to sustain long-term partnerships. At the policy level, the research underscores the need for more human-centered support structures. Targeted training on collaboration and communication, along with mentorship programs that support both startups and SMEs, emerged as effective practices that significantly enhance conditions for sustained Open Innovation.

7. Conclusions

This study explores the microfoundations crucial to Open Innovation (OI) collaborations between SMEs and startups in Italy, addressing a gap in the literature that predominantly examines OI in large corporations rather than smaller business partnerships. By analyzing seven OI projects, the research identifies both enabling and limiting factors influencing collaboration outcomes through two primary frameworks. The first framework, adapted from Barrett and Tsekouras (2022), categorizes microfoundations into six types: Startup antecedent, Startup behaviour, SME antecedent, SME behaviour, Joint Action antecedents, and Joint Action behaviours. The second framework innovatively examines how interactions among these microfoundations generate different results depending on context, illustrating that factors typically seen as enabling may yield mixed or negative effects when combined with others. Findings highlight that effective collaboration is strongly supported by microfoundations such as shared vision, personal compatibility, and mutual adaptability. Goal alignment fosters

trust and smooth project coordination, enabling SMEs to leverage startups' flexibility and innovative insights. Additionally, established networks and access to venture capital enhance startups' credibility and resource base. Conversely, the study identifies critical barriers including divergent priorities, cultural mismatches, and resource limitations. Early resolution of these challenges in partnership agreements is essential to mitigate conflicts and create a balanced, supportive environment conducive to innovation. The study acknowledges limitations related to its geographic focus on Italy and sector specificity. It suggests that future research could broaden these boundaries through cross-country comparisons and sector-specific analyses, which may uncover distinct challenges and strengths particular to different industries.

Ethical and AI Declaration

No ethical clearance was required.

AI tools were used for copy editing and proofreading

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