

The role of culture in multi-industry collaboration: collaborative lock-in across regional innovation systems

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Abstract

Purpose – This study aims to investigate why some regions with high collaboration intensity experience persistently low innovation performance; a phenomenon we term the collaboration paradox. We introduce and empirically examine the concept of collaborative lock-in to explain how culturally embedded collaboration patterns systematically constrain innovation outcomes despite intensive collaborative activity.

Design/methodology/approach – Integrating regional innovation systems theory, institutional theory, and force-field theory, we develop a multi-level framework proposing seven mechanisms of collaborative lock-in. We adopt a sequential mixed-method design. This includes a systematic literature review, a regional survey of 16 multi-industry actors in Kymenlaakso (Finland, a region with high collaboration but low R&D investment), and 12 qualitative interviews with key innovation system actors.

Findings – Results reveal a systematic force-field gradient: as collaboration moves from internal through dyadic external to network configurations, restraining forces (perceived risk, coordination costs) amplify while relational drivers (trust and familiarity) decline. This produces an aspiration-enactment gap: actors normatively endorse openness but behaviorally revert to familiar partners. Seven empirically validated mechanisms sustain lock-in, including trust-through-familiarity and self-reinforcing feedback where low-novelty outcomes validate risk-averse schemas.

Originality/value – This study conceptualizes collaborative lock-in as a distinct form of regional lock-in focused on relational routines and partner selection schemas. It offers a mechanism-based account of how cultural schemas translate into collaboration decisions, explaining the persistence of suboptimal collaboration equilibria. For policy, findings suggest interventions must recalibrate the perceived balance of forces at the novelty threshold, through risk-sharing mechanisms and trust-brokering infrastructure, rather than merely promoting collaboration volume.

Keywords Collaborative lock-in, Regional innovation systems, Collaboration paradox, Force field theory, Cultural-cognitive schemas

Paper type Research article

1. Introduction

Regional innovation systems (RIS) theory has long been a foundation of regional competitiveness and innovation performance. The fundamental assumption is that innovation results from context-specific geographically concentrated and synergistic relationships between firms, universities, and state institutions (Cooke *et al.*, 1997; Asheim and Gertler, 2005). This theory has driven worldwide policies that promote collaborative networks, cluster development, and triple-helix collaboration. However, an empirical puzzle

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hidden behind the policy consensus suggests a non-linear relationship between collaboration levels and innovation impact ([Aschhoff and Schmidt, 2008](#); [Broekel, 2012](#); [Hottenrott and Lopes Bento, 2016](#)).

Indeed, some regions across Europe and elsewhere exhibit a high intensity of collaboration but consistently poor innovation performance ([Fitjar and Rodríguez-Pose, 2013](#); [Grillitsch and Nilsson, 2015](#); [Isaksen and Trippel, 2016](#)). This collaboration paradox, as we call the phenomenon, suggests that collaboration alone is an insufficient explanation for innovation potential and points to underlying systemic issues. The social foundations that enable collaboration may, under certain conditions, inadvertently constrain novelty and reinforce suboptimal paths ([Uzzi, 1997](#)). This paradox is particularly prominent in regions where dense local networks coexist with limited external knowledge flows and repeated collaboration fails to provide radical or transformative innovations ([Uzzi, 1997](#); [Boschma, 2005](#)).

Recent findings show that innovation performance depends less on intra-regional network size than on openness to knowledge-intensive external partners ([De Noni et al., 2018](#)). However, other research shows that local R&D collaborations can be more applicable to innovation development, while remote partners are only useful in certain situations, such as co-invention networks ([Hazar et al., 2018](#)).

A disconnect between collaboration activity and innovation outcomes indicates a significant theoretical gap in RIS. While the literature covers various forms of regional lock-in, including technological, functional, cognitive, and political ([Arthur, 1989](#); [Grabher, 1993](#); [Boschma, 2005](#); [Tödtling and Trippel, 2005](#)), what remains undertheorized is how collaboration patterns become rigid traps. In particular, the microprocesses that transform structural conditions into enduring collaborative lock-in remain unknown, even when actors profess openness.

The gap is especially problematic because these regions often have structural issues, including organizational thinness, cognitive lock-in, traditional structures, and fragmented capabilities ([Asheim and Gertler, 2005](#); [Boschma, 2005](#); [Tödtling and Trippel, 2005](#); [Marques and Morgan, 2021](#)). Firms may collaborate frequently, but these relationships, often based on familiar ties, yield incremental rather than radical innovation ([Uzzi, 1997](#); [Grillitsch and Nilsson, 2015](#)). Our investigation addresses this gap by asking, “Why do some regions with high collaboration intensity levels show low levels of innovation performance?”

To answer this question, we introduce the concept of collaborative lock-in: a culturally embedded, path-dependent state where regional collaboration practices systematically favour familiar partners and low-novelty projects, which limits innovation despite frequent collaboration. In our study, we define “familiar ties” as relationships with known partners and “closed networks” as structures with limited external bridging.

We built this concept by integrating three complementary perspectives. First, RIS theory provides the structural view that regionally embedded relations shape innovation capacity ([Cooke et al., 1997](#)). Next, institutional theory highlights cultural–cognitive schemas: taken-for-granted assumptions that shape actors’ perceptions and evaluations of collaboration opportunities ([Scott, 2014](#)). Finally, force field theory ([Lewin, 1951](#)) offers a process-oriented perspective: collaboration decisions reflect a dynamic balance between driving and restraining forces. This framework allows us to examine how the balance shifts as collaboration moves from familiar internal relationships to novel external ties. We formulated seven propositions identifying collaborative lock-in mechanisms to guide our empirical investigation.

We answered this question empirically through a sequential mixed-method study in Kymenlaakso, Finland, which is a region where collaboration is highly intensive, yet low R&D investment persists. We combined a systematic literature review (SLR) to determine the global force field of cultural drivers and barriers with a regional survey to measure the local force field dynamics and qualitative interviews to identify the cultural–cognitive mechanisms sustaining these patterns.

This paper proceeds as follows. [Section 2](#) presents the literature review and theoretical framework. [Section 3](#) describes the research context and mixed-methods design. [Section 4](#)

presents the results, synthesizing the force field literature and analyzing the survey and interview data to develop a force field gradient model. Finally, [Section 5](#) discusses theoretical contributions and practical implications, and [Section 6](#) concludes with limitations and future research directions.

2. Literature review and theoretical framework

The RIS theory takes a more geographically based approach to innovation, seeing it as a process in which firms, universities, and state institutions interact ([Cooke et al., 1997](#); [Asheim and Gertler, 2005](#)). This synergy is seen as a key element of competitiveness and spurs huge policy efforts that aim to foster collaboration. However, there can also be a negative relationship between collaboration intensity and innovation performance ([Fitjar and Rodríguez-Pose, 2014](#); [Grillitsch and Nilsson, 2015](#); [Isaksen and Trippl, 2016](#)). The collaboration paradox implies that collaboration is not sufficient to explain innovation performance, and collaboration might thus have an unintended side effect of inhibiting novelty in the social foundations of collaboration ([Uzzi, 1997](#)).

An example is the relationship between the size of an intra-regional network and innovation performance, where being open to external knowledge-intensive partners is more relevant than network size in lagging European regions ([De Noni et al., 2018](#)). Innovation development can be facilitated by the involvement of local R&D partners, but not distant partners in all contexts, for instance, in co-invention networks ([Hazır et al., 2018](#)). To bring to light sustained underperformance in the face of high levels of collaboration, the RIS literature has adopted the concept of lock-in.

2.1 Regional lock-in and the collaboration paradox

RIS literature attributes underperformance to lock-in, in which regions get ensnared in suboptimal development trajectories. The following types of lock-in have been identified: technological lock-in to outdated industries ([Arthur, 1989](#); [Grabher, 1993](#)), functional lock-in to rigid interfirm relationships ([Grabher, 1993](#)), cognitive lock-in to rigid mental models ([Grabher, 1993](#); [Boschma, 2005](#)), and political lock-in to capture policy through incumbents ([Tödtling and Trippl, 2005](#)). These become more severe when organizations are thin, intellectual capital is drained, and cognitive proximity exists ([Boschma, 2005](#); [Tödtling and Trippl, 2005](#); [Isaksen and Trippl, 2016](#)).

There are currently insufficient theories and explanations about the relationships between collaboration patterns and lock-in. Research suggests that, while close relationships are not a prerequisite for innovation, the mechanisms by which such relationships lead to lock-in and lasting retention remain unknown ([Fitjar and Rodríguez-Pose, 2013, 2014](#); [Grillitsch and Nilsson, 2015](#)). Shared mental models ([Grabher, 1993](#)) have been identified, but not in relation to decisions. [Boschma \(2005\)](#) did not address partner selection but did take a geographic approach when discussing cognitive proximity. [Sydow et al. \(2009\)](#) presented a general theory of path dependence but didn't focus specifically on the issue of collaboration routines.

One exception is [Burger and Sydow \(2014\)](#), who conducted an empirical study of path dependence in inter-organizational networks. They found nine indicators capturing the continuum of bargaining, from flexibility to lock-in, that are associated with self-reinforcing processes. However, their study, focused on bargaining in the photonics industry, did not examine RIS or cultural–cognitive schemas of partner-selection biases.

