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Knowledge Spillovers, Related and Supporting Industries, and Government Intervention: An Integrated Framework for Cluster-Driven Corporate Innovation

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Abstract

Late-developing inland clusters face a notable innovation paradox, in which substantial industrial capacity coexists with weak firm-level innovation. Existing research identifies knowledge spillovers, related and supporting industries, and government intervention as major external drivers of innovation, but pays limited attention to how these external conditions are transformed into corporate innovation capability. Drawing on Regional Innovation System Theory, Dynamic Capability Theory, and Porter's Diamond Model, this study develops an integrated framework comprising seven propositions on direct effects, mediated pathways, and contextual variation. It proposes that cluster performance, defined as the effectiveness of cross-organisational coordination, mediates the relationship between external cluster conditions and corporate innovation capability. This mediating effect is expected to be stronger in late-developing inland clusters than in mature coastal clusters, where firms are more likely to access external resources directly. Situated within the automotive manufacturing context of the Chengdu-Chongqing Twin-City Economic Circle, this study explains why similar structural advantages may produce different innovation outcomes across regions.

Keywords: Knowledge Spillovers, Related and Supporting Industries, Government Intervention, Cluster Performance, Corporate Innovation Capability, Late-developing Clusters

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1.0 Introduction

Global industrial clusters do not generate innovation in the same manner. Mature industrial regions, such as the Stuttgart automotive cluster and technology-intensive regions in East Asia, tend to sustain competitiveness through dense knowledge networks, specialised supplier systems, and relatively stable policy frameworks. However, the situation differs in inland clusters in late-developing economies (Alqararah & Alnafrah, 2024; Yan & Zou, 2024). Despite industrial growth, rising employment, and expanding output, manufacturing innovation capability may remain limited because knowledge is unevenly shared and related and supporting industries often lack sufficient depth and specialisation (Cavalcante, 2022). There is some government support, although this may be disjointed between jurisdictions. This pattern is evident in the automotive manufacturing cluster of the Chengdu–Chongqing Twin-City Economic Circle, which has developed substantial production capacity but continues to lag major coastal counterparts in R&D intensity and patent quality (Zeng & Wu, 2023).

Existing explanations remain fragmented. Prior studies attribute weak innovation to sparse knowledge networks and limited proximity effects (Obschonka et al., 2023; Xu & Zhu, 2024), insufficient industrial complementarity and institutional coordination (Hsu et al., 2025), and fragmented or insufficient innovation-oriented policy implementation (Halkier, 2014; Rodríguez et al., 2014). These explanations are valuable, but each factor is only a part of the innovation process. These factors are commonly examined in separate research streams, leaving insufficient explanation for how their combined effects extend from cluster-level conditions to firm-level innovation capabilities (Hu et al., 2025; Wei, 2023). Recent research further suggests that the innovation benefits of regional clustering and knowledge spillovers are neither automatic nor uniform; cooperation with external agents and entrepreneurial orientation mediate the clustering–innovation relationship, while firms’ absorptive capacity shapes their ability to benefit from external knowledge (Audretsch & Belitski, 2026; Sánchez-García et al., 2026). Moreover, cluster performance is commonly treated as a contextual condition or aggregate outcome rather than as the coordination process through which external cluster conditions become firm-relevant innovation inputs (Lehmann et al.,

2025; Mendes et al., 2023). This omission is particularly important in late-developing inland regions, where firms often face weaker absorptive capacity, less effective market mechanisms, and fragmented institutions (Artemenko, 2024; Lobova et al., 2024; Repushevskaya, 2024). Therefore, a context-sensitive framework is required to explain the coordination process.

This study develops a context-sensitive framework to explain how external cluster conditions translate into corporate innovation capabilities in late-developing inland clusters. It has three objectives: 1) to examine how realised knowledge spillovers, related and supporting industries, and government intervention shape cluster performance; 2) to theorise cluster performance as a meso-level coordination process through which external cluster conditions are organised into firm-relevant innovation inputs; and 3) to explain why this coordination mechanism is particularly important in late-developing inland clusters compared to mature coastal clusters. Methodologically, this study adopted a theory-building conceptual approach. It synthesises complementary theoretical insights to develop an integrated explanatory framework and derive propositions concerning direct relationships, mediated pathways, and contextual variation. These propositions provide the basis for subsequent empirical examination. This study also contributes by linking regional, cluster, and firm-level explanations of innovation. Positioning cluster performance as a coordination process through which regional conditions become usable innovation inputs explains why similar external advantages may produce different firm-level outcomes in late-developing inland clusters.

2.0 Theoretical Foundations and Construct Conceptualisation

2.1 Theoretical Foundations

This study draws on regional innovation system theory, dynamic capability theory, and Porter's diamond model to explain the institutional, organisational, and structural conditions of cluster innovation (Cooke et al., 1997; Porter, 1990; Teece, 2007). These perspectives clarify how regional institutions, firms' capabilities, and industrial

structures shape innovation. However, none fully explains how external cluster conditions are converted into corporate innovation capability. Cluster development also relies on coordination among industrial, institutional, and knowledge actors rather than on co-location alone (Munday et al., 2024).

Regional innovation system theory views innovation as institutionally embedded and shaped by interactions among firms, knowledge organisations, and public agencies. Universities, research institutes, and public organisations provide knowledge inputs, which diffuse through collaborative arrangements among firms and supporting actors (Al-Kfairy et al., 2022; Jha & Basu, 2025). This perspective explains how regional knowledge systems are created and often assumes institutional coherence that may be absent in late-developing inland regions. Poorly developed regional innovation systems may be constrained by weak interactive learning, fragmented institutions, and limited coordination, even where formal organisations and policy instruments are present (Friedrich & Kagel, 2025). Innovation dynamics also reflect place-specific institutional and geographical conditions rather than a uniform systemic model (Derudder & Liu, 2025). Therefore, RIS provides a regional context but does not fully explain how dispersed knowledge becomes a firm-level innovation capability.

