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The Urban–Rural Funding Divide: A Multi-Criteria Decision-Making (MCDM) Approach to Resource Allocation in the Bangalore Startup Ecosystem

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Abstract-- The rapid expansion of India's startup economy has been geographically uneven, with venture capital, institutional finance, and innovation infrastructure heavily concentrated in metropolitan clusters. Among these, Bangalore has emerged as the nation's leading entrepreneurial hub, attracting a dominant share of investment flows. While such concentration strengthens innovation density and global competitiveness, it simultaneously widens the urban–rural funding divide, particularly across Karnataka and comparable regions of India. Rural and semi-urban entrepreneurs face structural constraints including limited access to risk capital, weak institutional networks, infrastructural gaps, and heightened informational asymmetries. This secondary research paper examines the determinants of the urban–rural funding divide and proposes a structured Multi-Criteria Decision-Making (MCDM) framework for rational and equitable resource allocation. Drawing upon 23 peer-reviewed studies across entrepreneurial ecosystem theory, venture capital geography, agglomeration economics, regional innovation systems, financial exclusion, and decision-science methodologies, the study synthesizes theoretical and empirical insights to construct a hybrid allocation model. The proposed model integrates five weighted criteria economic viability, scalability potential, social impact, infrastructural readiness, and regional equity contribution using the Analytical Hierarchy Process (AHP) for weight determination and TOPSIS for ranking alternatives. The analysis demonstrates that conventional return-maximization frameworks reinforce cumulative advantage in metropolitan hubs, whereas structured multi-criteria evaluation improves the ranking of high-potential rural ventures without significantly compromising efficiency. The findings suggest that public funding agencies, blended finance institutions, and state innovation missions can utilize MCDM tools to balance growth with inclusivity. The study contributes theoretically by linking entrepreneurial ecosystem scholarship with quantitative decision models and contributes practically by presenting a policy-oriented allocation template adaptable to state-level innovation governance. Addressing the urban–rural funding divide requires strategic optimization rather than redistribution alone; MCDM provides a transparent and replicable pathway toward inclusive innovation development.

Keywords-- urban–rural divide, startup funding, entrepreneurial ecosystems, MCDM, venture capital geography, inclusive innovation

I. INTRODUCTION

India's ascendance as a global startup powerhouse, characterized by the proliferation of unicorns and deep-tech ventures, masks a profound geographic paradox. While the nation fosters the third-largest startup ecosystem globally, its benefits remain tethered to a handful of metropolitan corridors. Bangalore, often designated the "Silicon Valley of India," exemplifies this duality. It accounts for a disproportionate share of the nation's venture capital (VC) deals, patent filings, and technology talent. However, this intense concentration simultaneously generates systemic exclusion for entrepreneurs operating in semi-urban and rural Karnataka. The neoclassical logic of capital markets dictates that investment flows toward regions of highest return and lowest risk. Urban centers, with their agglomerative advantages, naturally satisfy these criteria. Yet, this market-driven allocation is not synonymous with optimal social allocation. The persistent exclusion of rural innovators represents not only a failure of distributive justice but a systemic inefficiency; latent entrepreneurial potential in peripheral regions remains untapped, constraining the overall innovation capacity of the state and nation. This paper addresses the following research questions: (1) What are the structural determinants of the urban–rural funding divide within the context of the Bangalore startup ecosystem? (2) How can public and blended finance institutions intervene to correct this imbalance without undermining economic efficiency? (3) To what extent can Multi-Criteria Decision-Making (MCDM) methodologies provide a transparent, replicable framework for balancing growth and inclusivity? The purpose of this paper is threefold. First, it examines the structural drivers of the urban–rural startup funding divide through an interdisciplinary lens.

Second, it synthesizes theoretical perspectives ranging from agglomeration economics to information asymmetry to explain the persistence of geographic concentration. Third, and most significantly, it develops a conceptual MCDM model for equitable resource allocation. By integrating the Analytical Hierarchy Process (AHP) and TOPSIS, this paper proposes a policy-oriented toolkit that enables funding bodies to evaluate ventures not solely on return expectations but on a balanced scorecard of economic, social, and regional equity metrics. This research is significant for three audiences. For policymakers, it offers a governance framework to operationalize inclusive innovation mandates. For institutional investors, it provides a methodology to de-risk rural investments through structured assessment. For entrepreneurship scholars, it bridges the gap between descriptive ecosystem theory and prescriptive decision science.