[Hertrich and Brenner \(2023\)](#) classified German regions according to their dominant innovation barriers but did not examine the causal mechanisms underlying these barriers, leaving this to future case studies. Therefore, these mechanisms are not well understood.

Actor, network and institutional diversification, and specialization are key to transformational innovation within a regional system, according to [Asheim \(2019\)](#). Differentiated systems have multiple knowledge bases, complementary capabilities, and

different institutional logics that allow for the possibility of recombinant innovation and new path development (Boschma and Frenken, 2010). Research has shown that areas with a diverse industrial base and complementary industries are more innovative. Differentiated collaboration portfolios are most beneficial in lagging regions, both in terms of local and external collaboration (Boschma and Frenken, 2010; De Noni *et al.*, 2018).

In contrast, in low differentiation areas, there is more homogeneity in traditional areas and structural challenges in transformative innovation (Isaksen and Trippel, 2016). However, similar knowledge bases and mental schemas restrict recombination potential, even in cases of intense collaboration (Broekel, 2015).

Many peripheral areas have drawbacks, such as traditional sectors, limited skilled workforce, low social capital, and low system differentiation (Naderi and Vilko, 2026), that weaken the innovation system and break up collaboration networks (Asheim, 2019). In such circumstances, firms working with existing partners may produce incremental rather than radical results. This induces the collaboration paradox, or the lack of a correlation between collaboration activities and innovation performance (Fitjar and Rodríguez-Pose, 2013, 2014; Grillitsch and Nilsson, 2015).

The closure–brokerage trade-off (Coleman, 1988) and the paradox of embedded ties (Uzzi, 1997) are both described with network theory. Closure (dense, trust-based networks) promotes coordination and sharing of knowledge but can limit new knowledge, while structural holes and bridging positions provide a variety of knowledge and higher coordination costs, but also uncertainty (Vedres and Stark, 2010). So, collaboration both facilitates and constrains exploration. Results vary based on regional setup and network structure.

Enabling conditions (e.g. strength of research and funding, external relations) can overcome structural disadvantages in peripheral regions to deliver more innovation. Innovation thus relies on configurations and not on individual factors (Nordli *et al.*, 2024). The cognitive schemas of the culture for risk, trust, and legitimacy perceptions need to be understood because they guide collaboration in the face of uncertainty.

2.2 Cultural–cognitive foundations of collaboration choices

Although structure, proximity, and institutions are key factors in accounting for the nature of collaboration as revealed in RIS and network perspectives (Cooke *et al.*, 1997; Boschma, 2005), less addressed by these perspectives are the micro-level processes for sense-making of opportunities and risks (Weick, 1995; Felin *et al.*, 2015). To explain suboptimal collaboration equilibria, one needs to look at culturally embedded schemas that influence perceptions of legitimacy, appropriateness, and risk. The institutional theory is relevant here because it emphasizes the importance of assumptions affecting perceptions of stable organizational practice (Thornton *et al.*, 2012; Scott, 2014). Thornton *et al.* (2012) demonstrated that these schemas are the indicators of legitimate partners, acceptable governance, and tolerable uncertainty.

In areas of economic shortfalls, adaptive schemas such as risk aversion and familiarity or viewing trust as earned over time become institutionalized (Grabher, 1993; Nooteboom, 2002). In the absence of formal institutions, informal ones, such as social sanctioning, shape collaboration more strongly. In low levels of trust and less informal and formal control, networks are closed and selective. This fragmentation reduces interactive learning and focuses capacities in a few companies, thus limiting regional development (Marques and Morgan, 2021).

They are self-reinforcing and path-dependent, being reproduced by socialization, homophily, and institutional reinforcement, as described by David (1985) and Pierson (2000). Familiarity is deemed to be a good thing when collaboration with established partners is successful, and when it fails, it is seen as proof of risk (Weick, 1995; Sydow *et al.*, 2009). With the inward-facing groups that have formed, the level of familiarity trumps any level of trust, which means they don't see outside opportunities. Actors also overestimate the risk of strangers, thereby diminishing knowledge sharing. This can lead to a lack of coordination and innovation because these dynamics can result in mismatched expectations and trust (Mitcheltree, 2023).

This is a cultural institutional failure that is greater than a network failure. To foster predictable and low-novelty alliances, regions create collaboration scripts (Oliver, 1992). Even where actors espouse openness, the underlying schemas continue to reproduce closed behaviour. The “aspiration-enacted collaboration” paradox (Meyer and Rowan, 1977) does not reflect deliberate hypocrisy on the part of the actors, who are largely unaware of the inconsistency. Rather, it is an authentic contradiction based on a cultural–cognitive schema. This gap must be addressed with a dynamic framework that will account for how schemas influence real-world decisions about collaboration.

2.3 Integrating a force field perspective: from schemas to action

The literature on proximity and inter-organizational collaboration indicates that perceived costs of coordination, level of risk, and differences in knowledge are greater when the relationship is more distant, especially when the other party is less familiar (Nooteboom, 2002; Boschma, 2005; Laursen, 2012). Yet these studies cannot fully account for the formation of these perceptions and their conversion to decisions.

To connect the macro-level schema with the micro-level decision, we applied Lewin’s force field theory (1951), which sees decisions as a product of dynamic tension between driving and restraining forces. In balance, there is a temporary equilibrium; when these forces are out of balance, change occurs. We transfer the findings of collaboration decisions to the perceived drivers and restraints. Managers consider both factors in any conceivable partnership, particularly with new partners, and the decision is based on the balance at that time.

Importantly, such forces are not fixed; they systematically change, from internal collaboration through dyadic relationships to open networks. This proximal force field is influenced by cultural schemas of cognition. A risk-averse schema exacerbates uncertainty and unfamiliarity with partners. A trust-through-familiarity schema means that trust is based on previous interactions, which are not present in new networks.

This creates a gradient. As novelty increases from internal to network collaboration, restraining forces amplify, while relational drivers that buffer restraints decline (Nooteboom, 2002; Laursen, 2012). Rather than being objective, these forces are perceived through schemas. This gradient explains the aspiration–enactment gap in which actors support external collaboration in theory but avoid new partners in practice, especially when decisions use unknown partners. Thus, conditional openness emerges.

2.4 Research gaps

Despite force field theory’s promise, the literature has not systematically identified collaborative lock-in mechanisms. Analysis of prior research (Table 1) reveals several gaps. Few theories explain how collaboration patterns become trapped in suboptimal paths. The microprocesses of risk assessment and partner selection remain unclear in RIS and network approaches. And cultural–cognitive aspects, risk aversion, familiarity-based trust, and perceived legitimacy are not sufficiently integrated into RIS theory. The field also lacks a dynamic mechanism that explains schema reproduction across collaboration contexts, from internal routines to open networks.

These gaps require a framework that moves beyond structure and networks to explain how cultural–cognitive schemas translate into collaboration patterns and regional lock-in. The following section develops this framework.

2.5 Theoretical framework: collaborative lock-in as a new concept

The previous section identified four research gaps and showed that prior studies have not systematically addressed collaborative lock-in’s cultural–cognitive mechanisms. To fill these gaps, we created a synthetic theoretical framework that defines collaborative lock-in, presenting a multilevel conceptual model and articulating seven propositions in the following subsections.

Table 1. Key concepts and methods in studies on regional lock-in, collaboration, and innovation

Study	Key finding	Methodology
Grabher (1993)	Threefold lock-in (functional, cognitive, political) in the Ruhr: strong intraregional ties cause paralysis, dependent suppliers without R&D, groupthink, and protection of declining industries	Qualitative historical case study of Germany's Ruhr region (1970s–80s) using economic indicators, expert interviews, and industry surveys
Arthur (1989)	Under increasing returns, random events can lock the market into an inferior technology. Allocation is non-ergodic and inflexible; laissez-faire does not guarantee survival of the best technology	Dynamic stochastic model with absorbing barriers (random walk); path-dependent strong law theorems and non-linear urn schemes
Uzzi (1997)	75% of plant relocations yielded no labor cost savings. Survival requires a balanced mix of embedded trust-based ties and arm's-length relations. Loss of network diversity or collapse of a core firm triggers decline	Integration of comparative cost and threat-rigidity perspectives; historical plant migration data (1960–85) and network metrics of the New York apparel industry (1992)
Boschma (2005)	Geographical proximity is neither necessary nor sufficient for innovation. Five proximity dimensions (cognitive, organizational, social, institutional, geographical) can substitute for or complement each other. Too much of any causes lock-in	Conceptual critical literature review, creating a five-dimension proximity framework; argues for firm level testing considering absorptive capacity and network position
Hassink (2010)	Old industrial areas are not automatically locked in renewal vs. adjustment depends on sectors specific traits, contingent path dependence, and local political-institutional contexts	Interviews, policy documents and literature research, qualitative cross regional, cross sectoral comparison of 4 regions in Germany and South Korea
Tödtling and Trippel (2005)	No one-size-fits-all innovation policy. Lagging regions face distinct failures: peripheral areas (organizational thinness), old industrial areas (lock-in), some metropolitan zones (fragmentation). Policy must be differentiated	Conceptual RIS based analysis that moves away from success towards problem areas and identifies three types of innovation deficits and allows specific policy options to be drawn
Grillitsch and Nilsson (2015)	Firms with poor local knowledge spillovers collaborate more externally, but this compensates only for firms with strong internal capabilities. Weaker firms remain dependent on regional resources	Data analysis of innovative Swedish firms based on the Community Innovation Survey (CIS) 2008, and microdata from Statistics Sweden
Burger and Sydow (2014)	Interorganizational networks can become path-dependent through self-reinforcing coordination effects and complementarities. Nine lock-in indicators (e.g. reduced alternatives, replication, inertia). Two of three photonics networks moved from flexibility to full lock-in	Qualitative case study of three regional photonics networks in Germany; semi-structured interviews, content analysis, pattern-matching to nine path-dependence indicators
De Noni <i>et al.</i> (2018)	Network size alone does not improve innovation performance in lagging regions. Benefits come from collaborations that extend beyond the region, especially with knowledge-intensive areas. Openness and quality matter more than size	Panel fixed-effects regression of European regions, using OECD RegPat patent data; collaboration measured by co-patenting networks, innovation by patent counts

