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Rural Infrastructure and the Growth of Rural Retail Enterprises: A Supply Chain Perspective from Dakshina Kannada, Karnataka

Nishanth Rao

Lecturer, Department of Management, Government First Grade College, Haleyangadi; Research Scholar, Srinivas Institute of Research and Technology, Mangalore

Abstract

In this paper, the manner in which rural infrastructure shapes the supply chains, and therefore the growth prospects, of rural retail enterprises in Dakshina Kannada, Karnataka, with a focus on its interior taluks, is examined. The paper is conceptual and is based on secondary sources: parliamentary replies on rural roads and digital connectivity, district enterprise data, news reports on highway disruptions and published studies. It is suggested by the evidence that last-mile road quality and the reliability of Ghat corridors influence how often, and at what cost, goods reach village shops; that mobile and broadband coverage is expanding but may remain uneven in hilly settlements; and that enterprise and credit support reaches retailers only partly, since retail is recognised under Udyam with limited benefits. Four propositions are offered, based on the view that infrastructure is necessary but not sufficient for retail growth. Attention to last-mile roads, resilient corridors, digital procurement and retailer-focused credit is suggested as a means of strengthening rural retail as a source of local self-employment under the Viksit Bharat-Guarantee for Rozgar and Ajeevika Mission (Gramin) framework. A field survey of interior retailers is proposed as the next step.

Keywords: Rural Infrastructure, Rural Retail, Supply Chain, Rural Entrepreneurship, Digital Adoption, Dakshina Kannada

1. Introduction

Rural development policy in India is shifting from a single wage-employment guarantee towards a broader livelihood framework. The Viksit Bharat-Guarantee for Rozgar and Ajeevika Mission (Gramin) Act, 2025 (VB-G RAM G), which received the President's assent in December 2025, is intended to replace the Mahatma Gandhi National Rural Employment Guarantee Act, 2005 (MGNREGA), and provides a statutory guarantee of 125 days of wage employment per rural household per year [1]. As rural livelihoods become more diversified, local enterprises assume greater importance as sources of self-employment and local jobs. Village retail shops are among the most widespread of these enterprises.

Rural retailers form the last link in the distribution chain. The ability of a retailer to stock goods, serve customers and grow depends on how reliably supplies arrive, and this in turn depends on infrastructure such as roads, power, storage, communication networks and credit. It has been argued that infrastructure constraints fragment rural markets and raise transaction costs (Khan, 2010) [2]. Interior Dakshina Kannada illustrates this concern. The Member of Parliament for the district has told the Lok Sabha that, in hilly,

forested terrain with high rainfall, many habitations recorded as connected still lack all-weather motorable access (Chowta, 2025) [3].

In this paper, the manner in which rural infrastructure conditions shape the supply chains of rural retail enterprises in Dakshina Kannada, and the implications for their growth, are examined. Three contributions are made: scattered district-level evidence is brought together; infrastructure is linked to retail ordering, supply and digital adoption; and testable propositions for field research are proposed.

2. Objectives of the Study

The objectives of the study are:

1. To examine how last-mile roads and Ghat corridors may affect the ordering and replenishment of rural retail enterprises in interior Dakshina Kannada.
2. To assess the state of digital connectivity in the district and its relevance for the procurement and payment of retailers.
3. To review how enterprise recognition, credit and local production networks support rural retailers.
4. To propose a conceptual framework and testable propositions, and to draw policy implications for rural livelihoods.

3. Conceptual Background and Review of Literature

3.1 Infrastructure and Rural Enterprise

The evidence on infrastructure and rural enterprise is mixed. Infrastructure maintenance in rural India was studied by Chaurey, et al. (2022) [4], and it was observed that village-level employment and the number of microenterprises appeared to rise, with no change for formal firms; electrification and connectivity were suggested as likely channels. By contrast, it was reported by Asher, et al. (2020) [5] that roads built under the Pradhan Mantri Gram Sadak Yojana (PMGSY) mainly helped workers move out of agriculture, while employment in village firms expanded only slightly. It is implied by these studies together that infrastructure is necessary but not sufficient: what matters is whether it lowers the cost of the specific transactions on which small enterprises depend.