II. LITERATURE REVIEW

Entrepreneurial Ecosystems and Cluster Theory

The concept of the entrepreneurial ecosystem has gained significant traction as a framework for understanding the spatial concentration of venture creation. Stam (2015) defines the entrepreneurial ecosystem as a set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship. Feld (2012) emphasizes that successful ecosystems are characterized by dense local networks, leadership, and a culture of reciprocity. These characteristics are inherently spatial; they require physical proximity to facilitate trust and tacit knowledge transfer.

Porter's (1998) cluster theory provides a complementary economic rationale. Porter argues that geographic concentration enhances productivity by improving access to specialized inputs, information, and institutions. While these theories explain why Bangalore thrives, they also implicitly explain why rural regions struggle. Rural areas, by definition, lack the density of suppliers, skilled labour, and supporting institutions that define a functional cluster. Consequently, they remain peripheral to the entrepreneurial mainstream.

Knowledge Spillover and Agglomeration Economics

Audretsch and Keilbach (2007) advanced the knowledge spillover theory of entrepreneurship, positing that new ventures are mechanisms for commercializing knowledge generated in incumbent organizations. Urban environments, rich in universities, research labs, and corporate R&D centres, generate high levels of knowledge spillover.

Entrepreneurs situated within these environments are uniquely positioned to identify and exploit these opportunities. Agglomeration economics suggests that this concentration is self-reinforcing. As more firms locate in a region, the labour pool deepens, supplier networks specialize, and infrastructure improves. However, this creates a cumulative advantage mechanism. Merton (1968) famously described this as the "Matthew Effect," whereby initial advantages compound over time. In the context of Karnataka, Bangalore's early lead in software services in the 1990s created institutional path dependency that continues to divert capital and talent away from emerging rural hubs (Roundy et al., 2018).

Venture Capital Geography and Proximity Bias

The geography of venture capital is distinct from the geography of entrepreneurship. Sorenson and Stuart (2001) demonstrated that VC investment patterns are highly spatially sensitive. Their analysis of syndication networks revealed that VCs prefer proximate investments to mitigate monitoring costs and information asymmetries. This proximity bias is not merely logistical; it is relational. Investors rely on weak ties and social embeddedness to source deals and conduct due diligence (Granovetter, 1973). Entrepreneurs outside these spatial and social networks face significant barriers to entry, regardless of the quality of their innovation.

Financial Exclusion and Information Asymmetry

Akerlof's (1970) seminal work on information asymmetry provides a foundational lens for understanding the funding divide. In credit markets, the inability of lenders to accurately assess borrower quality leads to adverse selection. For rural entrepreneurs, this asymmetry is amplified. They lack the certification signals such as elite institutional affiliations, prior exits, or introductions from trusted intermediaries that urban founders leverage to secure meetings. Beck et al. (2007) provide cross-country evidence that small and medium enterprises (SMEs) in peripheral regions face systemic financing constraints, a phenomenon they attribute to both high transaction costs and weak institutional environments.

Regional Innovation Systems and Institutional Void

Cooke (2001) argues that innovation is not a firm-level phenomenon but a systemic one embedded within regional institutional frameworks. A functional Regional Innovation System (RIS) requires a nexus of universities, public research institutes, technology transfer offices, and venture financiers.



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Rural Karnataka, with the exception of emerging hubs like Mysore and Hubli, lacks these institutional endowments. This institutional void increases the cost of entrepreneurship and reduces the probability of venture survival.

The Entrepreneurial State and Public Intervention

Mazzucato (2013) challenges the narrative of the state as a mere facilitator of private sector innovation. Through case studies of the internet, GPS, and biotechnology, she demonstrates that the state has historically acted as the primary risk-taker in funding radical innovation. This perspective legitimizes proactive government intervention in correcting spatial market failures. For Karnataka, this implies that the state cannot rely on market forces to diffuse innovation benefits; it must strategically deploy capital to de-risk peripheral regions.

Impact Investing and Blended Finance

The rise of impact investing and blended finance offers alternative capital allocation paradigms. Bugg-Levine and Emerson (2011) argue for the intentional integration of social and environmental metrics alongside financial return. Blended finance structures—which use catalytic capital from public or philanthropic sources to mobilize private investment—are particularly relevant for rural development. These mechanisms can absorb the first-loss risk that deters private VCs, thereby making rural ventures investable.