(continued)

Table 1. Continued

Study	Key finding	Methodology
Nordli <i>et al.</i> (2024)	Peripheral regions can achieve high innovation through different combinations of collaboration and funding. Strong collaboration with national partners and research institutions is crucial; public funding works best when paired with collaborative networks	Qualitative Comparative Analysis (QCA) of Norwegian economic regions using CIS data; examines configurations of collaboration (firms, research institutions) and public funding (regional, national)
Present study	Introduces collaborative lock-in, a culturally embedded, path-dependent state sustained by seven mechanisms (e.g. trust through familiarity, aspiration-enactment gap). The force-field gradient explains why restraining forces amplify with relational novelty, producing conditional openness and persistently low innovation despite high collaboration intensity	Sequential mixed-method design: systematic literature review, regional survey (multi-industry actors in Kymenlaakso, Finland), and qualitative interviews with key innovation system actors

Source(s): Authors' own work

2.5.1 Defining collaborative lock-in. By synthesizing the structural insights of RIS, cultural-cognitive depth of institutional theory, and processual mechanism of force field theory, we define collaborative lock-in as follows:

Collaborative lock-in is a culturally embedded path-dependent state of a regional innovation system in which dense practices of trust-based collaboration, governed by schemas that value familiarity and risk mitigation, systematically reduce the exposure to novel knowledge and reinforce partner homogeneity, thereby restraining innovation outcomes despite the high rates of collaboration.

To see the novelty of this concept, it is useful to distinguish it from prior accounts of regional stagnation. Studies such as those from Grabher (1993), Boschma (2005), Tödtling and Trippel (2005), and Hassink (2010) have deepened our understanding of macro-level regional lock-in. However, Martin and Sunley (2006) pointed out that the notion remains conceptually vague and overly structural, without a clear specification of the micro-level agency that maintains or alters development paths. This critique is especially relevant for the relational dimension of lock-in. Gilsing and Nooteboom (2005), for example, showed how dense, strongly tied networks limit exploration of novel partners at the network level, but they did not explore the cognitive cultural schemas driving such partner selections. Recent empirical work confirmed that overcoming relational attachments, meaning the persistent tendency to stick with familiar collaborative partners, represents a distinct challenge separate from technological renewal (Wang *et al.*, 2024). Similarly, Hwang *et al.* (2025) demonstrated that partner-selection decisions continue to be governed by proximity-based heuristics even as knowledge complexity increases. A closely related logic is the threshold argument: Uzzi (1997) showed that embedded ties enhance performance only up to a point, beyond which over-embeddedness insulates firms from outside information, and Boschma (2005) generalized this across five dimensions of proximity. Both, however, locate the threshold in the properties of ties and proximities themselves. Collaborative lock-in relocates it in the cultural cognitive schemas through which actors judge which partners are safe to approach.

Our concept bridges the gap between macro and micro by combining the structural understanding of the collaboration paradox and a mechanism-based account of cultural-cognitive path dependence. Unlike technological or cognitive lock-in, collaborative lock-in concentrates specifically on the relational routines and scripts that guide partner selection and governance (Hassink, 2010). It differs from earlier accounts by placing the lock-in mechanism

not in the industrial path, network structure, or knowledge complexity, *per se*, but in the cultural–cognitive schemas actors use to evaluate prospective partners and in the resulting force field dynamics that make familiar, low-novelty ties feel systematically safer than novel ones. In this respect, the construct represents a synthesis: it incorporates the path-dependence logic of regional lock-in and the relational-tie mechanics of network lock-in through an institutional cognitive schema lens that is missing from previous work. Lock-in is maintained by a self-reinforcing cycle: cultural schemas steer collaboration towards familiar ties, generating closed networks and low-novelty outcomes which, in turn, validate and reinforce the original schemas (Grabher, 1993; Sydow *et al.*, 2009).

2.5.2 Conceptual framework. Figure 1 outlines the conceptual framework for understanding collaborative lock-in in peripheral RISEs. The logic is from macro to micro levels: regional structural conditions (such as industrial legacy, institutional conditions, and organizational thinness) influence the cultural–cognitive schemas of trust and risk, along with partner appropriateness. At the micro-level, these schemas contribute to a proximal force field component that is responsible for considering the balance of the driving forces (e.g. access to complementary knowledge, resources, and relational benefits), and the restraining forces (e.g. uncertainty, coordination costs, and perceived risks). This sense of balance leads to collaboration choices. Collaboration relationships transition from internal to dyadic to network, bringing increased contextual novelty and relational distance along with an aspiration–enactment gap that reveals a desire to work with new partners, yet choosing familiar ones.

The meso level is characterized by a dense local network of collaboration and weak network bridging due to repeated partner selections. Such networks promote coordination and trust but also restrict access to a variety of sources of knowledge, thereby fostering incremental innovation, knowledge redundancy, and ultimately, collaborative lock-in, meaning sticking to existing ways of working in collaboration despite identified shortcomings. Path-dependent development is the result of a reinforcing feedback loop between the outcomes of innovation and the cultural–cognitive schemas. Acceptable results from repeated interactions with familiar partners sustain a belief in the capability of trusted relationships and risk avoidance, which gradually reduces the perceived choice of partners. So, adaptive schemas start to act as constraints to transformational change and produce the same kind of collaboration and deepening lock-in.

2.5.3 Propositions. Based on this framework, we formulated seven propositions (Table 2) specifying collaborative lock-in mechanisms. They are not statistical hypotheses but analytical heuristics to guide empirical investigation and refine through qualitative pattern detection.

2.5.4 Research contributions. This study makes three important theoretical contributions. First, it introduces collaborative lock-in as a state that is nuanced and culturally entrenched, as well as path-dependent, meaning that the region’s actors prefer working with known partners rather than new ones, which would account for the high intensity of collaboration alongside

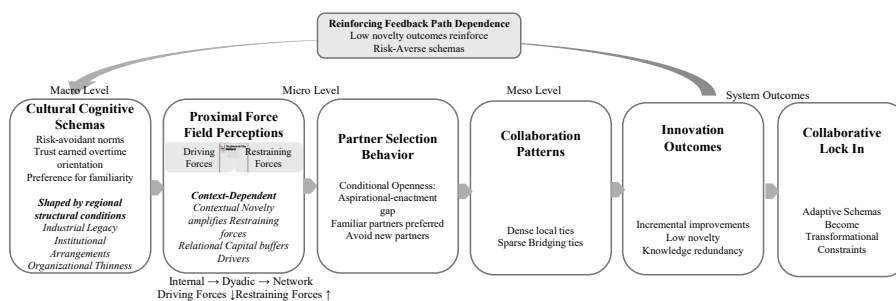


Figure 1. Conceptual framework: regional lock-in and collaboration paradox. Source: Authors' own work

Table 2. Propositions on the mechanisms of collaborative lock-in

No	Proposition name	Description
P1	Foundational Schema	Regional actors develop risk-averse schemas: they avoid risk, trust only familiar partners, and believe familiarity equals safety. These schemas are shaped by the region's history and economy
P2	Persistence Schema	Once established, schemas persist through reinforcement: new actors learn them, they ignore information that contradicts their beliefs, they stick with similar partners, and successful familiar collaborations validate the schemas
P3	Proximal Force-field	Schemas determine which forces actors perceive as driving (trust, commitment) or restraining (risk, uncertainty, costs). This perception varies with the novelty of the collaboration context
P4	Conditional Openness	Actors endorse openness in principle but choose familiar partners in practice. This creates an aspiration-enactment gap: stated intentions diverge from actual behavior
P5	Restraint Amplification	Restraining forces increase as collaboration moves from internal to dyadic external and then to network configurations. The sharpest rise occurs at the transition from dyadic to network level
P6	Driver Decline	The effectiveness of relational drivers (trust, commitment, familiarity) declines with increasing novelty. Familiarity is the most context-dependent: it works well in familiar settings but loses effect in novel configurations
P7	Self-Reinforcing Feedback	Repeated familiar-partner choices yield low-novelty outcomes. Actors interpret these outcomes as confirmation that new partners are risky and familiar ones are safe. This strengthens the original schemas and deepens lock-in

Source(s): Authors' own work

low innovation performance. Second, it incorporates cultural–cognitive dimensions into RIS theory by showing how schemas that are taken for granted with respect to risk, trust, and appropriate partners influence micro-level collaboration decisions. Third, it extends the force field theory and proposes a restraining force field gradient argument to explain how the strength of the restraining forces increase and relational drivers decrease when moving from internal through dyadic to network configurations of collaboration, accounting for the aspiration–enactment gap. These contributions together challenge the dichotomy of the collaboration paradox, moving from its structural and network perspective to a process that is culturally embedded and mechanism-driven.