Dynamic capability theory explains how organisations sense opportunities, seize them, and reconfigure resources to sustain competitive advantage. This explains how firms recognise, absorb, and internalise external inputs as part of building innovation capabilities (Supriyanto et al., 2024). Recent evidence shows that dynamic capabilities, particularly absorptive capabilities, mediate the conversion of technological resources into innovation-related outcomes, although this process remains contingent on competitive and technological conditions (Wang et al., 2026). However, the theory focuses primarily on organisational processes and gives limited attention to the coordination arrangements through which firms access opportunities beyond organisational boundaries, particularly in fragmented institutional contexts (Gonzalez, 2022; Kaur, 2022). In late-developing clusters, such access may depend on cluster-level coordination and alignment rather than on firms' direct actions alone (Di Cataldo et al., 2023). Therefore, dynamic capability theory alone provides limited leverage for explaining regional variation in innovation outcomes under similar external conditions,

as its application to territorial and regional settings remains insufficiently developed (Kasper et al., 2025).

Porter's diamond model identifies factor conditions, related and supporting industries, demand conditions, and firm strategy and rivalry as determinants of industrial competitiveness (Wei, 2023). It provides a useful framework for interpreting the geographical advantages associated with industrial organisation (Nedelev & Kondev, 2024). However, the model is comparatively static: it identifies favourable conditions but does not explain how they are translated into innovative outcomes. It also offers limited guidance on the government's coordinating role beyond factor provision (Butt et al., 2023). Therefore, the model cannot fully explain why clusters with similar structural configurations achieve different innovation outcomes, particularly when coordination quality varies across late-developing inland contexts (Pratiwi et al., 2024). Table 1 summarises the focus, mechanisms, and limitations of the three theoretical perspectives and provides the basis for the integrated framework.

Table 1: Comparison of Theoretical Traditions

Theory	Analytical Level	Core Mechanism	Contribution To Framework	Limitation In Late-Developing Contexts
Regional Innovation System (RIS)	Regional /System	Institutional arrangements enable knowledge production and circulation	Explains how knowledge spillovers operate through institutional infrastructure; clarifies the government's role in shaping regional environments	Assumes coherent institutional governance; overlooks operational quality vs. institutional presence; underspecifies firm-level absorption processes
Dynamic Capability Theory (DCT)	Organisation	Sensing-seizing-reconfiguring processes enable organisations to adapt and innovate	Explains how firms internalise external advantages; specifies absorptive capacity	Focuses on organisational internal processes; neglects meso-level cluster structures; cannot explain cross-

Theory	Analytical Level	Core Mechanism	Contribution To Framework	Limitation In Late-Developing Contexts
Porter's Diamond Model	Structural		requirements for knowledge utilisation	regional variation in outcomes
		Factor combinations create a competitive advantage through related and supporting industries, factor conditions, demand, and rivalry.	Identifies related and supporting industries as independent drivers; provides a multi-factor architecture for analysis	Static specification of conditions; limited attention to the government's active coordination role; cannot explain operational quality distinct from factor presence
Integrated Framework (This Study)	Multi-level	Knowledge Spillovers / Related and Supporting Industries Government Intervention Cluster Performance Corporate Innovation Capability	Addresses all analytical levels; specifies / mediation mechanism; theorises context-specific boundary conditions	Requires empirical verification across contexts; assumes linear relationships; focuses on a specific industry context.

2.2 Construct Conceptualisation

In this study, knowledge spillovers refer to inter-organisational flows of technical and market-related knowledge within a cluster, arising through labour mobility, university–industry collaboration, and supplier involvement in development activities (Tzabbar et al., 2022; Wei & Tong, 2024). Measures based on spatial proximity or patent linkages often assume that spatial concentration promotes knowledge exchange, although proximity creates only the potential for spillovers (MacDonald & Selmanovic, 2023). Recent evidence further indicates that the innovation value of knowledge spillovers is contingent on firms' internal capabilities and the industrial context. These benefits vary according to the type and intensity of knowledge engagement, firms' absorptive

capacity, and innovation outcomes pursued (Audretsch et al., 2024; Audretsch & Belitski, 2026). In inland clusters, knowledge may be co-located with institutions but less shared because of limited reciprocity in the network and fragmented institutions (Hu et al., 2025; Wilke & Pyka, 2024). The study therefore focuses on realised spillovers: knowledge transferred across organisational boundaries, rather than knowledge merely present within the region or already assimilated by a focal firm.

Related and supporting industries comprise specialised and complementary actors that provide the structural basis for innovation across the value chain (Andres et al., 2024). These include suppliers, service providers, and institutional intermediaries involved in design, production, testing, logistics, and other supporting functions (Kim et al., 2022; Rachinger & Müller, 2024). Their relevance lies not in simple co-location but in the degree of specialisation, technological complementarity, and value-chain completeness that they provide. Measures such as the number of suppliers and diversity indicators commonly indicate whether suppliers reveal less about the specialised and complementary roles they play within a cluster (Grumadaitė et al., 2022). Inland clusters may have a sizeable industrial base while still lacking clear specialisation and adequate complementarity across supporting functions (Zhang et al., 2023). This study focuses on how complementary actors are structurally configured, and the extent to which they coordinate effectively is treated as an element of cluster performance. This distinction is consistent with the innovation ecosystem perspective, which views innovation as emerging from actor interdependence. Their complementary contributions must be coordinated; physical co-location alone is insufficient (Baldwin et al., 2024). Therefore, it distinguishes the presence of complementary actors from the effectiveness of the collaborative arrangements through which they work within a cluster (Silva et al., 2024).

Government intervention refers to the quality of public institutional support that underpins cluster development. This includes coherent policy, regulatory stability, consistent implementation, and the provision of public goods relevant to innovation (Poon et al., 2023). Existing measures that often count policies or fiscal levels seldom capture whether policies are coherent or implemented (Guzman et al., 2024). In inland clusters, policy overlap and fragmented administration may hinder effective

implementation. Recent research in China indicates that government support for innovation involves more than just financial assistance or policy issues. Different levels of government undertake distinct yet interdependent responsibilities in planning, coordination, resource allocation, infrastructure provision, regulation, and evaluation, and inadequate coordination may compromise implementation outcomes (Chen et al., 2025). Therefore, this study focuses on policy coherence, institutional stability, and implementation quality rather than solely on the volume of policy support (Smorchkova, 2023).

In this study, cluster performance is understood as neither an aggregated outcome of cluster activity, such as patent output or industrial growth, nor an input, such as agglomeration intensity or resource availability. Instead, it refers to the effectiveness with which firms, suppliers, knowledge organisations, and public agencies coordinate interdependent innovation-related activities within a cluster. This is reflected in the alignment of roles, dependable joint decision-making, sustained collaborative problem-solving, and the ability to address coordination failures across organisational and jurisdictional boundaries. Regional and industrial advantages rely not only on the presence of relevant actors and resources but also on the institutional and relational arrangements that link them (Cooke et al., 1997; Munday et al., 2024; Porter, 1990). Therefore, cluster performance is distinct from knowledge flow, industrial structure, policy provision, infrastructure, and innovation output.

