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Innovation Ecosystems and Startup Development: An Integrative Conceptual Framework for Networks, Institutions, Finance, and Digital Capabilities

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Abstract

Innovation ecosystems are frequently presented as catalysts of new venture creation, yet their effectiveness depends less on the mere presence of organizations than on the quality of relationships connecting entrepreneurs, knowledge producers, investors, markets, and public institutions. This article develops an integrative conceptual framework explaining how institutional reliability, network brokerage, entrepreneurial finance, and digital capabilities jointly influence startup experimentation, resource mobilization, scaling, and resilience. It adopts a transparent, non-systematic integrative review of foundational peer-reviewed studies and institutional research, without claiming exhaustive database retrieval or quantitative meta-analysis. The synthesis distinguishes ecosystem inputs, relational mechanisms, venture-level capabilities, and heterogeneous outcomes. Six testable propositions articulate complementarity, mediation, and boundary conditions, with particular attention to emerging-economy regions and the risk of metropolitan concentration. The analysis argues that policy should prioritize coordination quality, inclusive access, entrepreneurial learning, and evidence-based evaluation rather than startup counts alone. A multi-level research agenda and an operational measurement matrix are offered for future empirical testing. The paper contributes a mechanism-oriented account that treats ecosystems as evolving institutional and relational configurations rather than universally replicable policy packages.

Keywords: innovation ecosystems; entrepreneurial ecosystems; startups; entrepreneurial finance; digital entrepreneurship; institutions; regional development

Introduction

Startups are important vehicles for introducing new products, testing organizational forms, commercializing knowledge, and challenging incumbent routines. Their capacity to do so,

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however, is rarely produced within the boundaries of an individual firm. Early-stage ventures draw upon universities, customers, specialized suppliers, informal mentors, professional service providers, investors, and public agencies. The innovation ecosystem perspective seeks to explain how these actors and their relationships shape the discovery, validation, and exploitation of entrepreneurial opportunities. Its growing popularity reflects dissatisfaction with explanations that reduce entrepreneurship either to founder traits or to isolated financial incentives (Stam, 2015; Spigel, 2017).

The term ecosystem is analytically useful only when it explains interdependence. A city may possess several incubators, a technology park, a university, and a public seed fund while still offering weak opportunities to founders who lack social connections or face delayed payments, regulatory uncertainty, or inaccessible markets. Conversely, modestly resourced regions can generate productive entrepreneurship when trust, knowledge circulation, anchor customers, and institutional coordination reduce the cost of experimentation. The central question is therefore not how many support organizations exist but how their activities combine into usable entrepreneurial opportunities.

The literature has developed several overlapping perspectives. Regional innovation systems emphasize institutions and interactive learning; cluster research highlights agglomeration and localized externalities; entrepreneurial ecosystem research foregrounds founders, growth-oriented entrepreneurship, and the social organization of resources. Digital entrepreneurship scholarship further complicates place-based assumptions because cloud infrastructure, online distribution, and platform intermediation allow startups to access distant capabilities while remaining exposed to local institutions (Autio et al., 2018). These perspectives are complementary but not interchangeable.

This article asks: through what mechanisms do ecosystem conditions influence startup development; when are ecosystem resources complementary rather than substitutable; how do digital infrastructures alter the relationship between regional location and venture growth; and what evaluation principles should guide policy in emerging economies? The objective is conceptual integration rather than an unsubstantiated claim of causal measurement. The proposed

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contribution is a four-layer framework connecting ecosystem conditions to relational mechanisms, startup capabilities, and outcomes, together with propositions suitable for empirical examination. Three considerations motivate this approach. First, startup creation is not equivalent to high-quality entrepreneurial development: survival, productive innovation, decent employment, and regional spillovers may diverge. Second, ecosystem policies may reinforce unequal access when resources flow to already connected founders. Third, observed ecosystem success can be endogenous: successful startups attract investors and skilled workers, making it difficult to separate causes from consequences. An adequate framework must therefore incorporate feedback, distribution, and temporal sequencing.