3. Research context and methods

3.1 Research design and methodology

We used a sequential exploratory mixed-methods design (Creswell and Clark, 2017) with an overall focus on global patterns and relationships applied to a regional diagnosis and mechanism-based explanation, resulting in a transferable theory of collaborative lock-in (Eisenhardt, 1989; Gioia *et al.*, 2013). Analytical generalization involves explaining complex social phenomena with a mechanism-driven explanation (Yin, 2018). We use abductive logic, which is alternating between theory and empirical content, to elaborate on concepts and establish scope conditions (Timmermans and Tavory, 2012). The study took place in three stages. Phase 1 developed the global force field of cultural drivers and barriers by systematically reviewing the literature. In Phase 2, these forces were operationalized at the regional level, looking at both aspiration (importance) and enactment (likelihood) to determine the aspiration–enactment gap. This gap was addressed in Phase 3 using open-ended questionnaires and semi-structured interviews to demonstrate cultural–cognitive mechanisms.

The sequence enables methodological triangulation (Denzin, 2017): the survey gave insights into the extent of collaborative lock-in, and the interviews provided insights into the

mechanisms and shared constructions of practice. The design is based on literature trends and cultural–cognitive schemas in low-innovation regions, thus ensuring that the findings are theoretically grounded and context sensitive.

3.1.1 Phase 1: systematic literature review. To set up an analytical baseline of cultural forces shaping innovation collaboration globally, we conducted an SLR according to [Xiao and Watson \(2019\)](#). The search was conducted in April 2025 and was limited to peer-reviewed English-language journal articles (2015–2025). Google Scholar was chosen as the search engine for interdisciplinary research that is relevant to the fields of innovation management, economic geography, organizational sociology, and regional studies ([Falagas et al., 2025](#)). To address the opacity of algorithms, the search was supplemented through references from the 19 core articles for backwards and forwards citation tracking (snowballing) and by cross-checking the key papers against Scopus. Search strings included “innovation collaboration,” “inter-organizational relations,” and “culture” with driver/barrier operators.

Of the 1,180 initial hits, 19 core articles were identified through screening based on inclusion/exclusion criteria and were assessed for full text. The last set was taken as a concentrated and precision set. The explicit consideration of cultural drivers or barriers to inter-organizational collaboration at a regional or organizational level, as opposed to only structural, policy, or network factors, was essential for inclusion. As such, studies were not considered for inclusion if they did not include cultural–cognitive variables such as trust, partner similarity, cultural asymmetry, or risk-aversion schemas. Once no new cultural forces were found in the last five articles screened, saturation was achieved, indicating that the sample was sufficient for qualitative metasummary.

Evidence synthesis was conducted using the qualitative metasummary method ([Sandelowski and Barroso, 2007](#)) to code results into themes and calculate the frequency effect sizes of each cultural force. Themes were arranged according to Lewin’s force field analysis to identify cultural drivers and restraints that were then used to interpret low-innovation regional contexts in the next empirical phase.

3.1.2 Phase 2: empirical regional survey. A multi-industry survey was conducted in a low R&D area that has a high perceived collaboration dimension to measure the impact of these cultural factors. We reached out to regional innovation actors at 36 organizations through Google Forms and purposive sampling. Ultimately, a total of 16 organizations from five sectors (manufacturing, circular economy, high tech, engineering, and education) responded.

The sample size was small because the population of strategic innovation actors in Kymenlaakso is rather small. Strategic depth rather than statistical representativeness was the goal of purposive, information-oriented sampling ([Flyvbjerg, 2004](#)). Even a small sample can show that there can be big differences between what is perceived as important and what is reported as likely. The respondents consisted of project managers, consultants, development executives, and CEOs and represented various aspects of the regional collaboration culture. The questionnaire consisted of mostly multiple choice items assessing the likelihood and importance of cultural norms related to innovation collaboration.

3.1.3 Phase 3: open-ended questionnaire and follow-up interviews. We designed an open-ended questionnaire for key actors in RIS to assess cultural–cognitive mechanisms explaining survey patterns.

We used purposive sampling based on three criteria: (1) organization type to ensure representation from firms, public agencies, intermediaries, and knowledge institutions; (2) functional role for informants with strategic decision-making authority (e.g. CEOs; research, development, and innovation (RDI) directors; development managers; senior advisors); and (3) regional embeddedness to prioritize actors with at least two years of experience in the Kymenlaakso innovation system. Potential participants were identified through stakeholder mapping and snowball sampling. We approached 22 individuals who satisfied these criteria and completed semi-structured interviews with 12 respondents who agreed to participate (55% response rate).

The composition aimed to capture the full spectrum of perspectives, from core industrial actors (manufacturing, logistics, food industry) to enabling institutions (public administration, education, RDI support, intermediaries). This made it possible to analyze how collaboration practices, constraints, incentives, and cultural–cognitive schemas vary across structural positions in a low-innovation context. Including both senior practitioners (up to 20 years) and emerging leaders (2–5 years) enabled us to examine whether schemas are generationally or institutionally persistent. Given the limited population of strategically positioned innovation actors, this sample size is consistent with guidance that qualitative sample adequacy is judged by information power and interpretive depth, not statistical representativeness (Guest *et al.*, 2006; Malterud *et al.*, 2016).

3.2 Case selection: the Kymenlaakso region

Kymenlaakso, a region in south-east Finland, has a traditionally industrial economic base of forestry and port logistics that is now working to diversify and modernize (Finnvera, 2018; Pöntinen and Vilko, 2023). The region has well-defined innovation-policy goals and concerns about improving RDI and expertise, but faces the typical constraints of smaller, less central regions (Regional Council of Kymenlaakso, 2024; Naderi, 2025). Kymenlaakso has low levels of R&D investment (Neittaanmäki, 2023) but high perceived levels of inter-organizational collaboration (Suomen Yrittäjät, 2023). This combination makes it an interesting case from a theoretical standpoint for studying the collaboration paradox and collaborative lock-in mechanisms (Eisenhardt, 1989; Yin, 2018).

Kymenlaakso's low R&D investment derives from historical and structural conditions. This close industrial cluster (Finnvera, 2018) went through significant change in the 2000s and 2010s, with mill closures and reorganizations, which left a legacy of organizational thinness. Kymenlaakso's R&D investment is among the lowest in Finland, typical of sectors with lower R&D intensity than found in high-tech industries (Neittaanmäki, 2023). The regional need to accelerate RDI and boost smart specialization (Regional Council of Kymenlaakso, 2024) further indicates limited R&D capacity. A recent study identified significant barriers as lack of networked innovation and trust at the ecosystem, inter-firm, and individual levels (Pöntinen and Vilko, 2023). These factors explain Kymenlaakso's persistently low R&D investment despite its strategic location.

4. Results and analysis

This section provides the outcomes of our sequential mixed-method research that consisted of four stages and was conducted in the context of Kymenlaakso-based collaborative lock-in. First, the global force field was synthesized by following an SLR and based on the force field theory (Lewin, 1951), with a view to determining driving and restraining forces. Second, we provide the quantitative survey findings, which provide diagnoses of the regional force field and the aspiration–enactment gap. Next, we discuss the qualitative interviews that account for the cultural–cognitive mechanisms. Fourth, we bring these findings together into a force field gradient model that explains how collaborative lock-in persists. This structure enabled us to link the theoretical field from the literature with the enacted field observed in the survey and interviews, providing an integrated explanation of the collaboration paradox.

4.1 Global force field: literature synthesis

Table 3 presents the 19 core articles included in the qualitative metasummary, along with the extracted driving and restraining forces for each study.