Cluster performance acts as a transmission mechanism that links external cluster conditions to firms' innovation capability. Knowledge spillovers offer relational knowledge inputs, and related and supporting industries supply structural complementarity, whereas government interventions provide institutional support. However, none of these conditions alone ensures effective collective action. Similarly, recent ecosystem evidence shows that regulatory mandates and the presence of interdependent actors do not generate collective action by themselves; institutional facilitation and orchestration are required to align heterogeneous actors, establish actionable standards, and foster trust and interoperability (Böttcher et al., 2026). Through role alignment, joint decision-making, and lower coordination and search costs, cluster performance allows firms to identify opportunities, mobilise

complementary resources, and reconfigure them for innovation (Bruyaka et al., 2024; Teece, 2007). The five constructs are analytically distinct: knowledge spillovers refer to knowledge transfer; related and supporting industries refer to industrial structure; government intervention refers to public institutional support; cluster performance refers to coordination effectiveness; and corporate innovation capability refers to firm-level innovation capability.

3.0 Integrated Framework and Boundary Conditions

3.1 Conceptual Architecture

The integrated framework operates at three analytical levels. At the regional and structural levels, knowledge spillovers, related and supporting industries, and government interventions shape the conditions in which cluster innovation occurs. At the cluster level, cluster performance aligns these conditions with the relevant actors. At the firm level, corporate innovation capability denotes the capacity to develop, adapt, integrate, and commercialise new products, processes, or technologies. This framework incorporates external conditions, cluster-level coordination, and firm-level innovation capabilities into a single explanatory structure. Mediating logic distinguishes between external cluster conditions being present and cluster actors being able to use these conditions together. Cluster performance captures the effectiveness of coordination through which knowledge, industrial complementarity, and public support become usable inputs for firm-level innovation capability (Cooke et al., 1997; Munday et al., 2024; Porter, 1990).

These three external conditions affect cluster performance through distinct but complementary mechanisms. Knowledge spillovers expand access to relevant expertise and support joint innovation activities (Xu et al., 2022; Zhang et al., 2022). Related and supporting industries provide the structural complementarity required for coordinated problem-solving (Huang, 2023). Government intervention promotes cluster performance by reducing institutional uncertainty and providing stable conditions for cross-organisational coordination (Fadeikina & Bavykina, 2022). Their contribution to

corporate innovation capability depends on how effectively cluster actors coordinate these conditions.

At the firm level, cluster performance strengthens corporate innovation capabilities by providing collaborative arrangements through which firms can combine external knowledge, complementary expertise, and institutional support. By reducing uncertainty, search costs, and coordination costs, these arrangements support sensing, seizing, and reconfiguring in line with dynamic capability theory (Bruyaka et al., 2024; Teece, 2007). When cluster performance is weak, external conditions are less likely to be converted into innovation capabilities. The principal pathway runs from external cluster conditions through cluster performance to corporate innovation capability, although direct effects may also occur. Such effects are more likely when firms possess strong absorptive capacity, well-developed external networks, and the organisational capability to mobilise knowledge, suppliers, and policy resources independently (García Vega & Vicente-Chirivella, 2024). Figure 1 illustrates the conceptual framework.

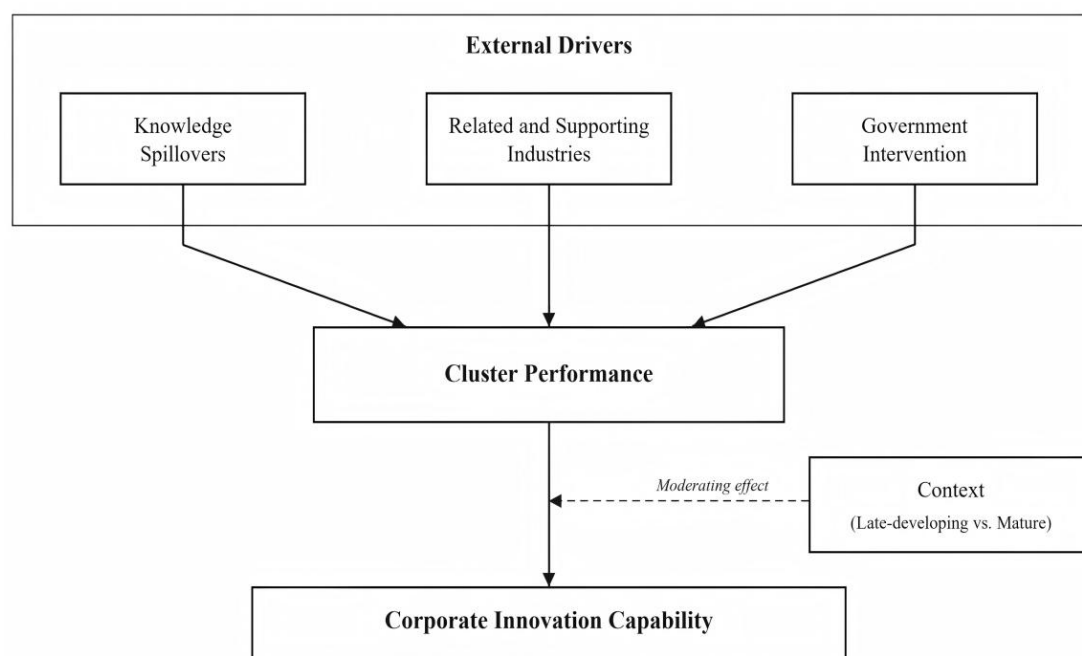


Figure 1: Integrated Framework of External Drivers, Cluster Performance, and Corporate Innovation Capability

3.2 Boundary Conditions

The framework is not intended to be universally applicable. Its explanatory scope is defined by the cluster's spatial organisation, institutional setting, and stage of development. It is particularly relevant to late-developing inland automotive clusters, where substantial industrial capacity may coexist with uneven innovation performance and weak inter-organisational coordination. Chinese urban agglomerations, including Chengdu–Chongqing, the Central Plain, and the Guanzhong Plain, provide a relevant context for this argument. Comparative evidence shows differentiated eco-innovation-efficiency trajectories and policy effects across these agglomerations (Wang et al., 2024), while innovation resources in Chengdu-Chongqing remain concentrated in a relatively stable core-periphery structure (Deng & Wu, 2023). Evidence from the Chengdu-Chongqing-Mianyang urban agglomeration further indicates that the accumulation and upgrading of innovation-management technologies has not kept pace with regional innovation needs (Li et al., 2024).