Conceptual Foundations and Scope

An innovation ecosystem can be understood as an evolving arrangement of interdependent actors, resources, rules, and practices through which knowledge is transformed into economic or social value. An entrepreneurial ecosystem is a related, more venture-centered configuration of interdependent actors and factors affecting the quantity and quality of entrepreneurship in a place (OECD, 2025). The distinction is one of emphasis rather than mutually exclusive membership: innovation ecosystems can include mature firms and public research missions, while entrepreneurial ecosystems make startup formation and scaling the primary outcome of interest.

The regional innovation-system tradition emphasizes the institutional embedding of knowledge creation and diffusion. Universities and research organizations supply codified expertise; firms contribute tacit knowledge and market problems; intermediaries translate between scientific and commercial communities. The Triple Helix model places university–industry–government interactions at the center of knowledge-based development (Etzkowitz & Leydesdorff, 2000). This framework helps identify actor categories but cannot, by itself, establish that their interaction is effective or inclusive.

Stam (2015) challenges entrepreneurship policy to move beyond maximizing business entry toward productive entrepreneurship and value creation. Spigel (2017) similarly depicts ecosystems as relational configurations of cultural, social, and material attributes rather than a fixed checklist. These insights imply that two regions with similar institutional inventories may exhibit different

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outcomes because of variation in trust, brokerage, norms, and the accessibility of support. Ecosystem effectiveness is relational and contingent.

Digital affordances reshape this account. Autio et al. (2018) distinguish digital and spatial affordances and explain how entrepreneurial opportunity pursuit can combine local embeddedness with geographically dispersed resources. Cloud services lower fixed technological costs, digital marketplaces widen demand, and online communities connect founders to expertise. Yet broadband quality, digital literacy, platform governance, and access to trusted payments remain uneven. Digital connectivity should consequently be conceptualized as a conditional amplifier, not an automatic substitute for physical ecosystems.

The term startup is used here for a young, independent venture pursuing a novel or meaningfully differentiated value proposition under substantial uncertainty and with potential for replication or growth. This definition does not imply that every startup is technology intensive, venture-capital backed, or oriented toward rapid global expansion. Entrepreneurship also includes socially innovative, locally embedded, and resource-constrained ventures. Outcome measures should respect this diversity instead of treating a single financing trajectory as the universal benchmark.

Review Methodology and Analytical Procedure

This study uses an integrative conceptual literature review. Such a review is appropriate when the purpose is to combine theoretical perspectives, clarify constructs, and develop propositions rather than estimate a pooled effect size. The evidence base comprises foundational scholarly articles in entrepreneurship, regional development, institutional theory, digital entrepreneurship, and innovation studies, supplemented by a recent OECD diagnostic report. The manuscript does not claim to be a PRISMA systematic review, a bibliometric census, or an exhaustive survey of all published work.

Source identification proceeded through purposive selection of influential theoretical contributions and authoritative institutional publications. The verification stage checked publisher or institutional pages for bibliographic metadata, publication years, journal titles, page ranges, and persistent DOI links where available. The included works were selected for their relevance to at least one of five analytical dimensions: ecosystem definition, relational coordination, institutions,

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finance, or digital opportunity formation. Recent institutional evidence was used to assess measurement implications, not to fabricate country-level findings.

The synthesis applied a transparent concept-mapping logic. First, statements about enabling conditions were separated from statements about causal mechanisms. Second, venture-level processes such as learning, experimentation, and resource mobilization were distinguished from final outcomes such as scaling or employment. Third, theoretical tensions were recorded, including local versus global resource access, cooperation versus competition, public support versus crowding out, and ecosystem growth versus unequal participation. Fourth, candidate propositions were formulated only where the conceptual linkage was defensible and empirically testable.

Because the review is purposive, it is subject to selection bias and cannot support claims about the prevalence of findings across the entire literature. No database search counts, screening flow, inter-rater reliability, interview results, regression estimates, or field observations are reported. Readers should interpret the propositions as reasoned theoretical expectations rather than validated hypotheses. Replication would require a registered search strategy specifying databases, strings, inclusion criteria, date limits, and independent screening procedures. This methodological restraint is essential to research integrity.