The qualitative metasummary hints at a consistent worldwide power field. The most common enabling conditions are trust (79%), and communication (47%), which are the most prominent. Similarly, partner differences (68%) and cultural asymmetry (42%) are the predominant forces. This indicates that the driving force of innovation collaboration is the

Table 3. Included studies and extracted driving and restraining forces

Paper	Drivers	Restraints
Han and Xu (2024) O'Dwyer et al. (2023)	Trust; Shared Goals and Culture Trust; Flexibility; Partner Familiarity; Commitment; Communication; Contracts/Formal Procedures	– Differences Between Partners; Lack of Trust; Control; Cultural Asymmetry; Opportunism/Free Riding; Risk Aversion (Fear); Lack of Openness (Reluctance to Share)
Oliver et al. (2020) Ferrari et al. (2019)	Trust; Partner Similarity; Respect Trust; Commitment	Diverging Timelines; Intellectual Property (IP); Bureaucracy; Self- Sufficiency (NIH Syndrome) Lack of Trust
Nguyen et al. (2023) Spithoven et al. (2021)	Trust; Communication; Knowledge Sharing Institutional Thickness (Regional Support); Trust; Partner Similarity (Cognitive Distance; Knowledge Base)	–
Zhao et al. (2015) Kharazmi and Dartoomi (2023)	Commitment; Trust; Communication; Informal Knowledge Sharing; Regional R&D Trust; Commitment; Communication; Partner Similarities; Environmental Support	Differences Between Partners; Strict Rules and Contracts; Regional Bureaucracy Risk Aversion; Resistance to Change; Power Distance; Differences Between Partners; Lack of Trust
Enkel et al. (2018) Malmström and Johansson (2015)	Trust; Connectedness; Openness Openness; Trust; Commitment; Goal Congruence	– Differences Between Partners; Lack of Trust; Divergent Opinions; Lack of Commitment
Giglio et al. (2025) Evald et al. (2025)	Partner Compatibility (Similarity); Regional Support; Informal Relationships; Commitment Trust; Acceptance of Uncertainty; Commitment; Openness; Partner Similarities (Knowledge Base); Communication	Cultural Asymmetry; Differences Between Partners (Cognitive Distance) Differences Between Partners
Dekker et al. (2024) De Groote et al. (2023)	– Trust; Contracts; Openness	Cultural Asymmetry; Differences Between Partners (Cognitive Distance) Differences Between Partners; Control; Power Distance
Klimczak et al. (2023) Dzhengiz (2020) Dekkers et al. (2019)	Trust Trust; Shared Goals and Culture; Familiarity Openness (Resources; Knowledge; Ideas)	Risk Aversion Lack of Trust; Opportunism; Power Imbalance Lack of Trust; Control; Fear of Knowledge Loss; Power Distance; Risk Aversion
Hertrich and Brenner (2024)	–	Regional Image; Cultural Asymmetry; Bureaucracy; Lack of Regional Support; Differences Between Partners; Risk Aversion; Lack of Trust

Source(s): Authors' own compilation based on the systematic literature review

removal of cognitive and cultural differences, which is promoted by a common cultural language and shared values. These findings can be a useful reference point to determine if the relative importance of these forces changes in various contexts.

The global force field identifies trust, communication, and partner differences as the most salient forces. However, global patterns may not fully capture region-specific dynamics, so we investigated how these forces operate in Kymenlaakso through survey data.

4.2 Quantifying the collaboration paradox: likelihood vs. importance

The multi-industry survey confirmed a region-specific collaboration paradox: regional actors fully endorse open innovation, yet reported practices remain limited to familiar, low-novelty relationships. Table 4 quantifies these cultural forces, and Figure 2 compares importance and likelihood.

Results point to a strong aspiration–enactment gap: importance scores for most drivers are high, but likelihood (enactment frequency) is significantly lower. Focusing on patterns where the gap exceeded 2.0 or the importance exceeded 5.0, the top five drivers by likelihood were familiarity (6.75), low power distance (6.75), commitment (6.63), trust (6.13), and internal collaboration (5.75). The greatest gaps were for external collaboration (importance, 5.75, vs. likelihood, 3.13) and new partners (importance, 3.88, vs. likelihood, 2.38).

Table 4. Importance and likelihood of cultural forces in regional innovation collaboration

Cultural forces	Likelihood	Importance	Cultural forces	Likelihood	Importance
Commitment	6.63	8.25	Similar knowledge base	3.53	3.40
Trust	6.13	7.38	Cultural symmetry	3.50	3.13
Familiarity	6.75	6.63	Different knowledge base	2.36	4.40
Internal collaboration	5.75	7.13	Similar timeframe	3.13	3.13
Low power distance	6.75	6.00	New partner	2.38	3.88
Long-term commitment	4.25	7.00	Cultural asymmetry	2.50	3.38
Regional support	4.38	5.75	Informal communication	2.81	2.75
Similar goals	5.13	4.88	Outside contracts	1.75	2.67
External collaboration	3.13	5.75	High power distance	1.69	2.69
Contracts	3.75	4.38	Risk	1.75	2.19
Different goals	3.31	4.69	Different timeframe	1.40	2.47
Control	4.00	3.88	Uncertainty	1.06	2.38
Even control	3.67	3.63	Lack of trust	0.19	

Source(s): Authors' own work

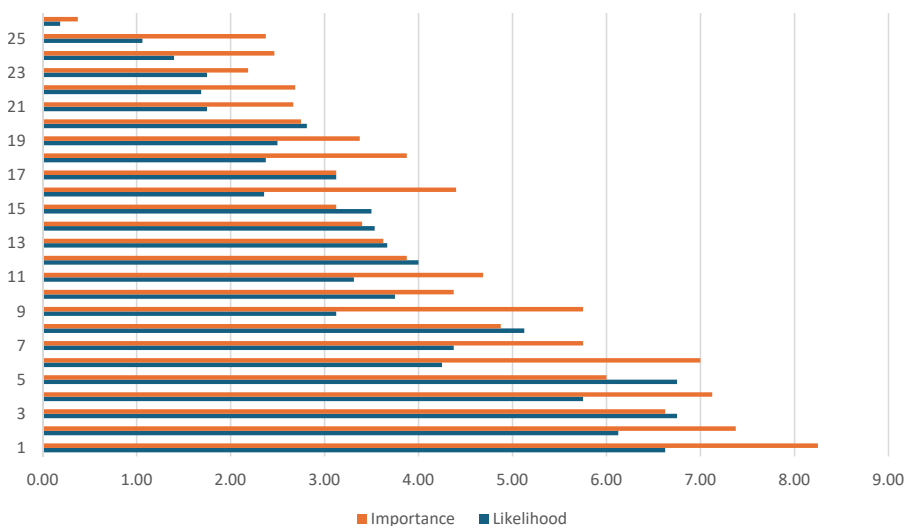


Figure 2. Likelihood vs. importance of cultural forces in Kymenlaakso. Source: Authors' own work

Distinctively, lack of trust was rated as non-existent by 81% (likelihood) and 63% (importance) of respondents, indicating localized trust rather than generalized distrust. Unlike the global synthesis, where lack of trust appeared as a primary restraint (42%), in Kymenlaakso it is largely discounted. Trust is thus a taken-for-granted baseline: assumed until violated. However, this spatially and socially localized trust generates a familiarity trap. While 63% of actors reported a high likelihood of working with familiar partners, 50% identified a low likelihood of working with new partners.

A risk–uncertainty disconnect was also found. Risk and uncertainty were unlikely but severe, reinforcing a risk-averse frame of mind. Fear of losing or not getting what is fair prevents experimentation, making a stable one-to-one collaboration more appealing than open networks. Elements of high likelihood and low novelty, such as commitment (6.63) and trust (6.13), are used to reinforce the safe zone in the region’s force field. This means that the innovation system is not only functionally stabilized, but it is also consolidated with familiar partners rather than with broader partner selections.

The survey revealed a clear aspiration–enactment gap and localized trust patterns, supporting symptoms of collaborative lock-in, but not the cultural–cognitive processes that lead to it.

4.3 Qualitative insights: unpacking the collaborative lock-in

To deepen our understanding of the survey patterns, we carried out a qualitative deep dive with 12 experts representing the regional innovation ecosystem (Table 5). The panel was intentionally constructed to capture diversity across four key dimensions: (1) role type, spanning operations, development, education, RDI, innovation advisory, and executive

Table 5. Profile of the expert interview panel (n = 12)

Respondent	Role/Designation	Industry/Sector	Exp. (Yrs)	Regional focus
R1	Senior Operations Specialist	Logistics and Marine	5	Kotka/Hamina and Uusimaa
R2	Senior Regional Development Officer	Public Sector/Dev	6.5	Kymenlaakso
R3	Executive, Vocational Education and Skills Development	Education and Consulting	5	Kouvola
R4	Senior RDI Manager	Higher Education Institution/RDI	5	Kymenlaakso
R5	Senior Innovation Advisor/Engineer	Innovation Services/Engineering Consultant (Intermediary)	14	Kouvola
R6	Chief Operations Officer	Food Industry (ETM)	14	National/Kymenlaakso
R7	Project Coordinator	Regional Public Administration	2	Kymenlaakso
R8	RDI Director (PhD)	Education/Research Organization	2.5	Kymenlaakso
R9	Entrepreneur and CEO	Trade and Manufacturing	4	Kouvola
R10	Professor and Academic Leader (Innovation/IT Business)	University/Research	20	Kymenlaakso
R11	Municipal Development Director	Public sector (municipality)	3+	Kotka/Kymenlaakso
R12	Entrepreneur and Founder-CEO (SME)	Manufacturing	4+	Kouvola

Source(s): Authors’ own work

leadership; (2) industry sector, including logistics, manufacturing, food industry, public administration, and education/research; (3) organizational function, covering both core production firms (SMEs and larger enterprises) and enabling institutions (intermediaries, municipalities, universities); and (4) experience level, ranging from early career practitioners (2 years) to senior leaders with 2 decades of regional engagement. This diversity allowed us to capture how collaborative lock-in mechanisms manifest differently across structural positions, while also identifying shared schemas that cut across role boundaries. All together, the panel provided a cross-sectoral view of the cultural–cognitive barriers to innovation.

The 12 informants represented a balanced cross-section of the Kymenlaakso innovation system: four core industrial sectors (R1, R6, R9, R12); three public and regional development actors (R2, R7, R11); and five knowledge and intermediary actors (R3, R4, R5, R8, R10). This composition gave us the ability to capture the perspective of actors who create and commercialize innovation (firms), as well as those who enable, fund, and coordinate collaboration (public agencies, universities, intermediaries). Finally, the range of experience levels (2–20 years) enabled us to distinguish between temporary collaboration constraints and more lasting cultural–cognitive schemas that are transmitted through generations.