The framework further assumes a spatially and institutionally fragmented context in which cluster activities span several cities and administrative jurisdictions rather than a single governance structure. Such fragmentation weakens institutional coherence, impedes cross-organisational coordination, and raises the costs of collaborative innovation (Lin, 2024). The framework is more relevant to clusters undergoing consolidation and upgrading than to those undergoing an initial accumulation phase. At this stage, the main challenge is to turn industrial scale into innovation capability, rather than simply increasing production (Coșniță & Iorgulescu, 2022). Therefore, policy priorities shift towards technological upgrading, more consistent standards, and better responses to market and innovation needs (Zou, 2024). Under these conditions, coordination between institutions and relationships among organisations matter more than the number of resources available.

Under these conditions, cluster performance becomes particularly important because it helps coordinate different actors and resources. Their role may be less important in clusters that are geographically concentrated and have shared governance, in which firms can access knowledge, suppliers, and policy resources more directly

(Rasel & Kalfadellis, 2021). It may also matter less in early-stage or small-scale clusters, where growth still depends mainly on factor accumulation (Tavares et al., 2021), and in mature clusters with stronger absorptive capacity and more established relationships (Fulgence et al., 2022; Sheng et al., 2024).

4.0 Propositions

4.1 Direct Paths to Cluster Performance

Proposition 1. Knowledge Spillovers → Cluster Performance

Statement. Greater realised knowledge spillovers are associated with higher cluster performance.

Theoretical basis and mechanism. Regional innovation system theory holds that innovation depends on the arrangements through which knowledge circulates and is applied. Knowledge spillovers enable firms and other cluster actors to identify complementary expertise and organise joint innovation activities, thereby facilitating the development of corporate innovation capability (D'Amico et al., 2025; Xu & Zhu, 2024). They can improve cluster performance by strengthening coordination rather than constituting coordination.

Context. This relationship may be more consequential in late-developing inland clusters, where market-based knowledge exchange and inter-organisational networks remain limited. Cluster-level coordination may determine whether dispersed knowledge becomes accessible to local firms (Friedrich & Kagel, 2025).

Proposition 2. Related and Supporting Industries → Cluster Performance

Statement. Greater specialisation and complementarity of related and supporting industries are associated with higher cluster performance.

Theoretical basis and mechanism. Related and supporting industries enhance competitiveness by providing specialised suppliers, service providers, and complementary capabilities. Innovation ecosystem research further suggests that the

value created by these actors depends on the coordination of their complementary roles rather than on simple co-location (Baldwin et al., 2024; Silva et al., 2024). Such structural complementarity creates interdependencies that support coordinated problem-solving across the value chain. Locally embedded industrial and institutional linkages can, in turn, strengthen cluster capabilities (Munday et al., 2024).

Context. This relationship may be stronger in late-developing inland clusters, where supplier networks and internal coordination capabilities are less established. Cluster-level coordination can help overcome fragmented industrial relationships and improve access to complementary resources.

Proposition 3. Government Intervention → Cluster Performance

Statement. Higher-quality government intervention, reflected in policy stability, transparency, and shared infrastructure provision, is associated with higher cluster performance.

Theoretical basis and mechanism. Regional innovation system theory acknowledges the role of government in shaping the institutional conditions under which knowledge is generated, diffused, and collaboratively applied. In late-developing clusters, the role of the government goes beyond financial support. This also includes planning, aligning regulations, providing infrastructure, and removing administrative barriers. Evidence from China suggests that different levels of government perform distinct but interdependent roles in innovation, whereas poor coordination can weaken policy implementation (Chen et al., 2025). Effective interventions can improve cluster performance by reducing institutional uncertainty and providing stable conditions for collaborative innovation. In contrast, fragmented or inconsistent interventions can hinder coordination and leave policy resources underused (Ren & Tang, 2024).

Context. This relationship may be stronger in late-developing inland clusters, where firms depend more on public coordination to deal with fragmented institutions and have limited access to shared innovation resources. Established institutions, private networks, and firm capabilities may reduce this dependence in more mature market settings.

4.2 Cluster-Performance-Mediated Paths to Corporate Innovation Capability

Proposition 4. Knowledge Spillovers → Cluster Performance → Corporate Innovation Capability

Statement. Greater realised knowledge spillovers are expected to enhance corporate innovation capability through stronger cluster performance, which supports the coordination of knowledge, complementary resources, and joint innovation activities.

Theoretical basis and mechanism. Realised knowledge spillovers can strengthen cluster performance by facilitating the identification, evaluation, and integration of external knowledge among firms and other cluster actors. Cluster performance supports this process by lowering the search and coordination costs associated with accessing externally generated knowledge. Therefore, the value derived from external knowledge depends on a firm's capacity to absorb and combine it (Audretsch et al., 2024). Dynamic capability theory explains this process through the mechanisms of sensing, seizing, and reconfiguring (Bruyaka et al., 2024; Teece, 2007).

Context. This mediating relationship may be stronger in late-developing inland clusters, where firms often have limited absorptive capacity and less-developed external knowledge networks. Consequently, cluster-level coordination is important for transforming dispersed knowledge into usable innovation resources (Friedrich & Kagel, 2025).

Proposition 5. Related And Supporting Industries → Cluster Performance → Corporate Innovation Capability

Statement. Greater specialisation and complementarity of related and supporting industries are associated with higher corporate innovation capability through stronger cluster performance.

Theoretical basis and mechanism. Related and supporting industries provide specialised knowledge, technical services, complementary inputs, and problem-solving capabilities. Their contribution to innovation depends on value chain coordination, which enables firms to access and combine these resources. Innovation ecosystem

research emphasises that innovation value arises from coordinating interdependent actors rather than from the mere presence of multiple organisations (Baldwin et al., 2024; Silva et al., 2024). Cluster performance provides predictable collaborative arrangements between firms and complementary actors, thereby supporting cross-organisational problem-solving and reducing the need to internalise every innovation-relevant function.

Context. This mediating relationship may be stronger in late-developing inland clusters, where mature supplier networks and mechanisms for inter-firm coordination are lacking. Effective cluster-level coordination can help overcome fragmented value chain relationships and improve access to complementary industrial resources.