The unit of conceptual analysis is multi-level: regional or national institutional arrangements, interorganizational relationships, and startup-level capabilities. The temporal unit is a venture-development sequence from opportunity recognition to validation, commercialization, and potential scale. Cross-sectional indicators can reveal associations but cannot establish the direction of ecosystem feedback. Longitudinal designs are therefore preferred for future causal testing.

Core Dimensions of Innovation Ecosystems

Institutional reliability and policy coherence. Formal institutions determine the predictability of business registration, contract enforcement, taxation, intellectual-property administration, and public procurement. Informal institutions influence attitudes toward entrepreneurial failure, collaboration, and commercial risk. Stable rules can reduce uncertainty and increase the willingness of founders and investors to commit irreversible resources. However, an extensive catalogue of schemes may impose administrative burdens when eligibility requirements conflict

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or information is fragmented. Institutional quality is better judged by accessibility, predictability, and procedural fairness than by the volume of announced programs.

Policy coherence matters across levels of government and across ministries responsible for education, commerce, technology, finance, and urban development. Fragmented agencies may duplicate training while leaving commercialization support unaddressed. The OECD (2025) treats ecosystem diagnosis as a way to identify bottlenecks rather than assume that the same intervention is suitable everywhere. A region with substantial technical talent but weak customer access may need procurement reform and market linkage more than another incubation facility.

Universities, skills, and knowledge exchange. Higher education institutions supply technical and managerial skills, research expertise, laboratories, and legitimacy. Their value for startups depends on whether knowledge can move across organizational boundaries. Joint projects, internships, proof-of-concept grants, accessible intellectual-property arrangements, and entrepreneur-in-residence programs can lower the translation gap between invention and market use. Publication outputs and patent counts alone are incomplete measures of this function because many startup innovations arise through recombination, process improvement, and customer learning.

Universities also differ in absorptive capacity and incentives. Faculty may face promotion systems that reward publication but not engagement, while founders may lack the time or language to navigate academic bureaucracy. Boundary-spanning intermediaries can translate technical possibilities into commercially testable hypotheses. The resulting value is not simply knowledge transfer from university to firm; customers and entrepreneurs also identify practical problems that redirect research agendas.

Networks, social capital, and brokerage. Network ties facilitate referrals, credibility, market intelligence, team formation, and resource access. Dense local relationships can sustain trust, but excessive closure may recycle similar ideas and exclude outsiders. Brokerage across disconnected communities can expose startups to nonredundant knowledge, partners, and investors. The analytical challenge is to explain when strong ties support execution and when bridging ties promote novelty. Spigel's (2017) relational view suggests that the benefits of cultural, social, and material attributes depend on how they are assembled.

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Networking events should not be confused with productive networks. Attendance counts reveal little about whether founders secure pilot customers, hire specialized employees, or gain credible advice. Useful indicators include repeat collaboration, diversity of contacts, the proportion of first-time founders receiving support, and documented transitions from introduction to commercial relationship. Trust can lower transaction costs, but governance mechanisms remain necessary to address conflicts of interest, information asymmetry, and unequal bargaining power.

Entrepreneurial finance and resource sequencing. Startups face financing gaps because they often possess intangible assets, uncertain cash flows, and limited collateral. Bootstrapping, customer revenue, grants, angel capital, bank credit, and venture capital meet different needs at different stages. A well-functioning ecosystem does not necessarily maximize venture-capital investment; it matches financing instruments to business models and risk profiles. Premature equity financing can encourage expansion before product–market fit, whereas excessive dependence on grants may weaken market discipline.

Finance also has relational dimensions. Investors provide screening, governance, introductions, and strategic advice, while founders signal credibility through prototypes, customers, and trusted endorsements. Financial inclusion requires attention to geography, gender, caste or class barriers, language, and access to professional networks. A policy that increases aggregate investment while leaving new entrants excluded may improve headline performance without broadening entrepreneurial opportunity.

Digital infrastructure and platform dependence. Digital tools can accelerate prototype development, reduce distribution costs, and enable remote coordination. They can also intensify competition and shift bargaining power toward platform operators. Startups using online marketplaces, app stores, cloud infrastructure, or payment gateways may benefit from scale while becoming vulnerable to algorithm changes, fees, data restrictions, or service outages. The key capability is not mere adoption but strategic digital competence: data governance, cybersecurity, interoperability, customer analytics, and the ability to diversify channels.