3.2 Rural Retail Supply Chains

Village retailers were described by Sathyanarayana, et al. (2008) [6] as operating under constraints of space, power, storage and finance. It was reported that distributors often do not visit remote outlets, so that retailers buy from feeder towns or nearby cities, and that some interior retailers charge above the maximum retail price to recover the cost of fetching goods. These are the observations of the authors and not measured results, and the data are dated; however, the mechanism that matters here is identified: poor connectivity shifts the cost and burden of replenishment onto the retailer.

3.3 Digital Adoption among Small Retailers

Low digital adoption in the supply-side and customer-side processes of small stores was found by Seethamraju, et al. (2019) [7], and poor physical infrastructure and unreliable digital access were listed among the barriers. In coastal Karnataka, a survey of 383 fisher-women retailers showed that 91.4 per cent owned a feature phone and 2.3 per cent a smartphone, while education, debit-card ownership and awareness of cashless payment were associated with willingness to adopt m-commerce (Prabhu, et al., 2018) [8]. The sample covered urban and rural markets and a specific trade; hence, likely constraints are indicated, and interior village shops are not described.

3.4 Research Gap

Three gaps are left by the studies above. First, work on infrastructure and rural enterprise (Chaurey, et al., 2022; Asher, et al., 2020) [4, 5] looks at village firms, employment and workers, and not at the effect of infrastructure on the replenishment of village shops. Second, studies of rural retail (Khan, 2010; Sathyanarayana, et al., 2008) [2, 6] describe distribution constraints in general terms, mostly at national level and from the viewpoint of marketers. Third, research on Dakshina Kannada has examined Micro, Small and Medium Enterprise (MSME) producers and e-commerce (Jagadisha, 2026) [9] and sellers of a self-help group (SHG) brand (Jagadeesh, 2022) [10]; however, among the studies reviewed here, none links road, corridor and digital infrastructure to the supply chains of village retailers in the interior taluks. In short, the central gap is the absence of work linking infrastructure to the supply chains of village retailers in Dakshina Kannada. This gap is addressed in the present paper through a framework (Figure 1) connecting infrastructure to ordering, supply and payment, and through four propositions for testing. The contribution is conceptual: effects are not measured, but what should be measured is identified.

4. Methodology

This paper is conceptual and is based entirely on secondary sources: replies in the Lok Sabha and Rajya Sabha, a memorandum of the Ministry of Micro, Small and Medium Enterprises, news reports on highway disruptions and published studies. Most official data are available only at the district level, and evidence on individual taluks is obtained mainly from parliamentary replies and press reports. The interior taluks of Belthangady, Sullia and Puttur are therefore used as illustrative cases, the evidence is treated as indicative, and the main arguments are presented as propositions to be tested and not as findings on the behaviour of retailers. No primary data were collected.

5. Study Context and Retail Profile

Dakshina Kannada combines the urban and port economy of Mangaluru with a hilly rural hinterland. A large MSME base is present in the district. Jagadisha (2026) [9], citing district industries centre data, reports 24,072 registered MSMEs employing 1,06,148 persons as on 31 March 2016, and Udyam registrations rising from 2,952 in 2020-21 to 69,975 in 2023-24, citing the Karnataka Economic Survey. These series come from different systems and are not strictly comparable, and it is not stated in the Udyam table whether the figures are cumulative. Scale is indicated, and retail growth is not.

