

# Localized Innovation Systems And Small Business Competitiveness: A Conceptual Integration Of Cluster Dynamics And Incubation Processes

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## **Abstract:**

*Small and medium-sized enterprises (SMEs) are vital to regional economies but they face growing pressure to innovate with limited local resources. This paper develops an integrated Localized Innovation Systems (LIS) framework that brings research on clusters, incubation and entrepreneurship together to explain how SMEs upgrade on tight budgets. The model highlights four linked elements: formal networks (incubators and business associations), informal networks built on mentorship and peer ties, shared spaces (co-working areas and labs), and local institutions including universities and municipal agencies. This study shows how governance shapes their impact through networked coordination, polycentric stewardship and platform-based tools.*

*The framework explains how SMEs can improve processes, products and functions without heavy public funding. This paper proposes six testable claims, and provides low-cost steps for managers and policymakers. Connecting firm behavior with broader incubation and cluster systems, the LIS framework provides a clear roadmap for strengthening SME competitiveness and guiding practical, locally grounded actions that support resilience, inclusion and shared growth.*

**Keywords:** *Localized innovation systems, SME competitiveness, Cluster dynamics, Business incubation, Shared infrastructure*

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## **I. Introduction**

Small and medium-sized enterprises (SMEs) still make up the most important part of regional economies. Their competitiveness now depends on how well they can innovate with the limited resources and support available in their local areas. With digital change, supply chain disruptions, and environmental pressures growing, SMEs must find low-cost ways to upgrade their capabilities and create value<sup>6</sup>. In many regions, especially outside big innovation centres, localized innovation systems (LIS) have become important spaces that provide shared learning, infrastructure, and institutional support so that SMEs can innovate at lower cost<sup>8</sup>. These systems bring firms, incubators, universities, and public actors together, and they give SMEs practical support while keeping them rooted in local production networks<sup>19</sup>.

The theory behind SME competitiveness in these local markets is still scattered. Cluster research explains how proximity supports knowledge sharing and cooperation<sup>15</sup>. Incubation studies examine support tools like mentoring, seed funding, and innovation facilities that help new firms survive and grow<sup>26</sup>. Previous works on entrepreneurship and ecosystems shows that SMEs perform best when learning networks and local governance are aligned<sup>6</sup>. Still, only a few studies combine these ideas into one model that explains how clusters, incubation, and system governance work together, <sup>7,8</sup>.

This study proposes an integrated Localized Innovation Systems (LIS) framework that connects cluster dynamics and incubation as key influencers of SME competitiveness. Drawing on recent work in innovation systems and cluster governance<sup>19</sup>, it describes LIS as ecosystems where governance, learning, and proximity work together to help SMEs adapt. This combined view answers calls for models that link different levels of regional innovation, <sup>6,8</sup>. In practice, this study supports policies that mix cluster collaboration with incubator-led services, thereby helping SMEs innovate with limited resources through local support and trust-based coordination.

## **II. Conceptual Foundations**

### **Cluster Dynamics**

Clusters are groups of firms and supporting institutions located close to each other. Their strength comes from the way proximity makes it easier to share knowledge, specialize, and coordinate. Studies show that cluster performance depends on local knowledge spillovers, firm specialization, and governance structures<sup>14</sup>. Knowledge spreads through formal partnerships and supplier links, but it also spread informally through

workers' mobility and social ties<sup>23</sup>. These spillovers give SMEs access to tacit know-how that is hard to buy or imitate<sup>9</sup>.

Specialization inside clusters lets firms focus on what they do best while they rely on trusted partners for complementary tasks at the same time<sup>21</sup>. These relationships lower transaction costs and support joint problem solving<sup>4</sup>. Governance can take many forms, from market-led coordination to structured management by associations or public agencies,<sup>20,34</sup>.

Because of these mechanisms, clusters work as learning systems, not just as geographic groupings. Strong governance helps avoid duplication; it supports shared infrastructure, and it increases SME competitiveness through collective efficiency<sup>10</sup>.

### Business Incubation and Intermediary Support

Business incubators act as intermediaries that reduce entry barriers for new firms. They support capability building through mentoring, shared labs, and networking services. Research identifies university, private, and hybrid incubators, each with different goals<sup>38</sup>. University incubators focus on research transfer, private ones focus on scaling, and hybrid models combine academic and market strengths<sup>22</sup>.

Incubators lower the fixed costs of starting a business by providing shared resources and professional guidance<sup>11</sup>. They also connect entrepreneurs to partners, funders, and wider innovation networks<sup>38</sup>.

Some scholars argue that incubators can create dependency, while others see them as catalysts when they are connected to strong local governance<sup>12</sup>. The most effective incubators act as network orchestrators that connect startups to clusters, accelerators, and investor communities<sup>14</sup>.