Market access and demand articulation. Entrepreneurial policy often concentrates on supply-side inputs—training, laboratories, and funding—while underestimating demand. Pilot customers,

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procurement opportunities, corporate partnerships, and export channels create feedback loops that validate value propositions. Early revenues may provide stronger evidence of commercial relevance than participation in accelerator programs. Where public procurement is used, transparent eligibility and performance criteria are needed to prevent capture and to protect competition.

Culture, inclusion, and resilience. Entrepreneurial culture shapes perceptions of opportunity, legitimacy, and failure. Yet cultural explanations risk blaming individuals for structural barriers. Founders' capacity to take risks depends on savings, family obligations, access to healthcare, and availability of second chances. Inclusion is therefore a design principle, not an optional social objective. Resilience also requires diversified customers, adaptable supply chains, peer support, and institutional responsiveness when economic shocks disrupt financing or demand.

An Integrative Multi-Level Framework

The proposed framework comprises four analytically distinct layers. Layer one contains ecosystem conditions: institutional reliability, knowledge infrastructure, talent, finance, digital connectivity, and market demand. Layer two comprises relational mechanisms: brokerage, trust, information exchange, coordination, legitimacy transfer, and resource matching. Layer three contains startup capabilities: opportunity recognition, experimentation, absorptive capacity, business-model adaptation, commercialization, and operational resilience. Layer four contains outcomes: innovative output, productive survival, responsible growth, employment quality, and broader regional spillovers.

The framework rejects a simple additive interpretation. An incubator without customers may generate demonstrations rather than sustainable businesses; skilled graduates without risk finance may pursue employment elsewhere; capital without governance and market discipline may inflate valuations without creating productivity. Complementarity means that the marginal value of one resource depends on the availability and usability of another. The binding constraint will differ across places and stages, so ecosystem policy should be diagnostic rather than formulaic.

Feedback connects outcomes to conditions. Successful founders may become mentors and angel investors; growing ventures may attract suppliers and skilled workers; repeated failures may reveal

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regulatory weaknesses and produce reusable knowledge. Negative feedback is possible too: high rents, talent poaching, concentrated investor power, and institutional capture can undermine ecosystem accessibility. The same expansion that improves aggregate entrepreneurial activity may reduce entry opportunities for marginalized groups.

The model further distinguishes enabling conditions from mechanisms. The presence of a university is an input; sustained exchange of usable knowledge is a mechanism. The availability of an investor is an input; credible screening and stage-appropriate financing are mechanisms. Broadband access is an input; rapid experimentation with distant customers is a capability. This distinction improves measurement validity by avoiding the assumption that institutional inventories automatically imply entrepreneurial value creation.

Spatial context moderates the framework. Dense metropolitan regions may enjoy larger labor markets and investor networks but face high operating costs and competition for attention. Secondary cities may offer lower costs and sector-specific specialization while struggling with visibility and late-stage capital. Digital networks can bridge some distances, but local administrative reliability and trusted social relationships remain relevant. Accordingly, no single ecosystem archetype should be treated as universally optimal.

Research Propositions

Institutional complementarity: Institutional reliability is positively associated with startup commercialization performance, and the relationship is stronger where market-access mechanisms and stage-appropriate finance are jointly available. This proposition follows from the expectation that predictability increases the value of entrepreneurial commitments while complementary resources convert commitment into sales and operational continuity.

Network mediation: The association between ecosystem resource availability and startup innovation outcomes is mediated by the quality of brokerage and knowledge exchange. A high count of institutions should be less predictive of innovation than the frequency and usefulness of cross-organizational relationships. Longitudinal network data could distinguish introductions from repeated productive collaboration.

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Digital moderation: Digital capability positively moderates the association between local resource scarcity and startup access to nonlocal markets and expertise, but the moderation weakens where platform dependence, low digital literacy, or inadequate connectivity are severe. This expectation reconciles the reach of digital tools with persistent institutional and infrastructural constraints (Autio et al., 2018).