Evidence on village sellers is limited. In a survey of 150 sellers of SIRI products, an SHG brand promoted by the Shri Kshetra Dharmasthala Rural Development Project (SKDRDP), in ten villages of Mangalore taluk, 46 per cent were found to have a monthly turnover below ₹15,000, 58.67 per cent operated from rented premises, and 54.67 per cent received supplies weekly while 32 per cent received them daily (Jagadeesh, 2022) [10]. The sample is small, product-specific and closer to the city than to the interior; nevertheless, it is suggested that many village outlets are small and depend on regular external supply.

6. Infrastructure and the Rural Retail Supply Chain

6.1 Roads and Ghat Corridors

Last-mile roads. According to a reply in the Lok Sabha, 11 roads of 71 km were sanctioned under PMGSY in Dakshina Kannada since 2020, 21 roads of 172 km were completed during the same period, and 2 roads of 5.75 km remained to be completed (Ministry of Rural Development, 2025) [11]. Delays in completion were acknowledged for projects sanctioned in the Sullia, Belthangady and Puttur blocks, and land issues,

utility shifting, adverse weather conditions, shortage of construction materials, slow progress of contractors and unforeseen site conditions were cited as factors [11]. However, while welcoming the focus of the fourth phase of PMGSY on last-mile roads, the Member of Parliament for the district has told the Lok Sabha that the ground reality differs from the programme data: habitations marked as connected can still lack all-weather motorable access in hilly, forested terrain, small inhabited clusters more than 1.5 km by footpath from a road fall outside the population thresholds, and Dakshina Kannada and other Western Ghat districts should be reclassified as hilly terrain (Chowta, 2025) [3]. This difference between recorded and effective connectivity matters for retail. A road that becomes unusable in heavy rain converts scheduled replenishment into irregular supply, which may force retailers to hold larger stocks, travel to town themselves, or accept stock-outs.

Trunk corridors. The interior taluks also depend on the Ghat highways linking the district with Bengaluru. The Shiradi Ghat section of National Highway 75 (NH-75) was closed for about ten hours after a landslide near Maranahalli in June 2025, and traffic was diverted via Charmadi Ghat (Deccan Herald, 2025) [12]. In August 2018, heavy vehicles were banned on Charmadi Ghat after the closure of Shiradi and Sampaje Ghats, leaving Charmadi as the only alternative route (Deccan Herald, 2018) [13]. Recurring corridor vulnerability is documented by these reports. The effect on village retail stock levels or prices is not quantified in the studies reviewed here; hence, the link to retail is plausible but unproven.

6.2 Digital Connectivity and Procurement

Over 95 per cent of villages in India were reported by the Government to have internet access in August 2024 (IANS, 2024) [14]. For Dakshina Kannada, new mobile base stations were installed in 73, 50 and 57 villages in 2021-22, 2022-23 and 2023-24, and in eight more villages in 2024-25 up to July 2024, and 57 new sites were planned for that year (Ministry of Communications, 2024) [15]. Karnataka had 14,221 km of BharatNet optical fibre by June 2025, and 1,618 of the 55,978 fibre-to-the-home (FTTH) connections in the state were in Dakshina Kannada (Deccan Herald, 2025) [16]. Signal quality in individual hamlets is not shown by coverage figures. Reliable internet access and last-mile logistics in remote gram panchayats are listed by Jagadisha (2026) [9] among the main barriers for rural MSMEs.

Dependence on intermediaries who rarely visit remote shops may be reduced by digital procurement platforms. In June 2026, the Department for Promotion of Industry and Internal Trade (DPIIT) and the Open Network for Digital Commerce (ONDC) brought fast-moving consumer goods (FMCG) leaders together on DigiDukaan, an effort to digitise procurement for kirana stores; it was noted that over 1.4 crore kiranas account for about 75-80 per cent of FMCG sales (India Shipping News, 2026) [17]. The integration of FMCG supply chains with ONDC is examined by Kaur, et al. (2025) [18] on the basis of secondary research, policy evaluation and case analysis, and their conclusions are therefore indicative and not conclusive. Whether interior retailers can use such platforms depends on devices and skills: in coastal Karnataka, feature phones dominated among the surveyed retailers, and willingness to adopt was shaped by education and payment awareness (Prabhu, et al., 2018) [8].