Proposition 6. Government Intervention → Cluster Performance → Corporate Innovation Capability

Statement. High-quality government intervention, as reflected in policy stability, transparency, and shared infrastructure provision, is associated with stronger corporate innovation capability through cluster performance.

Theoretical basis and mechanism. Government intervention contributes to corporate innovation capability when firms access and use policy support, institutional arrangements, and public infrastructure. Multilevel governments perform differentiated but interdependent roles in planning, resource allocation, infrastructure provision, and policy implementation, and poor coordination can weaken these effects (Chen et al., 2025). Cluster performance mediates this relationship by coordinating firms' engagement with policy support and shared facilities, reducing uncertainty, and enabling collaborative innovation. Policy resources are more likely to improve innovation capability when they help the cluster function effectively rather than being fragmented or left underused (Ren & Tang, 2024).

Context. This mediating relationship may be stronger in late-developing inland clusters, where firms rely more on coordinated public support and shared innovation infrastructure. Firms in mature markets may gain policy support and external resources directly through established institutions and private networks.

4.3 Contextual Boundary Condition

Proposition 7. Context (Late Developing vs. Mature) × Cluster Performance → Corporate Innovation Capability

Statement. The positive effect of cluster performance on corporate innovation capability is expected to be more pronounced in late-developing inland clusters than in mature coastal clusters.

Theoretical basis and mechanism. Regional innovation system theory emphasises the importance of place-specific institutions and regional interactions, whereas dynamic capability theory explains why firms differ in their ability to identify, absorb, and reconfigure external resources. Fragmented institutions, weak interactive learning, and limited coordination may constrain regional innovation systems (Derudder & Liu, 2025; Friedrich & Kagel, 2025). Likewise, the benefits of external knowledge depend on firms' capabilities and industrial context (Audretsch et al., 2024). Therefore, firms in late-developing inland clusters rely more heavily on effective cluster-level coordination to combine knowledge flow, complementary industrial resources, and institutional support. In mature coastal clusters, stronger firm capabilities, networks, and market institutions make the direct mobilisation of these resources more feasible.

Expectation. This contextual difference is expected to be most evident when institutional coherence and absorptive capacity are limited. This does not suggest that all inland clusters are weak or that all coastal clusters are mature. Rather, the importance of cluster performance depends on the institutional and organisational conditions of the individual cluster.

5.0 Future Research Agenda and Theoretical Boundaries

As a conceptual theory-building study, this study did not empirically test proposed causal relationships. Therefore, its seven propositions should be understood as theoretically derived directions for future research rather than empirically verified findings. Future research could compare inland and coastal clusters to examine whether cluster performance plays a stronger mediating role when institutional coordination,

absorptive capacity, and market-supporting conditions are weaker. This could involve combining firm surveys and interviews with patents, policy documents, and industrial network data. Further research should clarify the different dimensions of cluster performance and separate the quality of coordination from resource availability. We should also examine how the proposed relationships differ across industries, stages of cluster development, and institutional settings. Longitudinal studies can trace changes in policy coordination, industrial complementarity, and knowledge exchange over time.

6.0 Implications

This study has several theoretical, policy, and managerial implications. Theoretically, this explains how knowledge spillovers, related and supporting industries, and government intervention may contribute to corporate innovation capability through cluster performance as a coordination process (Coman et al., 2024; Piantoni et al., 2023). It also extends cluster innovation research to late-developing inland regions by linking regional innovation system theory, dynamic capability theory, and Porter's diamond model (Li, 2025; Robledo Fernández et al., 2023; Wei, 2023). Policymakers in late-developing inland clusters should look beyond isolated firm-level subsidies and strengthen the collective conditions that support innovation. Priorities include cross-jurisdictional coordination, consistent eligibility criteria and application procedures, and shared facilities for testing, pilot production, technical services, and university–industry collaboration (Chen et al., 2025). Policy evaluation should consider not only investment, firm numbers, and patent counts, but also the accessibility of shared infrastructure, coordination between government levels, and collaboration among firms, suppliers, and knowledge organisations (Munday et al., 2024).

Firms should regard cluster membership as an active source of innovation rather than a passive locational advantage. Managers should cultivate relationships with suppliers, universities, research institutes, and cluster organisations; engage in joint problem-solving and collaborative R&D; and enhance their capacity to identify, absorb, and apply external knowledge (Audretsch et al., 2024). These actions can help firms

convert cluster resources into innovation capabilities, where knowledge and institutional support are fragmented or unevenly accessible (Baldwin et al., 2024).

7.0 Conclusion

Late-developing inland clusters may possess substantial industrial capacity without developing the corresponding corporate innovation capability. This study argues that knowledge spillovers, related and supporting industries, and government intervention influence corporate innovation capability through cluster performance, understood as the effectiveness of cross-organisational coordination. This mediating role is particularly important when fragmented institutions and weak absorptive capacity restrict firms' access to external resources. It should be less pronounced in mature coastal clusters, where stronger capabilities, networks, and market institutions facilitate more direct resource mobilisation. This research refines cluster innovation theory by distinguishing the mechanisms through which cluster conditions support innovation across different contexts. The central implication for policymakers is the strengthening of cluster coordination and cross-regional governance. For firms, cluster collaboration should be treated as an active means of accessing and combining external resources. Future research could develop this framework through cross-industry and longitudinal research. Drawing on institutional theory, evolutionary economics, and network-based perspectives, such studies could explore how the relationships that support cluster innovation change over time.