Financing fit: Alignment between financing instruments and startup development stages is more strongly associated with sustainable venture progress than the absolute amount of external funding alone. This can be tested by comparing firms with similar sector, age, and founder characteristics but different financing structures and milestone attainment.

Inclusive access: Ecosystem interventions that explicitly reduce information, network, and administrative barriers for underrepresented founders will be associated with a more equitable distribution of startup opportunities, conditional on implementation quality. Aggregate startup counts should be supplemented by participation and outcome measures across founder groups.

Recursive development: Startup success and ecosystem resource quality reinforce one another over time through founder recycling, investment, talent attraction, and knowledge spillovers; however, the feedback may become negative when congestion, exclusion, or concentrated control raises entry costs. Dynamic panel or comparative historical designs are required to investigate these reciprocal effects.

Implications for Emerging Economies and India

Emerging economies combine substantial entrepreneurial demand with uneven access to infrastructure, credit, professional networks, and predictable administrative procedures. Ecosystem frameworks developed from highly capitalized technology centers can misdiagnose these contexts when they presume abundant venture capital, deep research commercialization pipelines, or rapid acquisition opportunities. The appropriate question is which institutional and relational combinations enable productive experimentation under local constraints.

India provides a useful context for future investigation because its entrepreneurial activity spans metropolitan technology services, manufacturing supply chains, agribusiness, retail innovation, education, health services, and digital commerce. These sectors differ sharply in capital intensity,

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regulation, customer acquisition, and scalability. Treating them as a homogeneous startup population would obscure mechanisms. Sector-specific and state-level comparisons could clarify how local educational institutions, procurement markets, payment infrastructure, and founder networks interact.

In secondary urban centers, colleges and commerce departments can serve as conveners of entrepreneurial learning by connecting students, local enterprises, banks, accountants, technology mentors, and public agencies. The objective need not be to imitate a metropolitan venture-capital ecosystem. Practical initiatives might include customer-discovery clinics, financial-literacy support, microenterprise digitization, business-model workshops, and transparent referral networks. Such interventions should be assessed against measurable founder needs rather than institutional branding.

Policy design should begin with ecosystem mapping and bottleneck analysis. Where information is fragmented, a reliable single-window directory may be more useful than another grant. Where prototype creation is possible but customer acquisition is weak, pilot procurement or industry partnerships may have greater value. Where women or first-generation founders lack network access, open mentoring and transparent selection processes can improve fairness. These are hypotheses for context-sensitive evaluation, not claims that particular programs have already produced measured effects.

Regional development strategies must also avoid concentrating benefits in a narrow set of well-connected firms. Support should account for entrepreneurial diversity, including service innovation, rural ventures, social enterprises, and climate-adaptation businesses. At the same time, inclusion should not replace performance assessment: interventions ought to document both access and outcomes, with safeguards against subsidizing ventures that have no plausible path to customer value.

Measurement, Evaluation, and Empirical Research Design

The OECD's Entrepreneurial Ecosystem Diagnostics (2025) offers a contemporary example of distinguishing ecosystem inputs, entrepreneurial outputs, and variation across groups and places. Its pilot benchmarking across OECD countries illustrates the usefulness of multidimensional

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diagnosis while also underscoring measurement limitations. An evaluation system should track ecosystem structure and startup outcomes separately, use consistent denominators, and record changes over time rather than equating program participation with impact.

At the ecosystem level, candidate measures include time and uncertainty associated with business procedures, accessibility of relevant financing, quality of digital connectivity, availability of technical and managerial talent, and breadth of market linkages. Relational measures should capture cross-sector collaborations, founder referrals, repeat mentoring, investor introductions that result in diligence, and customer pilots. Venture measures may include validated experiments, time to first revenue, innovation adoption, productivity, survival, and employment quality. Distributional measures should assess which groups and regions receive resources and experience outcomes.

A credible empirical design could sample startups across metropolitan and secondary-city ecosystems, stratify by sector and venture age, and observe them at repeated intervals. Baseline founder experience, education, sector, market conditions, and prior funding should be recorded to reduce confounding. Network surveys could measure brokerage and resource exchange; administrative data could establish registration and employment trajectories; founder surveys could capture experimentation and perceived institutional reliability. Measurement instruments should be piloted and translated where necessary.