Digital Infrastructure and the New Economic Geography

Malecki (2018) revisits the geography of entrepreneurship in the digital age. While digital infrastructure reduces some spatial frictions, it does not eliminate them. Rural digital deficits in broadband quality and reliability persist in Karnataka, constraining the scalability of tech-enabled rural ventures. Furthermore, digital access without accompanying ecosystem support (mentorship, networks, finance) yields limited entrepreneurial outcomes.

Foundations of Multi-Criteria Decision-Making

The limitations of single-criterion optimization (i.e., maximizing financial return) in complex public policy contexts necessitate alternative methodologies. Saaty (1980) developed the Analytic Hierarchy Process (AHP), a structured technique for organizing and analysing complex decisions. AHP decomposes a decision problem into a hierarchy of criteria and alternatives, deriving ratio scales from pairwise comparisons. Hwang and Yoon (1981) developed the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS).

TOPSIS ranks alternatives based on the geometric principle that the optimal solution should have the shortest distance from the positive-ideal solution and the farthest distance from the negative-ideal solution.

MCDM in Resource Allocation

Ishizaka and Labib (2011) provide a comprehensive review of AHP applications across public and private sectors, highlighting its utility in contexts involving multiple, often conflicting, stakeholder objectives. In the domain of innovation policy, MCDM allows policymakers to explicitly trade off growth objectives against equity objectives. This is particularly salient for the Bangalore ecosystem, where the Karnataka government must balance the global competitiveness of its flagship city with the developmental needs of its vast rural hinterland.

Theoretical Framework

This study is grounded in the integration of four theoretical pillars. This multi-paradigm approach is necessary to capture the multi-causal nature of spatial funding inequality. Entrepreneurial Ecosystem Theory (Stam, 2015; Feld, 2012) This theory provides the macro-level context, explaining why certain regions (Bangalore) generate self-sustaining entrepreneurial cultures while others remain nascent. It highlights the role of network density, leadership, and supporting services. Agglomeration Economics and Knowledge Spillover Theory (Porter, 1998; Audretsch & Keilbach, 2007): These theories explain the efficiency gains of concentration. They are essential for understanding why market forces naturally favor urban areas. Any intervention must respect these efficiencies while correcting for their exclusionary side effects. Information Asymmetry and Institutional Theory (Akerlof, 1970; Cooke, 2001): These theories explain why rural ventures are systematically undervalued. Information asymmetry increases perceived risk; weak regional institutions increase actual risk. Intervention must therefore address both perception (through certification/guarantees) and reality (through infrastructure investment). Multi-Criteria Decision Theory (Saaty, 1980; Hwang & Yoon, 1981): This provides the procedural and mathematical toolkit for the intervention. It offers a mechanism to formally integrate non-financial criteria into capital allocation decisions. The funding divide is conceptualized as a function of five latent variables: (a) Network Density, (b) Institutional Proximity, (c) Infrastructure Availability, (d) Risk Perception, and (e) Capital Accessibility. The MCDM model proposed in Section 4 directly operationalizes metrics to counterbalance these deficits.

III. METHODOLOGY

This research adopts a qualitative secondary research design combined with conceptual MCDM modelling. The study does not collect primary empirical data but instead synthesizes findings from 23 peer-reviewed sources to construct a theoretically robust decision-making framework.

Criteria Identification and Operationalization Based on an iterative synthesis of the literature particularly drawing from entrepreneurial ecosystem performance metrics (Acs et al., 2014), impact investing principles (Bugg-Levine & Emerson, 2011), and regional development indicators (Cooke, 2001) five evaluation criteria were identified. These criteria are designed to be exhaustive yet non-redundant, capturing the dual mandate of economic growth and inclusive development. Economic Viability (EV): This criterion measures the venture's potential for financial sustainability and profitability. Indicators include projected revenue growth, gross margins, unit economics, and time-to-break-even. This criterion ensures that the model does not abandon financial discipline. Scalability Potential (SP): This criterion assesses the venture's capacity to expand its customer base, geographic reach, and operational volume. Indicators include total addressable market (TAM), intellectual property moats, and the replicability of the business model. Social Impact (SI): This criterion evaluates the venture's contribution to societal well-being. For rural ventures, this may include job creation in underserved areas, access to essential services (healthcare, education, clean energy), or empowerment of marginalized groups.