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References

- Al-Kfairy, M., Majdalawieh, M., & Alrabae, S. (2022). Conceptualising the role of the UAE innovation strategy in university-industry knowledge diffusion process. *European Conference on Knowledge Management*, 23(2), 1439–1442. <https://doi.org/10.34190/eckm.23.2.435>
- Alqararah, K., & Alnafrah, I. (2024). Innovation-driven clustering for better national innovation benchmarking. *Journal of Entrepreneurship and Public Policy*, 13(2), 234–254. <https://doi.org/10.1108/jep-01-2023-0007>
- Andres, B., Díaz-Madroñero, M., Soares, A. L., & Poler, R. (2024). Enabling technologies to support supply chain logistics 5.0. *IEEE Access*, 12, 43889–43906. <https://doi.org/10.1109/access.2024.3374194>
- Artemenko, A. (2024). Analysis of the current state of cluster development in the regions of Ukraine and the world. *Green, Blue and Digital Economy Journal*, 5(3), 1–5. <https://doi.org/10.30525/2661-5169/2024-3-1>
- Audretsch, D. B., Belitski, M., Spadavecchia, A., & Zahra, S. A. (2024). The more, the merrier or the less is more? The role of firm capabilities and industry in the knowledge spillover of innovation. *Technovation*, 138, 103115. <https://doi.org/10.1016/j.technovation.2024.103115>
- Audretsch, D. B., & Belitski, M. (2026). Knowledge spillover of innovation: Entrepreneurial difference. *Research Policy*, 55(1), Article 105362. <https://doi.org/10.1016/j.respol.2025.105362>
- Baldwin, C. Y., Bogers, M. L. A. M., Kapoor, R., & West, J. (2024). Focusing the ecosystem lens on innovation studies. *Research Policy*, 53(3), 104949. <https://doi.org/10.1016/j.respol.2023.104949>
- Böttcher, T. P., Röckinghausen, S., Kernstock, P., & Krcmar, H. (2026). From regulation to orchestration: Collective action in the emergence of digital circular

- ecosystems. *Electronic Markets*, 36(1), Article 30.
<https://doi.org/10.1007/s12525-026-00888-x>
- Bruyaka, O., Prange, C., & Li, H. A. (2024). Dynamic capabilities measurement safari: A roadmap. *International Journal of Management Reviews*, 26(4), 495–517.
<https://doi.org/10.1111/ijmr.12364>
- Butt, M. A., Katuse, P., & Namada, J. (2023). Role of government as moderator: Porter's Diamond firm strategy, structure, and rivalry attributes and industry's performance. *International Journal of Research in Business and Social Science* (2147-4478), 12(7), 85–93. <https://doi.org/10.20525/ijrbs.v12i7.2925>
- Cavalcante, P. L. C. (2022). Heterogeneity is the rule, not the exception? A tentative typology of national innovation systems. *Revista Tempo Do Mundo*, (28), 85–110. <https://doi.org/10.38116/rtm28art3>
- Chen, K., Xue, Z., Guo, R., & Ning, L. (2025). The holistic role of multi-level government in transformative innovation process: Theoretical framework and evidence from China. *Technovation*, 139, 103122.
<https://doi.org/10.1016/j.technovation.2024.103122>
- Coman, C., Alexoaei, A., & Cojanu, V. (2024). The role of clusters in managing technological challenges and achieving resilient agri-food systems at the global level. *Proceedings of the International Conference on Business Excellence*, 18, 1495–1505. <https://doi.org/10.2478/picbe-2024-0123>
- Cooke, P., Uranga, M. G., & Etxebarria, G. (1997). Regional innovation systems: Institutional and organisational dimensions. *Research Policy*, 26(4), 475–491.
[https://doi.org/10.1016/S0048-7333\(97\)00025-5](https://doi.org/10.1016/S0048-7333(97)00025-5)
- Coșniță, D. A., & Iorgulescu, F. S. (2022). Searching for crisis-proof business models: The case of Romanian industrial clusters. In S. L. Fotea, I. Ș. Fotea, & S. Văduva (Eds.), *Navigating through the crisis: A special issue on the COVID-19 crises* (pp. 17–26). Springer. https://doi.org/10.1007/978-3-030-82755-7_2

- D'Amico, E., Belitski, M., Braga, A., & Savoie, R. (2025). Enhancing knowledge spillover of innovation through artificial intelligence: An empirical investigation. *The Journal of Technology Transfer*. Advance online publication. <https://doi.org/10.1007/s10961-025-10217-7>
- Deng, S., & Wu, Y. (2023). Spatiotemporal evolution and driving factors of urban green technology innovation efficiency in the Chengdu-Chongqing Economic Circle of China. *Frontiers in Ecology and Evolution*, 11, Article 1234374. <https://doi.org/10.3389/fevo.2023.1234374>
- Derudder, B., & Liu, X. (2025). Cross-border regional innovation systems: concepts, approaches and perspectives. *Regional Studies*, 59(1), 2418704. <https://doi.org/10.1080/00343404.2024.2418704>
- Di Cataldo, M., Ferranna, L., Gerolimetto, M., & Magrini, S. (2023). Splitting up or dancing together? Local institutional structure and the performance of urban areas. *Economic Geography*, 99(1), 81–110. <https://doi.org/10.1080/00130095.2022.2130749>
- Fadeikina, N., & Bavykina, E. (2022). About the state cluster policy in the Russian Federation, implemented in order to increase the innovative potential of the national economy and ensure its sustainable economic growth. *Siberian Financial School*, 3, 193–204. <https://doi.org/10.34020/1993-4386-2022-3-193-204>
- Friedrich, C., & Kagel, A. S. (2025). STI and DUI modes of innovation in poorly developed RIS. Systemic failures and challenges. *European Planning Studies*, 33(2), 245–263. <https://doi.org/10.1080/09654313.2024.2430240>
- Fulgence, B. E., Hu, X., Larbi-Siaw, O., Tuo, S. J., & Gnahe, F. E. (2022). Impact of knowledge absorptive capacity on innovative performance in SMEs: Mediating effect of cluster environment. *Kybernetes*, 52(12), 6001–6024. <https://doi.org/10.1108/K-03-2022-0373>

- García Vega, M., & Vicente-Chirivella, Ó. (2024). The role of public external knowledge for firm innovativeness. *International Journal of Industrial Organization*, 93, 103056. <https://doi.org/10.1016/j.ijindorg.2024.103056>
- Gonzalez, R. (2022). Organizational structure as antecedent of dynamic capability. *Gestão & Produção*, 29, e1821. <https://doi.org/10.1590/1806-9649-2022v29e1821>
- Grumadaitė, K., Jucevičius, G., & Staniulienė, S. (2022). Smart development principles of knowledge ecosystem in an industrial cluster. *European Conference on Knowledge Management*, 23(1), 478–486. <https://doi.org/10.34190/eckm.23.1.761>
- Guzman, J., Murray, F., Stern, S., & Williams, H. (2024). Accelerating innovation ecosystems: The promise and challenges of regional innovation engines. *Entrepreneurship and Innovation Policy and the Economy*, 3(1), 9–75. <https://doi.org/10.1086/727744>
- Halkier, H. (2014). Innovation and destination governance in Denmark: Tourism, policy networks and spatial development. *European Planning Studies*, 22(8), 1659–1670. <https://doi.org/10.1080/09654313.2013.784609>
- Hsu, D. H., Hsu, P.-H., Zhou, K., & Zhou, T. (2025). Industry–university collaboration and commercializing Chinese corporate innovation. *Management Science*, 71(6), 5351–5375. <https://doi.org/10.1287/mnsc.2022.00788>
- Huang, X. (2023). Integration of industrial chain and innovation chain of equipment manufacturing industry cluster. *Academic Journal of Business & Management*, 5(5), 48–52. <https://doi.org/10.25236/AJBM.2023.050507>
- Hu, Z., Cao, Z., Du, A., & Tu, Q. (2025). Where does it matter? Revisiting the role of proximity in knowledge spillovers. *The American Journal of Economics and Sociology*, 84(2), 297–322. <https://doi.org/10.1111/ajes.12604>