The qualitative deep-dive responses concisely explain the survey patterns by revealing the foundational schemas through which actors interpret collaboration. While Kymenlaakso seems to be a high-trust region, respondents indicated that trust is not extended to everyone. It mainly exists as trust-through-familiarity. People automatically trust familiar partners, but with new partners, trust must be built and proven, as was noted by R10, professor and academic leader:

Finnish culture is that you have trust until you lose it . . . but of course, trust needs from both sides; it needs adding more wood to the fire so that it works.

Thus, from our data, the high-trust context is a double-edged sword. It reduces the cost of transactions in existing relationships, but it increases the perceived cost of new collaboration arrangements, amplifying the sense of restraint with the growth of novelty. Reputation and credible references act as filters for safety. As R1, senior operations specialist, noted:

Starting with a new partner is very rare. . . generally, a new partner feels safe if it is a generally known actor with accumulated experience and references.

R11, municipal development director, added that safety requires “reliability, openness, a solid background, and credible references.”

These accounts also suggest that when collaboration shifts from familiar dyads, the buffering effect of relational capital weakens, and novelty is experienced as slower and riskier. R12, entrepreneur and founder/CEO, expressed this logic of time impact directly:

We don't have time to wait for their schedules . . . the risk is that the output of collaboration does not take us forward but is only “nice to know” level.

However, at the same time, respondents acknowledged openness to learning. R10, professor and academic leader, noted:

You learn quite a lot from new partners. But R10 also admitted that *If you change partner every time, you have to start from scratch.*

Another senior respondent noted the scaling effect:

The more partners, the more cautious the collaboration becomes.

The transition from dyadic to network-level collaboration was framed as a sharp coordination barrier. R12, entrepreneur and founder/CEO, emphasized:

It always requires lots of work to deal with the bureaucracy, and that's a challenge. . . in the city, we need to do very concrete things, and mostly the EU funding instruments are not very suitable for that.

Similarly, R10, professor and academic leader, described large-scale collaboration as an “instant headache.”

According to our data, these mechanisms appear to generate a self-reinforcing dynamic in the Kymenlaakso context. Repeated reliance on reliable, familiar partners produces incremental outcomes that validate the prevailing interpretive schemas and deepen lock-in. Even R10 warned that repeated partnering reduces learning returns:

Your learning curve goes down.

The qualitative interviews suggest seven mechanisms that sustain collaborative lock-in. We synthesized these qualitative insights with the quantitative patterns to develop an integrated force field gradient model.

4.4 Interpretation of findings: mapping empirical patterns to the theoretical propositions

Based on our data, the empirical results covered in Sections 4.1–4.3 provide support for the seven propositions introduced in the theoretical framework in Section 2. Next, we discuss our synthesis of key patterns and explicitly link each to the corresponding proposition.

4.4.1 Force field gradient: a structural explanation of collaborative lock-in. We define the force field gradient as the systematic shift in the balance of driving and restraining forces as collaboration moves across configurations of increasing relational novelty: from internal (within-firm) through dyadic external (one-to-one with known partners) to network (multi-party with unfamiliar partners). The gradient captures two simultaneous dynamics: (a) restraining forces (perceived risk, coordination costs, uncertainty) grow with each increase in novelty, and (b) the buffering effect of relational drivers (trust, commitment, familiarity) reduces as novelty increases. The result is a gradient of resistance, a structural penalty on novelty that explains why actors who value openness nevertheless choose familiar partners.

Collaborative lock-in can be graphically illustrated using the force field gradient (Figure 3) and can be synthesized from the survey–interview data. The data suggest that the same



Figure 3. Force-field gradient: likelihood vs. importance. Source: Authors' own work

stabilizing factors that support collaboration in familiar contexts (trust, commitment, familiarity/shared goals) are also present in other contexts, but the stabilizing factors increase in a systematic way as the degree of contextual novelty increases (from internal collaboration to dyadic external ties to network configurations).

The internal and dyadic levels are characterized by strong relational pulls and relatively low restraints in practice. However, at the network and external levels, there is a dramatic decrease in relational buffers and dramatic increase in coordination costs, resulting in a systematic disadvantage with novelty.

Such a gradient leads to an equilibrium that is suboptimal, where actors' stated preference for openness comes into conflict with a force field that rewards reliability and penalizes experimentation. The novelty threshold is the place where regional support becomes a leverage point: respondents tacitly anticipate that the regional institutions can lower some of the burdens of coordination and perceived risks and ease the way for trust to be built beyond familiar relationships. Specifically, the salience of regional support (importance, 5.75) suggests that respondents seek the assistance of regional institutions to alleviate this enactment gap by reducing the burden of coordination and perceived risk, and by scaffolding boundary-spanning relationships, but underlying cultural-cognitive schemas (familiarity preference) keep the system in the safe zone.

This means that the collaboration paradox is less a matter of a lack of will than the structural effect of an innovation culture that systematically chooses low-novelty alliances and recreates incremental paths, thereby strengthening the very lock-in that actors are trying to break out of.

4.4.2 Summary of seven empirically observed mechanisms. Table 6 presents a simplified overview of the seven mechanisms that sustain collaborative lock-in in the Kymenlaakso innovation system. For each mechanism, we provide a brief definition, concise evidence (shortened from interviews), and the resulting force field effect. Full verbatim quotations and extended evidence for each mechanism are available in Appendix Table A1.

4.4.3 Mapping empirical patterns to the seven propositions. Table 7 maps the empirical patterns observed in Kymenlaakso directly onto the seven theoretical propositions, showing how each proposition is supported by specific mechanisms and quantitative evidence.

4.4.4 Synthesis: the force field gradient model. The patterns observed in the Kymenlaakso context match the action of the force field gradient as described in Section 4.4.1. A recurring theme that emerged from the analysis of the quantitative and qualitative data is the absence of any lack of trust in Kymenlaakso, but it is localized. This localized trust, rather than generalized distrust, underpins the familiarity trap and reinforces collaborative lock-in. The gradient appears in Kymenlaakso in three interrelated ways. Driving forces are high, and restraining forces are low in the safe zone (intra-organizational/dyadic relationships). Here, there is a high frequency of collaboration, but there is low novelty. The gap that actors must bridge to cross from a dyadic to network level of interaction grows sharply beyond the novelty threshold, and the protection offered to actors by the intervening drivers decreases. Therefore, most actors do not cross this line. This results in a state of lock-in under which the safe zone stabilizes and sustains itself through small incremental results that further strengthen the same schemas that led to the safe zone.

The data from the survey are brought together in a dynamic force field gradient (Figure 3). It shows a clear concentration of drivers in the top right corner, the safe zone, where high likelihood meets high importance. However, toward the lower left (novelty threshold), the strength of these drivers falls off sharply. The arrow shows the gradient of resistance. Regional actors want to reach the novelty threshold, but the risks they perceive and the unfamiliarity are significant forces that draw the system back to the locked-in state. The figure illustrates that as collaboration becomes more novel and externally oriented, restraining forces intensify more rapidly than driving forces, structurally directing actors towards familiar, low-novelty forms of collaboration.

This reading helps explain why the collaboration paradox persists even when actors say they're open to innovation. The force field gradient isn't a matter of individual failure; it's a structural property of the region's cultural-cognitive infrastructure. Interventions therefore

Table 6. Overview of collaborative lock-in mechanisms

Mechanism	Brief definition	Concise evidence	Force-field effect
Trust-through-familiarity Risk-averse bureaucracy	Trust is path-dependent; familiarity is prerequisite for entry External/funded collaboration framed as risky and administratively heavy	“Starting with a new partner is very rare” (R1); “Trust must be earned gradually” (R2) “Funded collaborations are high friction due to bureaucracy” (R2); “Multi-party collaborations require a lot of work due to bureaucracy” (R7)	Familiarity acts as relational gatekeeper; trust is localized, making external entry difficult Restraining forces (risk, bureaucracy) amplify as novelty increases
Aspiration-enactment gap	Actors support openness but revert to closed networks for predictability	“You learn from new partners but have to start from scratch” (R10); “No time to wait for their schedules” (R12)	Conditional openness: drivers are salient in safe zones; restraints dominate as novelty increases
Individual-centric persistence	Collaboration is person-dependent, not institutionalized	“Everything starts between individuals” (R10); “Key persons know each other” in small region (R2)	Trust is informal and fragile, dependent on key individuals’ presence
Novelty threshold	Moving to networks triggers sharp spike in perceived coordination costs	“Primary friction is practical coordination, finding common time” (R5); “Broader collaboration needs clear coordination” (R7)	Restraint amplification: coordination overhead taxes novelty, anchoring actors in dyadic ties
Coordinator “umbrella”	System fragmentation requires a central broker to manage structural friction	“Multi-party work requires a coordinator, an organizing umbrella” (R7); “Coordination design is a first-order requirement” (R10)	Coordination is the critical catalyst; without an umbrella actor, the force-field collapses into silos
Self-reinforcing lock-in	Success in safe networks validates risk-averse schemas, preventing path change	Port sector is “structurally conservative and path dependent” (R1); Success with known partners makes new collaboration “more difficult” (R2)	Positive feedback loop: low-novelty stability interpreted as success, reinforcing original lock-in

Source(s): Authors’ own work

need to address the perceived balance of forces at the novelty threshold, not just push for more collaboration in general. Taken all together, these seven empirically observed mechanisms, along with the gradient model, directly answer our research question: high collaboration intensity fails to translate into innovation because culturally embedded schemas systematically bias decisions towards relational safety, penalizing novelty at the point of partner selection.