Infrastructure Readiness (IR): This criterion assesses the absorptive capacity of the venture's location. Indicators include access to reliable power, broadband connectivity, logistics networks, and proximity to ancillary services. This criterion penalizes ventures in completely unviable locations while rewarding rural ventures that have overcome infrastructural deficits. Regional Equity Contribution (REC): This criterion explicitly measures the venture's impact on reducing spatial inequality. It acts as a counterweight to the urban bias inherent in other metrics. Indicators include the location of the founder (rural/peri-urban), the location of primary operations, and the employment of local rural talent.

Weight Determination: Analytical Hierarchy Process (AHP) Weights for the five criteria were determined conceptually, simulating a policy-driven AHP exercise. In a real-world application, this would involve pairwise comparisons by a panel of stakeholders (policymakers, investors, ecosystem builders).

For this conceptual model, weights were assigned to reflect a policy shift from pure profit-maximization toward a "Balanced Scorecard" approach.

Economic Viability: 30%
 Scalability Potential: 20%
 Social Impact: 20%
 Infrastructure Readiness: 15%
 Regional Equity Contribution: 15%
 Sum: 100%

The assignment of the highest weight (30%) to Economic Viability is deliberate. It signals that the framework is not a charitable grant-making schema but an *investment* framework. Rural ventures must still clear a threshold of commercial credibility. The inclusion of REC at 15% provides a meaningful "handicap" for rural ventures without overriding the fundamental economic logic of the model.

Ranking Model: TOPSIS

TOPSIS (Technique for Order of Preference by Similarity to Ideal Solution) was selected for its intuitive logic and computational simplicity. The methodology proceeds as follows:

1. *Construct the Decision Matrix:* Alternatives (ventures) are rows; criteria are columns.
2. *Normalize the Matrix:* Convert raw scores to a uniform scale.
3. *Construct the Weighted Normalized Matrix:* Apply the AHP-derived weights.
4. *Determine Ideal and Negative-Ideal Solutions:*
Ideal Solution: The best performance score for each criterion across all alternatives. *Negative-Ideal Solution:* The worst performance score for each criterion across all alternatives.
5. *Calculate Separation Measures:*
 - Euclidean distance from the Ideal solution (S_i).
 - Euclidean distance from the Negative-Ideal solution (S_i^-).
6. *Calculate Relative Closeness (C_i):* $C_i = S_i^- / (S_i + S_i^-)$.
7. *Rank Alternatives:* Higher C_i values indicate a better ranking.

Hypothetical Scenario and Alternatives

To demonstrate the model's utility, we conceptualize three stylized alternatives:

Alternative A (Urban – Bangalore): A B2B SaaS venture. High Economic Viability (9/10), High Scalability (9/10), Low Social Impact (3/10) (targeting corporate clients), High Infrastructure Readiness (9/10), Low Regional Equity (2/10).

Alternative B (Semi-Urban – Mysore): A food processing venture leveraging local agriculture. Medium Economic Viability (6/10), Medium Scalability (6/10), High Social Impact (8/10), Medium Infrastructure Readiness (6/10), Medium Regional Equity (7/10).

Alternative C (Rural – North Karnataka): An agri-tech platform connecting farmers to markets. Medium Economic Viability (5/10), Medium Scalability (7/10), Very High Social Impact (9/10), Low Infrastructure Readiness (4/10), Very High Regional Equity (9/10).

Hypothetical Outcome

Under a conventional, single-criterion (EV-only) framework, the ranking is unequivocal: Under the proposed MCDM framework (using the weights and TOPSIS logic), the ranking shifts. While Alternative A still scores highly on economic metrics, its poor performance on SI and REC penalizes its composite score. Alternative C, despite its infrastructural challenges, scores highly on SI and REC. The TOPSIS analysis conceptually demonstrates that Alternative B (Semi-Urban) often emerges as the top-ranked alternative in such configurations, with Alternative C closing the gap significantly on Alternative A. This demonstrates that MCDM can elevate the rank-order of rural ventures without necessarily displacing high-quality urban ventures, thereby achieving a portfolio balance effect.

IV. FINDINGS AND DISCUSSION

Structural Causes of the Funding Divide

The synthesis of the literature confirms that the funding divide is not an anomaly but a structural feature of the current allocation regime. Five primary drivers are identified: Geographic Proximity Bias: VCs exhibit homophily, preferring to fund entrepreneurs within their geographic and network radius (Sorenson & Stuart, 2001).

Network Density Concentration: Deal flow originates through referrals. Rural entrepreneurs lack access to the "warm introductions" that are the de facto entry ticket to VC funding (Granovetter, 1973).

Infrastructure Asymmetry: The high fixed costs of infrastructure (digital and physical) in rural areas increase the capital requirements and operational risk of rural ventures (Malecki, 2018).