- Jha, S., & Basu, S. (2025). Knowledge spillovers between R&D-driven incumbents and start-ups in open innovation: A systematic review and nomological network. *Journal of Knowledge Management*, 29(2), 588–638. <https://doi.org/10.1108/JKM-05-2024-0563>
- Kasper, L., Sausen, J. O., Ferreira, G. C., & Salvati, A. O. (2025). Dynamic capabilities in regional studies: A systematic literature review. *Revista Alcance*, 32(2), 58–72. [https://doi.org/10.14210/alcance.v32n2\(Maio/Ago\).p58-72](https://doi.org/10.14210/alcance.v32n2(Maio/Ago).p58-72)
- Kaur, V. (2022). Managerial attention and knowledge-based dynamic capabilities: A meta-theoretical approach to competitive advantage. *Journal of General Management*, 50, 220–239. <https://doi.org/10.1177/03063070221126275>
- Kim, J., Paek, B., & Lee, H. (2022). Exploring innovation ecosystem of incumbents in the face of technological discontinuities: automobile firms. *Sustainability*, 14(3), 1606. <https://doi.org/10.3390/su14031606>
- Lehmann, E., Schenkenhofer, J., & Vismara, S. (2025). Hidden champions and knowledge spillovers: innovation-enhancing agglomeration effects and niche technology specificity. *Small Business Economics*, 1–21. <https://doi.org/10.1007/s11187-025-00999-3>
- Li, B. (2025). Improving the management of regional innovation systems in the context of the knowledge economy. *Economics and Management*, 30(12), 1545–1555. <https://doi.org/10.35854/1998-1627-2024-12-1545-1555>
- Li, R., Luo, Y., Chen, B., Huang, H., & Liu, P. (2024). Efficiency of scientific and technological resource allocation in Chengdu-Chongqing-Mianyang urban agglomeration: Based on DEA–Malmquist index model. *Environment, Development and Sustainability*, 26(4), 10461–10483. <https://doi.org/10.1007/s10668-023-03153-9>
- Lin, B. (2024). The spatial-temporal evolution of China's automobile manufacturing cluster network and its influencing factors. *Journal of the Knowledge Economy*, 15(4), 16038–16059. <https://doi.org/10.1007/s13132-024-01735-0>

- Lobova, E., Mingaleva, Z., & Sagidullin, A. (2024). Managing the selection of alternative models of industrial clusters, taking into account the density of the institutional environment. *Regional Economy. South of Russia*, 12(3), 62–75. <https://doi.org/10.15688/re.volsu.2024.3.7>
- MacDonald, P., & Selmanovic, S. (2023). How localised are knowledge spillovers? Evidence from microgeographic data on UK patent citations. *Economics of Innovation and New Technology*, 33, 323–343. <https://doi.org/10.1080/10438599.2023.2184809>
- Mendes, T., Braga, V., Silva, C., & Ratten, V. (2023). Taking a closer look at the regionally clustered firms: How can ambidexterity explain the link between management, entrepreneurship, and innovation in a post-industrialized world? *The Journal of Technology Transfer*, 48(6), 2007–2053. <https://doi.org/10.1007/s10961-022-09991-5>
- Munday, M., Huggins, R., Cai, W., Kapitsinis, N., & Roberts, A. (2024). The transformative potential of inward investment on industrial cluster development: The case of the semiconductor industry in Wales. *European Planning Studies*, 32, 1594–1612. <https://doi.org/10.1080/09654313.2024.2319704>
- Nedeleev, D., & Kondev, G. (2024). Adequate assessment of competitive advantages through Porter's Diamond. Application to Bulgarian non-ferrous metallurgy. *Journal of Chemical Technology and Metallurgy*, 59(6), 1317–1324. <https://doi.org/10.59957/jctm.v59.i6.2024.5>
- Obschonka, M., Audretsch, D. B., & Moog, P. (2023). The regional entrepreneurship and innovation ecosystem: A review and research agenda. *Research Policy*, 52(6), Article 104849. <https://doi.org/10.1016/j.respol.2023.104849>
- Piantoni, G., Dell Agostino, L., Arena, M., & Azzone, G. (2023). Assessing shared value in innovation ecosystems: a new perspective of scorecard. *International Journal of Productivity and Performance Management*, 73(11), 190–212. <https://doi.org/10.1108/ijppm-02-2023-0067>

- Poon, T., Wu, C., & Liu, M. (2023). Developing entrepreneurial ecosystem: A case of unicorns in China and its innovation policy implications. *Asian Journal of Technology Innovation*, 32, 20–36. <https://doi.org/10.1080/19761597.2022.2157849>
- Porter, M. E. (1990). *The competitive advantage of nations*. Free Press.
- Pratiwi, A. A., Wessiani, N. A., Suwignjo, P., & Fadli, R. (2024). Industrial cluster design using value chain analysis and Porter's Diamond Model: A case study in Batik Trusmi Cirebon Center. *E3S Web of Conferences*, 517, Article 05005. <https://doi.org/10.1051/e3sconf/202451705005>
- Rachinger, M., & Müller, J. (2024). Investigating a manufacturing ecosystem in transition toward electric vehicles - A business model perspective. *Journal of Manufacturing Technology Management*, 35(9), 24–50. <https://doi.org/10.1108/jmtm-07-2023-0279>
- Rasel, S., & Kalfadellis, P. (2021). Global and non-global city locations: The effect of clusters on the performance of foreign firms. *Regional Studies*, Regional Science, 8, 88–108. <https://doi.org/10.1080/21681376.2021.1898461>
- Ren, F., & Tang, G. (2024). Agglomeration effects of high-tech industries: Is government intervention justified? *Economic Analysis and Policy*, 83, 685–700. <https://doi.org/10.1016/j.eap.2024.07.015>
- Repushevskaya, O. (2024). Formation of cluster theory to smooth regional differentiation of socio-economic development. *Russian Journal of Management*, 12(3), 169–179. <https://doi.org/10.29039/2409-6024-2024-12-3-169-179>
- Robledo Fernández, J. C., Martínez Moreno, O. C., & Rodríguez Arias, C. A. (2023). Dynamic capabilities: Theoretical reflection from the field of strategy. *Publicaciones e Investigación*, 17(2). <https://doi.org/10.22490/25394088.7065>