5. Discussion

The present research set out to answer the question “Why does high levels of collaboration intensity occur together with low innovation performance in some regions?” Drawing on mixed-methods evidence from Kymenlaakso, our results indicate that the problem is not a lack of collaboration but, rather, its quality. High levels of collaboration frequency and low levels of novelty are found together as regional actors consistently prefer familiar partners, a situation we refer to as collaborative lock-in. This takes three interrelated forms. Actors express openness to new collaborators, yet in practice, they remain closed due to a trust-through-familiarity schema that reduces costs within familiar circles but increases costs of crossing boundaries, generating a familiarity trap (aspiration–enactment gap). At the same time, relational drivers, such as trust and commitment, decline as collaboration moves from internal

Table 7. Mapping of empirical patterns to propositions and supporting evidence

Proposition	Pattern observed	Evidence (referring to Table 4 mechanisms)
P1 – Foundational Schema	Risk avoidance, trust-through-familiarity, familiarity-equals-safety	Trust-through-familiarity mechanism; high likelihood for familiar partners (63%), low for new (50%)
P2 – Schema Persistence	Schemas reproduce through socialisation, homophily, success attribution	Individual-centric persistence; Self-reinforcing lock-in
P3 – Proximal Force-field	Cultural schemas shape which drivers/restraints are salient in specific contexts	Risk-averse bureaucracy; Coordinator “umbrella”
P4 – Conditional Openness	Aspiration-enactment gap: high normative support, low behavioral enactment	Aspiration-enactment gap mechanism; external collaboration importance 5.75 vs. likelihood 3.13
P5 – Restraint Amplification	Restraining forces increase with novelty, sharpest at dyad-to-network transition	Novelty threshold mechanism; coordination costs spike at network level
P6 – Driver Decline	Relational drivers buffer only in familiar settings; effect declines with novelty	Trust-through-familiarity; familiarity likelihood 6.75 but absent for new partners
P7 – Self-reinforcing Feedback	Low-novelty outcomes validate risk-averse schemas, completing lock-in cycle	Self-reinforcing lock-in mechanism; success with known partners makes new collaboration more difficult

Source(s): Authors’ own work

to dyadic to network configurations (force field gradient). Successful incremental collaborations reinforce risk-averse schemas, discouraging experimentation and maintaining suboptimal dynamics (self-reinforcing feedback loop). These findings call into question the assumption that more collaboration yields better innovation, redirecting attention to the quality, diversity, and relational structure of collaborative relationships.

Our results confirm and build on existing studies. They validate the collaboration paradox documented by [Fitjar and Rodríguez-Pose \(2014\)](#) and [Grillitsch and Nilsson \(2015\)](#), taking it beyond an aggregate pattern to provide micro-foundations. They add to [Grabher’s \(1993\)](#) typology by introducing collaborative lock-in, based on partner-selection routines and relational scripts rather than technological or cognitive lock-in. They also support the high-trust regional advantage literature ([Cooke et al., 1997](#)) by showing that trust is not universally advantageous; when localised and familiarity-driven, it becomes an obstacle to exploration. Finally, they apply Lewin’s force field theory ([Lewin, 1951](#)) to innovation studies, demonstrating how the force field gradient explains regional-level collaboration decisions.

Our integrated framework makes three theoretical contributions. First, it offers a mechanism-based explanation of the collaboration paradox, responding to calls for more explicit mechanisms in this area ([Hertrich and Brenner, 2023](#)). Second, it connects RIS theory with institutional and cultural–cognitive perspectives, explaining how macro-level regional histories, meso-level schemas, and micro-level collaboration decisions interact with one another. Third, it introduces the force field gradient as a dynamic analytical tool for studying collaboration with novelty, one that can be tested in other regional contexts going forward.

While our empirical focus is Kymenlaakso, the seven collaborative lock-in mechanisms and the force field gradient model are analytically transferable to comparable regions across Europe. Our results line up with those of [Pöntinen and Vilko \(2023\)](#), who independently analysed the same region and identified lack of trust, lack of innovation culture, low R&D investment, and tendency toward dyadic-only collaboration. Our framework generalizes beyond Kymenlaakso precisely because it rests on generic mechanisms of cultural cognition, including risk-averse schemas, trust-through-familiarity, and the force field gradient itself. That means it can be applied to any region where similar path-dependent collaboration routines are at work.

5.1 Policy implications

For regional policymakers, simply increasing collaboration intensity or funding more networks is unlikely to break collaborative lock-in. Interventions need to target the novelty threshold directly. First, create risk-sharing arrangements (innovation vouchers, pilot project funding) and coordination structures (professional brokerage) to lessen the perceived risk of failure and uncertainty of new partnerships. Second, provide funding support for intermediary entities that can serve as trust validators (providing third-party guarantees to validate unfamiliar partners) and processing coordinators (for logistics and paperwork in multi-party projects). Third, focus on diversity rather than volume: structured brokerage programs, mobility schemes, and boundary-spanning intermediaries all contribute to better management of cognitive distance. Fourth, provide safe environments for experimentation (innovation labs, sandbox schemes) and actively promote and communicate boundary-spanning achievements to progressively change risk-averse mindsets.

It is also worth stressing that simply promoting openness will not, on its own, loosen this lock-in. Business model innovation and organizational agility (Kim and Meng, 2026) are other internal absorption and governance capabilities that play a key role in the benefits of open innovation. Broad collaboration can also result in losses of coordination if the broader cultural environments and relational infrastructures are not conducive to collaboration (Bae and Choi, 2026; Khassawneh et al., 2026). In addition to the structural and cultural changes already outlined, networking would then need to be accompanied by policy incentives to break collaborative lock-in.

5.2 Managerial implications

There are internal practices that can offset collaborative lock-in. Strategies for reducing the bias toward familiar partners can include structured portfolio approaches that support incremental and transformative partnerships, along with routines for learning from failure and critical reflection. In this area, it is important to build absorptive capacity and the ability to identify, evaluate, and manage a variety of partnerships. This also involves training collaboration management skills, including collaborating with cognitively or culturally different partners and/or recruiting or developing boundary spanners with the ability to traverse the boundaries of knowledge and organization.

The results also indicate that collaboration is more about people than institutions. However, to minimize the risk of losing collaborators, firms can make collaboration knowledge firm-wide with formally documented collaboration processes, cross-training of collaborators, team-based relationship management, and external networks to access different opportunities, without counting on one individual. Managers should also communicate with institutions in the region to encourage policy changes, exchange experiences, and participate in activities that encourage diversity and risk taking. Ultimately, collaborative lock-in will only be broken over the long term through continued cultural investment and short-term measures. If such activities are not undertaken, areas have a chance of getting stuck with their traditional low-innovation partnership models.

Beyond firm-level strategies, these findings carry wider societal relevance. For educational institutions, they point to the need to embed collaboration management and risk assessment skills into vocational and university curricula, preparing future professionals to navigate cognitive distance effectively. The only way to achieve regional quality of life is to break lock-in and maintain regional economic vitality to keep talent in place and prevent the slow deterioration that results from continuing with a low equilibrium of innovation. In this sense, tackling collaborative lock-in is as much of a social challenge as it is an economic one that directly affects community resilience and regional well-being.

5.3 Limitations and future research

Our work comes with several limitations. The single-region design limits generalizability, as the force field gradient could differ across regions with different industrial structures, institutional arrangements, and policy contexts. We addressed analytical transferability in the

Discussion. The cross-sectional survey offers a snapshot, while dynamic processes, such as feedback loops and path dependencies, need to be observed over longer periods. The number of qualitative interviews ($n = 12$) is also limited in an absolute sense. This reflects both the small population of strategically positioned innovation actors available in a single RIS and a purposive sampling strategy that placed a priority on interpretive depth and role diversity over sample size (Flyvbjerg, 2004; Malterud *et al.*, 2016). Although suitable for identifying the qualitative mechanisms of collaborative lock-in, this limits the extent to which the relative prevalence of each mechanism can be generalized, and future studies need to validate these mechanisms with larger and more geographically diverse interview samples. Although rich, expert interviews may be skewed towards the perspective of the top group of experts and might be supplemented by dyadic- or network-level data on actual collaboration events in future studies. Additionally, our focus on cultural-cognitive schemas might downplay other elements, such as power dynamics, resource interdependencies, or formal institutional arrangements. Future research needs to replicate the gradient model in other regional contexts (peripheral and core), involve larger and more diverse samples, include longitudinal designs, and quantitatively test the gradient hypothesis, looking at driver decline and restraint amplification as continuous functions of relational novelty following policy interventions. Multi-method analyses combining network analysis and cognitive mapping could contribute further understanding of how collaborative lock-in emerges, persists, or can be overcome.