Information Gaps: Rural ventures suffer from a "liability of unconnectedness." Investors lack the heuristic shortcuts to evaluate them efficiently, leading to systematic discounting (Akerlof, 1970).

Investor Risk Aversion: The institutional logic of venture capital, which relies on a power-law distribution of returns (a few winners funding many losses), discourages experimentation with unfamiliar geographic markets.

Implications for the Bangalore Ecosystem

Bangalore's dominance is a double-edged sword. On one hand, it serves as a critical node in the global innovation network, attracting foreign direct investment, returning diaspora talent, and fostering a culture of high-risk innovation. On the other hand, the over-concentration of resources generates negative externalities:

Regional Imbalance: The widening gap between Bangalore and the rest of Karnataka creates political economy pressures and social tensions.

Talent Migration: The "brain drain" from rural colleges to Bangalore deprives rural regions of the human capital necessary to anchor local startups.

Innovation Exclusion: Potentially transformative innovations addressing rural problems (agriculture, logistics, rural fintech) are overlooked because they originate outside the "ecosystem perimeter."

Policy Implications and the Role of the State

The transition from a descriptive critique to a prescriptive solution requires institutional innovation. The proposed MCDM framework is not self-executing; it requires embedding within governance structures.

State-Level Blended Funding Pools:

Karnataka Innovation Mission should establish a dedicated "Beyond Bengaluru" fund. This fund should adopt a blended finance structure, where the state provides first-loss guarantees to de-risk private co-investment. The MCDM model should serve as the investment committee's scoring rubric.

Mandatory Regional Diversification Benchmarks:

Public procurement represents a significant lever. Government departments and public sector undertakings (PSUs) should mandate that a percentage of their innovation procurement contracts be awarded to ventures headquartered in Tier-2 and Tier-3 cities.

Digital Infrastructure as a Public Utility:

The state must recognize high-speed broadband not as a luxury but as a fundamental utility for economic participation. Public-private partnerships to extend fiber-optic networks to rural industrial areas and agricultural market yards are prerequisites for any rural startup policy.

Institutional Capacity Building:

MCDM requires skilled evaluators. State innovation missions must invest in capacity building, training program managers in AHP and TOPSIS methodologies. This enhances transparency and reduces the discretion that can lead to patronage politics.

Limitations and Avenues for Future Research

This study has limitations inherent to its conceptual, secondary research design. First, the AHP weights are assigned conceptually rather than empirically. Future research should convene a Delphi panel of Karnataka ecosystem stakeholders to derive statistically robust weights through pairwise comparison surveys. Second, the TOPSIS ranking is hypothetical. Subsequent research should apply this framework to a real dataset of funded and unfunded ventures to validate its predictive efficacy and calibration. Third, the model assumes independence of criteria; future studies could explore ANP (Analytic Network Process) to account for interdependencies (e.g., Social Impact influencing Economic Viability over the long term). The urban–rural funding divide is a persistent feature of the Indian startup landscape, reflecting deep-seated structural dynamics inherent in agglomeration economies and venture capital behavior. Bangalore’s status as India’s premier startup hub is both an asset and a liability; it generates immense wealth but also concentrates opportunity, leaving vast reservoirs of entrepreneurial potential in rural Karnataka untapped. This paper has argued that market-driven allocation is not synonymous with optimal social allocation. Addressing the divide does not require the futile task of redistributing existing capital away from Bangalore. Rather, it requires a strategic re-optimization of how new capital is allocated. The Multi-Criteria Decision-Making framework presented here offers a viable pathway. By integrating economic performance (Viability, Scalability) with social and regional equity parameters (Social Impact, Regional Equity Contribution), AHP and TOPSIS provide a transparent, auditable, and mathematically rigorous mechanism for balancing competing policy objectives. This framework transforms the concept of "inclusive innovation" from an amorphous ideal into a measurable, operationalizable metric. For Karnataka and other Indian states characterized by primate cities and neglected peripheries, the implications are clear. The ecosystems of tomorrow will not be built solely in metropolitan cores; they must be seeded in the semi-urban and rural corridors.

By adopting MCDM-based allocation frameworks, state innovation missions can act as strategic optimizers, correcting market failures without supplanting market mechanisms. Bangalore, therefore, can serve not only as India’s growth engine but as a redistribution catalyst proving that equity and efficiency are not zero-sum, but mutually reinforcing pillars of sustainable innovation development.

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