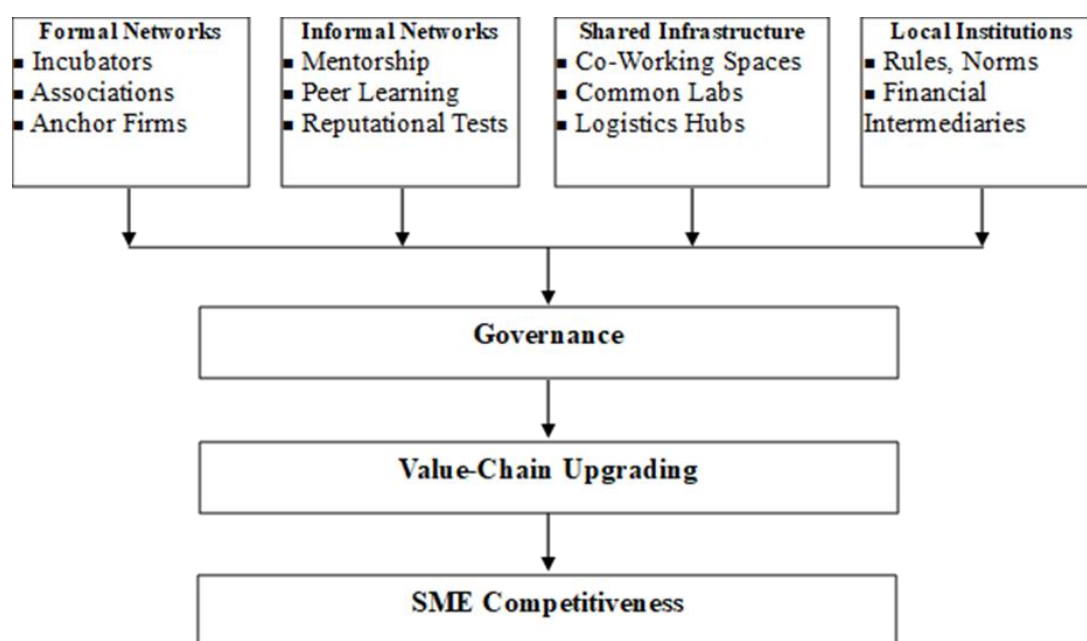
Incubators help SMEs move beyond early-stage risks by building absorptive capacity and innovation skills. In localized innovation systems, they serve as bridges between entrepreneurs and regional innovation structures<sup>9</sup>.

### Entrepreneurship Within Local Ecosystems

Entrepreneurship grows in ecosystems that are influenced by networks, institutions, and local culture. The entrepreneurial ecosystem perspective sees regional (or local) business development as a joint process involving entrepreneurs, intermediaries, and institutions that enable opportunity creation and resource access,<sup>33,37</sup>

Social capital and informal networks give entrepreneurs trust-based support and market information that formal institutions normally cannot provide<sup>24</sup>. These relationships complement clusters and incubators by embedding firms in cooperative local networks. Local institutions such as credit agencies, training centres, and municipal bodies affect how inclusive and supportive the environment is<sup>39</sup>.

Research shows that entrepreneurship is strongest when individual learning connects well with institutional support, this will create adaptive regional ecosystems<sup>11</sup>. In this sense, entrepreneurship depends on alignment between networks, institutions, and intermediaries, which together bolster localized innovation and SME competitiveness.



**Figure 1:** Integrated Model of Localized Innovation Systems for SME Competitiveness

### III. Integrative Framework For Localized Innovation Environments

#### Constituent Elements and Mechanisms of Capability Formation

Localized innovation systems work because several elements come together to give SMEs knowledge, resources, and access to markets.

- 1. Formal networks** such as incubators, business associations, and anchor firms provide structured support. Incubators provide mentoring, shared facilities, and they help with investment readiness, while business associations organize training and policy advocacy<sup>32</sup>. Anchor firms support SMEs through supply chain partnerships that transfer standards, technology, and contract opportunities<sup>21</sup>. These formal ties provide a way for SMEs to move into higher-value activities and strengthen trust and knowledge flows<sup>13</sup>.
- 2. Informal networks.** Peer groups, mentorship circles, and local reputation-based ties spread tacit knowledge that formal programs cannot fully provide<sup>27</sup>. Trust in these relationships reduces monitoring costs and it helps people learn faster and develop small-scale innovations<sup>16</sup>. These informal exchanges are especially useful for early-stage firms that are building confidence and learning to absorb new ideas.
- 3. Shared infrastructure** such as co-working spaces, labs, and logistics centers reduces entry barriers and lets SMEs access tools they could not afford alone. These spaces normally include digital technologies, prototyping labs, and joint training that support product diversification<sup>40</sup>. By pooling their assets, small firms can mimic some benefits of scale<sup>1</sup>.
- 4. Local institutions.** Universities, financial intermediaries, and municipal agencies influence the rules, incentives, and support systems that guide SME upgrading. These institutions influence access to finance, skills, and innovation programs, which in turn helps the system stay responsive to new technologies and markets,<sup>18,30</sup>.

#### Governance in SME Value-Chain Upgrading

Governance defines how actors in the system coordinate and how SMEs benefit from value-chain opportunities. Three main governance types affect SME upgrading:

- 1. Networked governance** uses trust-based relationships among incubators, associations, and firms to support collective problem solving. This setup helps SMEs to learn faster and improve through small and steady innovations<sup>35</sup>.
- 2. Polycentric stewardship** involves many actors such as universities, NGOs, and local governments who work independently are focused on the same goals. This gives SMEs access to different layers of support that strengthen their resilience across sectors,<sup>13,27</sup>.
- 3. Platform coordination** uses digital or physical hubs to centralize information, match firms to market opportunities, and streamline procurement. This reduces transaction barriers and helps SMEs to reach new markets and diversify their products<sup>2</sup>.