6. Conclusion

This paper answered the question of why some regions with high levels of collaboration intensity exhibit low innovation performance through the lens of collaborative lock-in. The findings demonstrate how cultural-cognitive schemas shape a force field that systematically biases collaboration towards familiar, low-novelty configurations. The aspiration-enactment gap, trust-through-familiarity schema, and novelty threshold uncovered in our data together explain why high collaboration rates can coexist with persistently low innovation performance. Through integrating RIS, institutional, and force field theories, we provided a diagnostic framework for understanding the collaboration paradox and a set of propositions to guide future research and interventions.

These findings have real implications for both policy and practice. Tackling collaborative lock-in means shifting the policy conversation away from how much collaboration happens and towards the kind of collaboration, specifically interventions that rebalance the forces at play around the novelty threshold. Tools like risk-sharing mechanisms, trust-brokering infrastructure, and cultural initiatives that make experimentation feel legitimate can help break the self-reinforcing cycles that keep regions locked in. Without this kind of targeted effort, regions risk staying stuck in familiar collaboration patterns that keep producing incremental results while closing off room for real transformation. The real challenge is not getting people to collaborate more; it is changing the underlying cultural and cognitive assumptions that currently make collaboration a conservative force rather than a transformative one.

One noteworthy limitation is that this study focused on a single region, Kymenlaakso, which limits how far the results can be generalized in a strict statistical sense. That means our seven mechanisms and the force field gradient model still need to be tested in other settings. Future work could take several directions: comparative case studies across regions with different industrial structures or institutional thickness, replication studies using our survey instrument in other peripheral and core regions, longitudinal research tracking how collaboration portfolios evolve over time, experimental designs with managers using short hypothetical scenarios to probe causal mechanisms, and cross-national comparisons spanning the Nordic, southern European, and central European coordinated and liberal market economies. Together, this kind of work would help clarify the boundary conditions of collaborative lock-in and strengthen our work's value as a broader theoretical model.

Table A1. Empirical evidence of collaborative lock-in mechanisms

Mechanism	Theoretical logic	Empirical indicators (role-linked)	Force-field effect
Trust-through-Familiarity	Trust is a path-dependent “earned” asset; familiarity is a prerequisite for entry (P1, P2, P6)	<i>R1. Senior Operations Specialist:</i> “In the port/ logistics sector, starting with a new partner is very rare . . . Trust is something that must be earned gradually.” <i>R2. Senior Regional Development Officer:</i> “Trust increases with time . . . we need at least some sort of discussion before signing any documents.” <i>R12. Entrepreneur and Founder-CEO, SME, Manufacturing:</i> “If the collaboration has gone well, then easier, because there is already experience of collaboration and trust has already been established.” <i>R7. Project Coordinator:</i> “It is assumed that collaboration is born and succeeds when we have meetings. Joint meetings do not lead to the desired outcome if there is no trust . . .” <i>R11. Municipal Development Director:</i> “reliability, openness, a solid background, and credible references.”	Familiarity acts as a Relational Gatekeeper; the driving force of trust is localized, making external entry difficult

(continued)

Table A1. Continued

Mechanism	Theoretical logic	Empirical indicators (role-linked)	Force-field effect
Risk-Averse Bureaucracy	External and funded collaboration is framed as both risky and administratively heavy, amplifying restraining forces under higher novelty (P1, P3, P5)	<i>R2. Senior Regional Development Officer:</i> “Funded collaborations are high friction due to bureaucracy and perceived financial risk, which can deter participation.” <i>R6. Chief Operations Officer:</i> “Increasing novelty leads to rising risk, including information leakage concerns.” <i>R7. Project Coordinator:</i> “Multi-party collaborations require a lot of work due to bureaucracy, which becomes a major barrier as novelty increases.” <i>R5. Senior Innovation Advisor/Engineer:</i> “Inter-organizational ‘projects etc. do not produce results for our customers, i.e., companies, in the desired way. Internal commotion . . .” <i>R3. Executive, Vocational Education and Skills Development:</i> “Through risk assessment . . . Recommendations, assessment of usefulness . . . with a familiar one when background information already exists.” <i>R12. Entrepreneur and Founder-CEO, SME, Manufacturing:</i> “It always requires lots of work to deal with the bureaucracy and that’s a challenge . . . in the city, we need to do very concrete things and mostly the EU funding instruments are not very suitable for that.”	Restraining Forces (Risk, Bureaucracy) are systematically amplified as the degree of novelty increases

(continued)

Table A1. Continued

Mechanism	Theoretical logic	Empirical indicators (role-linked)	Force-field effect
Aspiration-Enactment Gap	Actors support the concept of openness but revert to closed networks for predictability as novelty increases (P4, P5, P6)	<i>R1. Port and logistics incumbent:</i> “The more partners, the more careful and slower the progress becomes.” <i>R9. Entrepreneur and CEO, Trade and Manufacturing:</i> “A successful initial meeting makes a partner feel safe and trustworthy.” <i>R8. RDI Director:</i> “You don’t learn much from old partners, but you learn quite a lot from new partners . . . every now and then you have to change to learn new things.” <i>R10. Professor and Academic Leader:</i> “you learn quite a lot from new partners but if you change partner every time, you have to start from scratch.” <i>R12. Entrepreneur and Founder-CEO, SME, Manufacturing:</i> “We don’t have time to wait for their schedules . . . the risk is that the output of collaboration does not take us forward but is only ‘nice to know’ level.”	Creates Conditional Openness; Creates conditional openness: drivers (e.g. commitment) are most salient in the “Safe Zone,” while restraining forces dominate as novelty increases

(continued)

Table A1. Continued

Mechanism	Theoretical logic	Empirical indicators (role-linked)	Force-field effect
Individual-Centric Persistence	Collaboration is person-dependent rather than institutionalized, limiting transferability across organizations (P2)	<i>R10. Professor and Academic Leader:</i> “Everything starts between individuals . . . Institutions don’t collaborate; individuals do.” <i>R8. RDI Director:</i> “Trust is deeply interpersonal . . . and unevenly transferable across organizational boundaries.” <i>R7. Project Coordinator:</i> “collaboration is born between people (individuals), of course also between organizations, but even then, key individuals have a great significance.” <i>R2. Senior Regional Development Officer:</i> “In a small region, key persons know each other. And if they don’t know in advance, they get to know each other when they work together.” <i>R4. Senior RDI Manager:</i> “Activity and collaboration suitable for one’s own operations . . . Discussion and getting to know each other, agreeing on things and keeping promises.” <i>R9. Entrepreneur and CEO, Trade and Manufacturing:</i> collaboration typically works through “meetings, establishing clear rules, and maintaining open communication.”	Trust is an Informal Driver; the collaborative force-field is fragile and dependent on key individuals’ presence

(continued)

Table A1. Continued

Mechanism	Theoretical logic	Empirical indicators (role-linked)	Force-field effect
The Novelty Threshold	Moving to networks triggers a sharp spike in “perceived coordination costs” (P5)	<i>R5. Senior Innovation Advisor/Engineer:</i> “Primary friction is practical coordination, finding common time and aligning viewpoints . . . Scale leads to a loss of concrete outcomes and an increase in meeting-load.” <i>R7. Project coordinator:</i> “The broader and more multifaceted the collaboration, the more it needs clear coordination and division of tasks and time.” <i>R10. Professor and Academic Leader:</i> “If you have to struggle all the time, send reminders, or things are not developing at all . . . then it’s not a healthy collaboration.”	Restraint Amplification: Coordination overhead acts as a “tax” on novelty, anchoring actors in dyadic (one-to-one) ties
The coordinator “Umbrella”	System fragmentation requires a central “broker” to manage structural friction (P3, P5)	<i>R7. Project Coordinator:</i> “The structural requirement of multi-party work is the presence of a coordinator, an organizing ‘umbrella’ to clarify roles.” <i>R10. Professor and Academic Leader:</i> “Coordination design is a first-order requirement.” “Usually, the one who is suggesting the idea of collaboration is the one who is leading it. At least 99%.” <i>R12. Entrepreneur and Founder-CEO, SME, Manufacturing:</i> “Usually a large corporate operator or educational/research institute leads the collaboration . . . but there is a risk that the direction drifts away from the small company’s focus.”	Coordination is the Critical Catalyst; without an “umbrella” actor, the force-field collapses into fragmented silos

(continued)

Table A1. Continued

Mechanism	Theoretical logic	Empirical indicators (role-linked)	Force-field effect
Self-Reinforcing Lock-in	Success in safe networks validates the risk-averse schema, preventing path change (P2, P7)	<i>R1. Senior Operations Specialist:</i> Port sector is “structurally conservative and path dependent.” <i>R2. Senior Regional Development Officer:</i> “After successful collaboration with a known partner, working with new partners becomes more difficult.” <i>R7. Project Coordinator:</i> “Hard to say, successful collaboration naturally builds a certain basic trust. Unsuccessful collaboration undermines it.” <i>R12. Entrepreneur and Founder-CEO, SME, Manufacturing:</i> “As a small operator, we are faster to act than, for example, educational institutions or research institutes. We do not have time to wait for their schedules.”	A Positive Feedback Loop where low-novelty stability is interpreted as “success,” reinforcing the original lock-in

Source(s): Authors’ own work

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Further reading

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