6.3 Enterprise Recognition, Credit and Local Supply

Retail and wholesale trade has been permitted to register on the Udyam portal since July 2021, but the benefits are restricted to priority-sector lending (Ministry of Micro, Small and Medium Enterprises, 2021) [19]. Village retailers are thus recognised as MSMEs, but narrower access to MSME schemes than that of manufacturing units is available to them. Community institutions partly fill the gap. By 2012, about 169,000 SHGs covering 1.8 million families, roughly 20 per cent of rural households in Karnataka, had been promoted by SKDRDP (Ashden, 2012) [20]. More than 5,000 women are engaged by its SIRI brand

in producing over 75 items for sale through retail sellers (Jagadeesh, 2022) [10], and about 1,397 active dealers in its distribution network were reported by the Dakshina Kannada milk union in 2015 (Aneesh, et al., 2016) [21]. Shorter supply routes, depending less on long-distance trunk corridors, may be provided to village shops by such local production and cooperative networks, although their share of rural retail supply is not shown by the evidence reviewed.

Table 1: Infrastructure Channels and Their Likely Effects on Rural Retail Supply

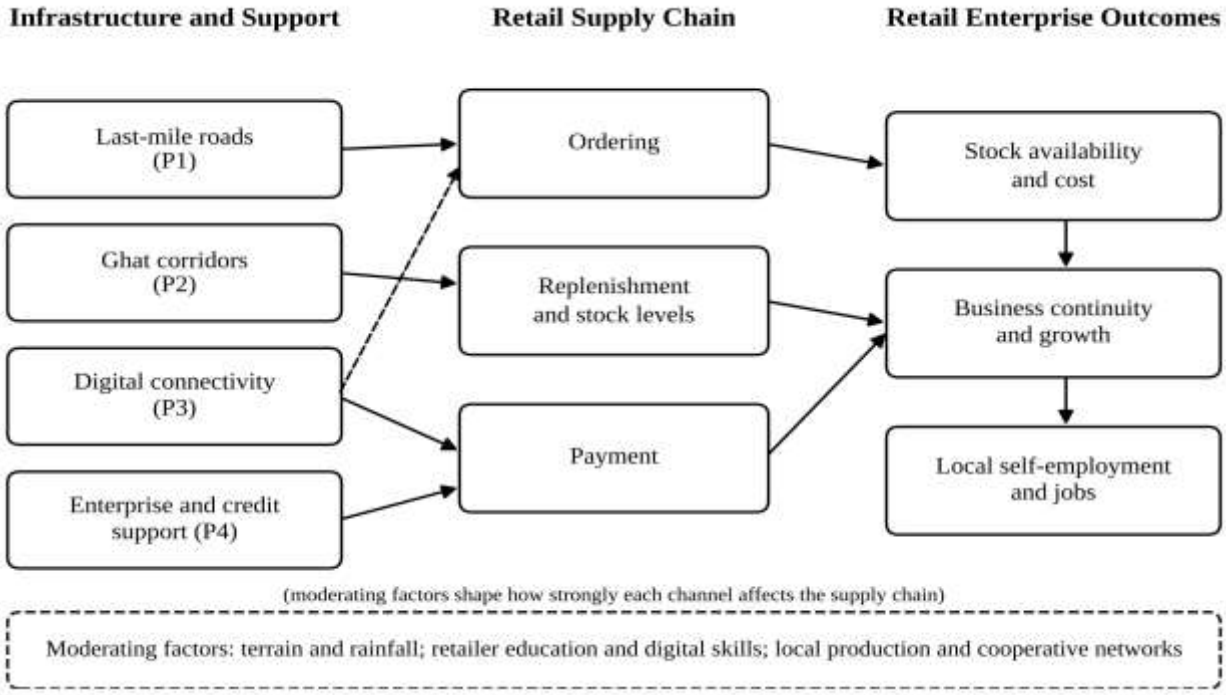
Channel	Likely Effect on Rural Retailers	Evidence in This Review	Strength of Evidence
Last-mile roads	Replenishment frequency, stock levels, transport cost	PMGSY completions and delays; recorded versus effective connectivity (Ministry of Rural Development, 2025; Chowta, 2025) [11, 3]	Indicative
Ghat corridors	Inbound supply from outside the district; stock-out and price risk	Documented closures (Deccan Herald, 2018; Deccan Herald, 2025) [13, 12]	Disruptions documented; retail effect not quantified
Digital connectivity	Direct ordering and digital payments	Tower and BharatNet expansion; barriers (Jagadisha, 2026; Prabhu, et al., 2018) [9, 8]	Indicative
Enterprise and credit support	Working capital; formal recognition	Udyam rule for retail; SHG network (Ministry of Micro, Small and Medium Enterprises, 2021; Ashden, 2012) [19, 20]	Indicative