Analytically, multilevel models can account for startups nested within regions, while panel methods can examine changes over time. Mediation analysis could test whether network brokerage explains links between ecosystem conditions and venture performance, but causal interpretation would require strong assumptions and appropriate temporal ordering. Policy interventions may be evaluated through matched comparisons, staggered implementation, or difference-in-differences designs where assumptions are credible. Qualitative comparative studies remain valuable for uncovering mechanisms that standardized indicators overlook.

Researchers must explicitly address survivorship bias: studying only visible successful startups exaggerates the effectiveness of ecosystems. Failed ventures, nonparticipants, and founders who abandoned entry should be included where feasible. Reverse causality also matters because

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thriving startups may attract ecosystem resources. Researchers should predefine outcomes, report missing data and attrition, and avoid treating correlations as proof of policy impact.

Practical Operationalization and Research Governance

A research instrument derived from the framework should avoid asking respondents whether their ecosystem is simply good or bad. Such global ratings conflate awareness, satisfaction, and performance. Instead, investigators can use behaviorally anchored items: whether a founder obtained a relevant technical referral in the previous six months, how long it took to secure a first pilot customer, whether funding terms matched projected cash flows, and whether regulatory information was consistent across agencies. Objective administrative indicators should complement these reports, while differences in venture age and sector should be recorded explicitly.

Construct validity requires careful separation of accessibility from availability. The existence of a university laboratory does not mean a startup can use it at a feasible price or within a relevant timeframe. Similarly, a regional investment fund may be geographically present yet inaccessible to ventures without established contacts. Researchers should therefore measure awareness, eligibility, transaction costs, actual usage, and perceived utility separately. This approach also helps identify where resources are underutilized because of poor communication rather than insufficient supply.

The temporal structure of entrepreneurial development is equally important. Pre-entry founders require credible information and low-cost experimentation; newly registered startups need product validation and first customers; growth-stage ventures may prioritize specialized managers, compliance systems, and expansion capital. A single ecosystem score obscures these stage-specific requirements. Empirical instruments can ask respondents to rank their most binding constraint at each milestone and track whether the constraint changes after intervention. Such event-based analysis is more actionable than a retrospective satisfaction survey.

Evaluation should establish a counterfactual whenever practical. An accelerator reporting that participants increased revenue cannot attribute the improvement to its program without considering selection: promising founders may have been more likely to enter in the first place.

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Appropriate comparisons might use waitlisted applicants, eligibility thresholds, or matched nonparticipants with similar baseline characteristics. Where experimental identification is infeasible, transparent process tracing and sensitivity analysis can still improve the credibility of interpretation. All evaluations should disclose attrition, unsuccessful firms, and changes in program rules.

Responsible data collection is a governance issue, not merely a technical step. Founder surveys may reveal commercially sensitive information, and network mapping can expose relationships that participants consider private. Researchers should obtain informed consent, minimize personally identifiable information, secure records, and report small-cell statistics carefully. When comparing groups, investigators must avoid publishing details that permit indirect identification. Ethical research design is particularly important in small regional ecosystems where participants may know one another and perceive consequences for declining participation.

A balanced scorecard can organize reporting under five domains: enabling conditions, network functioning, startup capabilities, business outcomes, and distributional equity. Each domain should include a small number of interpretable indicators and explicit data-quality notes. For example, reporting both total startup registrations and three-year survival rates discourages overemphasis on entry. Reporting the proportion of first-time founders accessing mentoring alongside aggregate attendance distinguishes breadth of access from event volume. Tracking revenue diversification and repeat customer contracts adds evidence of resilience.

Governance arrangements should specify who collects information, who can audit it, and how it affects funding decisions. Programs rewarded exclusively for registrations or events may inflate activity measures. Programs evaluated on investment raised may favor ventures that already possess strong connections. A more defensible system combines independently checked intermediate outcomes with longer-term measures and qualitative accounts of unintended consequences. Targets should be periodically revised when the ecosystem evolves, but revisions must be documented to preserve comparability.