- Rodríguez, I., Williams, A. M., & Hall, C. M. (2014). Tourism innovation policy: Implementation and outcomes. *Annals of Tourism Research*, 49, 76–93. <https://doi.org/10.1016/j.annals.2014.08.004>
- Sánchez-García, E., Martínez-Falcó, J., Marco-Lajara, B., & Millán-Tudela, L. A. (2026). Drivers of innovation in specialized regions. *Journal of the Knowledge Economy*. Advance online publication. <https://doi.org/10.1007/s13132-026-03253-7>
- Sheng, Y., Yang, X., Chih, Y. Y., & Zhang, J. (2024). Foreign direct investment spillovers and regional innovation in China: The spatial moderating role of absorptive capacity. *Review of Development Economics*, 28(4), 1803–1837. <https://doi.org/10.1111/rode.13122>
- Silva, L. E. N., Gomes, L. A. D. V., Faria, A. M. D., & Borini, F. M. (2024). Innovation processes in ecosystem settings: An integrative framework and future directions. *Technovation*, 132, 102984. <https://doi.org/10.1016/j.technovation.2024.102984>
- Smorchkova, L. (2023). Administrative-legal support for the development of innovation clusters in modern Russia. *Gosudarstvo I Pravo*, 3, 101–110. <https://doi.org/10.31857/s102694520024776-4>
- Supriyanto, A., Said, L. R., Firdaus, M., Asma, R., & Redawati, R. (2024). A systematic literature review on dynamic capabilities in marketing. *Access Journal - Access to Science, Business, Innovation in the Digital Economy*, 5(3), 478–492. [https://doi.org/10.46656/access.2024.5.3\(6\)](https://doi.org/10.46656/access.2024.5.3(6))
- Tavares, M. S. D. A., Gohr, C. F., Morioka, S., & Da Cunha, T. R. (2021). Systematic literature review on innovation capabilities in clusters. *Innovation & Management Review*, 18(2), 192–220. <https://doi.org/10.1108/INMR-12-2019-0153>

- Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28(13), 1319–1350. <https://doi.org/10.1002/smj.640>
- Tzabbar, D., Lee, J., & Seo, D. (2022). Collaborative structure and post-mobility knowledge spillovers: A dyadic approach. *Strategic Management Journal*, 43(9), 1728–1762. <https://doi.org/10.1002/smj.3384>
- Wang, C., Zhang, X., Tao, Y., & Zhang, K. (2026). Artificial intelligence, dynamic capabilities, and innovation resilience: The contingent roles of market competition intensity and technological turbulence. *Journal of Innovation & Knowledge*, 16, Article 101004. <https://doi.org/10.1016/j.jik.2026.101004>
- Wang, X., Nan, T., Liu, F., & Xiao, Y. (2024). Analysis of the spatiotemporal evolution characteristics and policy factors of eco-innovation efficiency in Chinese urban agglomerations. *Ecological Indicators*, 163, Article 112106. <https://doi.org/10.1016/j.ecolind.2024.112106>
- Wei, L., & Tong, L. (2024). The impact of university knowledge spillover on the innovation and development of technology enterprises. *Journal of Business and Green Innovation*, 2(2), 1–20. <https://doi.org/10.63646/HYCD9025>
- Wei, N. (2023). The competitiveness analysis of Chinese automobile industry based on Improved Porter's Diamond Model. *Highlights in Business, Economics and Management*, 17, 239–246. <https://doi.org/10.54097/hbem.v17i.11253>
- Wilke, U., & Pyka, A. (2024). Assessing the relevance of different proximity dimensions for knowledge exchange and (co-)creation in sustainability-oriented innovation networks. *Sustainability Science*, 19(4), 1427–1443. <https://doi.org/10.1007/s11625-024-01463-z>
- Xu, Y., Li, X., Tao, C., & Zhou, X. (2022). Connected knowledge spillovers, technological cluster innovation and efficient industrial structure. *Journal of Innovation & Knowledge*, 7(3), Article 100195. <https://doi.org/10.1016/j.jik.2022.100195>

- Xu, Y., & Zhu, S. (2024). Collaboration for radical and incremental innovation: The roles of intra-region and intra-group knowledge spillover. *Journal of Geographical Sciences*, 34(11), 2193–2211. <https://doi.org/10.1007/s11442-024-2289-9>
- Yan, G., & Zou, L. (2024). Cluster heterogeneity and efficiency of innovation network-Evidence from Shanghai and Taizhou in China. *Growth and Change*, 55(3), e12729. <https://doi.org/10.1111/grow.12729>
- Zeng, J., & Wu, X. (2023). Spatial-temporal pattern of scientific and technological talent agglomeration and its influencing factors in Chengdu–Chongqing City Cluster. In N. Akhtar et al. (Eds.), *Proceedings of the 2023 3rd International Conference on Public Management and Intelligent Society (PMIS 2023)* (pp. 269–278). Atlantis Press. https://doi.org/10.2991/978-94-6463-200-2_29
- Zhang, J., Zou, Q., & Wang, Y. (2022). Justice in triad: Revisiting supplier involvement in new product development. *Business Ethics, the Environment & Responsibility*, 32(1), 312–327. <https://doi.org/10.1111/beer.12490>
- Zhang, Y., Wang, D., & Xiao, X. (2023). Network characteristics of innovation ecosystem: Knowledge collaboration and enterprise innovation. *Science, Technology and Society*, 28, 488–510. <https://doi.org/10.1177/09717218231161216>
- Zou, T. (2024). Technological innovation promotes industrial upgrading: An analytical framework. *Structural Change and Economic Dynamics*, 70, 150–167. <https://doi.org/10.1016/j.strueco.2024.01.012>