**Table 1.** Governance Types and How They Support SME Upgrading in Localized Innovation Systems

Governance Type	How Coordination Works	What It Helps SMEs Achieve
<b>Networked Governance</b>	Incubators, associations, and peer firms coordinate through trust-based relationships. Knowledge is shared informally, and partners solve problems together. These lowers monitoring and transaction costs.	Small, steady innovations; quicker learning; better processes; stronger access to tacit knowledge.
<b>Polycentric Stewardship</b>	Universities, NGOs, and public agencies work independently but follow shared development goals. They offer joint training and refer SMEs across different support programs.	Deeper capabilities across sectors; more resilient ecosystems; stronger ability to adapt and solve problems.
<b>Platform Coordination</b>	Digital or physical hubs centralize information, standardize procurement, and connect SMEs with buyers, logistics, and market data.	New products and markets; easier scaling; broader competitiveness; fewer barriers to entry.

### IV. Alternative Funding Channels For Continuous SME Upgrading

Localized innovation systems now rely less on large government subsidies and more on private and collective ways of raising resources. Instead of depending on big public grants, actors in clusters and incubators use blended financing that mixes market-based, community-based, and reputation-based mechanisms to support SME upgrading<sup>25</sup>.

One option is *fee-for-service incubation*. Here, incubators charge small fees for mentoring, digital workspace, or market-linkage support. This helps incubators stay financially stable while also encouraging them to deliver high-quality services<sup>32</sup>. At the same time, shared infrastructure investments (fabrication labs, logistics hubs, or marketing cooperatives) allow SMEs to use expensive assets together; this lowers risk and increases the use of shared facilities<sup>5</sup>.

*Anchor-firm contracting* provides another market-based route. Large firms bring SMEs into their supply chains through subcontracting and technical assistance, which acts as an indirect source of finance for

upgrading<sup>28</sup>. SME business associations also raise funds through membership fees and in-kind contributions. These resources help maintain certification programs, trade fairs, and training services<sup>41</sup>.

Alongside these formal channels, micro-investment pools and informal lending networks, including rotating savings groups and trust-based credit circles provide flexible financing for early-stage business ventures,<sup>3,36</sup>. These systems rely on social capital and reputation; therefore, it reduces the need for collateral and lowering transaction costs,<sup>25,29</sup>.

## **V. Managerial And Policy Implications**

A localized innovation system works only when managers know how to use its parts. For incubator managers, the priority should not be building bigger spaces but making knowledge easy to share. Peer learning groups, founder roundtables, and open mentoring hours are low-cost practices that help entrepreneurs learn quickly without heavy programmes. Keeping an updated list of technical experts, investors, and service providers also gives SMEs a simple, reliable network they can use as they grow<sup>32</sup>.

Cluster facilitators and industry associations can support this by encouraging firms to share resources instead of investing alone. A small prototyping lab, a shared logistics desk, or a common testing area can reduce costs and give SMEs access to tools they normally cannot afford<sup>5</sup>. These facilities work best when maintenance costs are shared so that fees remain low.

Municipal actors are important players too. Many SMEs lose time dealing with licensing, tax paperwork, and compliance checks. Clear rules, shorter approval times, and single-window systems can remove these bottlenecks. Rather than providing large grants that disappear after one cycle, governments can provide small, repeated support to incubators, associations, and other intermediaries that work directly with entrepreneurs<sup>25</sup>.

Matchmaking is another essential task. Support organizations can help SMEs by connecting them to buyers, suppliers, researchers, and skilled workers through simple directories or regular networking events. These connections expand market access at very low cost<sup>41</sup>.

When these actions align, SMEs will build stronger capabilities, reach markets faster, and upgrade more easily. Well-coordinated small interventions often do more for local competitiveness than large one-time spending initiatives<sup>17</sup>.

## **VI. Conclusion**

This paper presents an integrated model that links clusters, incubators, and entrepreneurship to show how local innovation environments help SMEs upgrade. It explains how formal and informal networks, shared spaces, and local institutions work together through governance to move knowledge, lower costs, and open market opportunities. The model suggests that trust-based networks support small and steady innovation, shared assets help firms absorb new ideas, and intermediaries and platforms expand market reach – all of these allowing upgrading without heavy public funding. Focused on governance and simple coordination tools, the framework gives researchers clear directions for future studies and offers managers and policymakers practical ways to strengthen local SME competitiveness.

## **VII. Limitations Of The Study**

This study is conceptual and has not yet been tested with real-world data, so its claims need validation in different settings. The model also simplifies the roles of local actors and assumes a basic level of institutional trust, which may not exist everywhere. Outcomes will differ across sectors, firm ages, and types of knowledge. Future research should use comparative cases, network analysis, and long-term studies to test the framework.

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