Finally, comparative studies should recognize that indicators may not mean the same thing in every setting. An equity investment may be central to one software venture but irrelevant to a self-

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financed manufacturing supplier. A patent may capture scientific novelty while overlooking commercially valuable service innovation. Researchers should test measurement invariance where feasible and present sector-specific analyses rather than force heterogeneous ventures into a single ranking. The ultimate purpose of measurement is to support learning about mechanisms, not to produce an apparently precise league table.

Theoretical and Managerial Implications

The framework contributes to entrepreneurship scholarship by placing mechanisms between resource endowments and venture outcomes. It explains why apparently similar regional configurations can yield different results and why policy checklists have limited transferability. Its second contribution is the explicit treatment of complementarity: resources are productive when aligned with one another and with startup stage. Third, it integrates digital and spatial opportunity formation without assuming that geography has become irrelevant. Fourth, it incorporates distributional outcomes and negative feedback into an otherwise growth-oriented discourse.

For startup founders, the analysis suggests that ecosystem participation should be strategic rather than ceremonial. Founders can identify their current binding constraint—customer evidence, specialist knowledge, regulatory navigation, working capital, or hiring—and seek relationships that resolve it. Mentor quality can be judged by domain fit and actionable learning, not reputation alone. Founders should also manage dependence on a single investor, platform, anchor customer, or government program, because resource access can create new vulnerabilities.

For incubators and universities, program quality depends on progression from activity to evidence. A workshop is an input; a validated customer hypothesis is an intermediate outcome. A pitch event is an activity; a completed commercial pilot is stronger evidence of venture development. Support organizations should coordinate referral pathways, maintain transparent selection criteria, and collect longitudinal follow-up data, including unsuccessful outcomes, to avoid self-congratulatory reporting.

For investors and public agencies, the central lesson is to distinguish additionality from displacement. Public support is most defensible where it addresses a demonstrable market or coordination failure, expands access, and catalyzes capabilities that would not otherwise emerge.

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Monitoring should include unintended consequences, including subsidy dependence, selection favoritism, and the crowding out of private initiative. Long-term productivity and innovation matter more than a temporary rise in announcements or registrations.

Limitations and Future Research

The article is conceptual and does not provide original survey, interview, administrative, or experimental data. Its integrative review is purposive rather than exhaustive, so the propositions reflect theoretically informed synthesis and should not be interpreted as statistically established relationships. The conceptual boundaries between innovation and entrepreneurial ecosystems remain partly overlapping, and definitions of startup success vary by sector and institutional context.

Future work should test the framework with longitudinal multi-region datasets, including failed ventures and excluded potential founders. Comparative studies of secondary cities and metropolitan centers could examine whether digital capabilities compensate for local resource gaps. Network analysis could identify which intermediaries produce genuinely new connections rather than merely reproducing elite circles. Sector-specific work should investigate whether finance and knowledge relationships differ between manufacturing, digital services, social enterprise, and climate-oriented ventures.

Additional research should examine the environmental and social consequences of startup expansion. A region may attract investment while worsening affordability or employment precarity. Researchers should also study the governance of digital platforms and the conditions under which artificial intelligence lowers entry barriers or creates new concentration. Such questions require measurement of value distribution alongside growth.

Conclusion

Innovation ecosystems matter because startups develop through interactions among institutions, people, knowledge, finance, digital systems, and markets. Their value cannot be inferred from the simple existence of incubators, grants, universities, or technology parks. The proposed four-layer framework shows how ecosystem conditions operate through brokerage, trust, resource matching,

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and learning to shape venture capabilities and diverse outcomes. Complementarity, inclusion, feedback, and context are central to this explanation.

For researchers, the six propositions offer a structured agenda for causal and comparative testing. For policymakers, the priority is evidence-based diagnosis and coordination rather than imitation of celebrated entrepreneurial centers. For universities and founders, the most useful ecosystem relationships are those that convert knowledge and support into tested solutions, sustainable customers, and productive capabilities. Building a strong ecosystem is therefore a continuous process of institutional learning and relational improvement, not a one-time infrastructure project.

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