Source: Author's synthesis from the sources cited.

7. Framework and Propositions

The framework in Figure 1 and four propositions are suggested by the review. In the framework, four infrastructure and support channels act on the three stages of the retail supply chain (ordering, replenishment and payment), which in turn shape retail outcomes, while terrain, retailer skills and local production networks moderate the effects.

Figure 1: Conceptual Framework Linking Rural Infrastructure to Retail Supply and Outcomes



Source: Author's own framework.

P1. Retailers in interior settlements with weaker all-weather road access face less frequent and costlier replenishment than retailers near trunk roads.
P2. Closures of Ghat corridors raise stock-out risk and inventory-holding needs for shops that rely on goods from outside the district.
P3. Digital connectivity improves access to direct procurement, but adoption depends on education, device type and payment awareness.
P4. Local production and credit networks, such as SHGs and cooperatives, can reduce exposure to corridor disruption, but their reach to retailers is uneven.
It is implied by these propositions, taken together, that infrastructure raises retail growth prospects only when it lowers the cost of ordering, supply and payment for small shops. This is consistent with the mixed evidence of Chaurey, et al. (2022) [4] and Asher, et al. (2020) [5].

8. Policy Implications

First, connectivity should be assessed by all-weather usability and not only by recorded habitation status; the case for reclassifying Dakshina Kannada as hilly terrain for PMGSY purposes deserves examination. Second, contingency planning for Ghat corridors, such as pre-notified diversion routes for goods vehicles and buffer storage at taluk centres, could reduce disruption, although this is not tested in the paper. Third, onboarding of retailers to digital procurement platforms such as DigiDukaan could be supported through training by SHGs and Common Service Centres, since device and skill barriers appear significant. Fourth, retailer-specific working-capital products linked to Udyam registration could narrow the benefit gap. Finally, last-mile connectivity and local enterprise support could be considered in the planning of rural works and livelihood support under VB-G RAM G, subject to the provisions and guidelines of the Act.

9. Limitations and Future Research

The paper relies on secondary sources, with district-level data and a few taluk-level reports. Several cited studies are small or product-specific, and some sources are dated. A survey of retailers in interior taluks, compared with retailers near trunk roads, could measure order frequency, lead times, stock-outs, transport costs and digital use, and test propositions P1 to P4.

10. Conclusion

Rural retail enterprises can contribute to local self-employment within the livelihood framework envisaged under VB-G RAM G, but it is suggested by the district-level and taluk-level evidence reviewed here that their growth may be constrained by how reliably goods, information and payments reach them. Last-mile roads, resilient Ghat corridors, digital procurement, appropriate credit and local production networks are the main levers identified here, and the manner in which they act on ordering, supply and payment is shown by the framework in Figure 1. Infrastructure is necessary but not sufficient, and the next step is primary research to test the propositions in interior villages.

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