Response to TRAI Consultation Paper No. 07/2026

On the "Proliferation of Public Wi-Fi Networks in India"

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Submitted by: Dr. RS Sharma

Former Chairman, Telecom Regulatory Authority of India

Email: rssharma3@gmail.com

Introduction

I warmly commend the present leadership of TRAI for taking up this timely consultation on the proliferation of Public Wi-Fi. TRAI has been consistently proactive on this issue from the very beginning, and the current initiative is a welcome continuation of that tradition. As someone who initiated the WANI / PM-WANI proposal during my tenure as Chairman, TRAI — with the original recommendations submitted to the Department of Telecommunications in March 2017 and approved by the Union Cabinet on 9 December 2020 — I have a continuing interest in seeing the framework deliver on its transformational promise.

The present Consultation Paper is exceptionally well researched and merits commendation. It builds a compelling case for Public Wi-Fi as a fixed-wireless access layer through telling data points — India's USD 163 billion e-commerce projection, rising AR/VR, IoT and AI demand, and the Annexure-I comparison showing Wi-Fi-on-fibre is several times cheaper per gigabyte than mobile data — alongside a crisp technical exposition covering 6 GHz, Wi-Fi 7, WPA3 and HotSpot 2.0/Passpoint. The international scan of South Korea, the EU's WiFi4EU, the UK's BT-Fon, the United States and Hong Kong distils clear takeaways on government as funder and facilitator, neutral backhaul, voucher models, mandatory roaming and diversified monetisation, and the Indian-experience section is equally thorough on RailTel's RailWire, PM-WANI's ~4.1 lakh hotspots, the 71st Tariff Amendment, the lower 6 GHz and V-Band delicensing, and BharatNet's reach across 2.18 lakh Gram Panchayats. The BB&PA Wing of TRAI deserves appreciation for producing a consultation that informs as much as it consults.

The responses to the questions posed in the Consultation Paper are submitted in my personal capacity.

My core thesis is straightforward. PM-WANI is India's "UPI moment" for connectivity. It is, by deliberate design, a Digital Public Infrastructure (DPI) — open, interoperable, federated, licence-free and entrepreneur-led. The slow rollout to date is the result of (a) a three-year delay between TRAI's 2017 recommendations and the December 2020 Cabinet approval followed by onset of COVID (b) sustained resistance from incumbent telecom service providers (TSPs), (c) chronic under-utilisation of BharatNet because it has been operated as a vertically-integrated PSU project rather than as neutral common-carrier infrastructure, and (d) an absence of an NPCI-equivalent neutral nodal agency to drive ecosystem orchestration. The fix is therefore not to centralise or re-architect PM-WANI; it is to remove the friction that is suppressing its growth, integrate it with BharatNet through a clean three-player model, and create the governance scaffolding that allowed UPI to scale.

Against that backdrop, my responses to the 26 questions in Chapter 3 of the consultation paper are set out below, organised under the eight thematic blocks of the paper.

A. Status Assessment and Specific Strategies for the Proliferation of Public Wi-Fi

Q1. Key supply-side constraints affecting Public Wi-Fi proliferation in India and targeted measures.

The principal supply-side constraints are the following. First, last-mile fibre is shallow: while BharatNet has reached the Gram Panchayat (GP), it does not extend into the village or into community spaces where PDOs would actually deploy access points. Second, BharatNet bandwidth pricing for last-mile distributors is opaque, inconsistent across States and not benchmarked to retail tariffs, which destroys the unit economics for a small PDO. Third, TSPs actively oppose PM-WANI because they perceive that it competes with their retail mobile-data ARPU. Fourth, ISPs also do not support it because they are not clear about the regulatory regime for PM-WANI. Fifth, there is no neutral nodal agency to set targets, on-board the roughly 2,000 licensed ISPs, standardise onboarding and audit ecosystem health — the gap that NPCI fills for UPI. Fifth, customer-premises equipment (CPE) routers in the country today do not, by default, broadcast a PM-WANI-compliant second SSID, which means India is leaving 45+ million existing home broadband connections un-monetised as public hotspots. Sixth, while India has a sizeable domestic telecom-equipment industry and the Department of Telecommunications already operates a Production-Linked Incentive (PLI) Scheme for Telecom and Networking Products (notified February 2021, since supplemented by a Design-Linked Incentive top-up), the PM-WANI-specific compliant-device ecosystem is still nascent. Only a handful of OEMs have certified products that bundle the WANI captive-portal stack, dual-SSID firmware, Central Registry and PDOA-API integration, OTP / app-based authentication hooks and audit-log support. The mass-market consumer Wi-Fi router segment — which is what most PDOs actually deploy — remains overwhelmingly import-dominated, and outdoor / mesh / ruggedised access points are similarly import-heavy.

Targeted measures: (i) mandate a PM-WANI-compliant second SSID on all newly deployed and existing ISP CPE routers — a firmware-only intervention modelled on the BT-Fon programme in the United Kingdom which created over 5 million hotspots at zero hardware cost; (ii) institute a transparent, regulated dark-fibre tariff for BharatNet usable by any licensed ISP serving PDOAs; (iii) extend the Telecommunication Tariff (71st Amendment) Order 2025 cap to cover BharatNet retail fibre at GP level; (iv) finance demand-side aggregation through a designated Digital Bharat Nidhi (DBN) window for first-mover PDOs in unserved blocks; and (v) constitute a neutral nodal agency (see Q23) to drive supply-side orchestration. (vi) carve out a dedicated PM-WANI window within the existing PLI Scheme for Telecom and Networking Products and its Design-Linked Incentive top-up, with explicit weightage for PM-WANI-compliant firmware and software (WANI captive-portal stack, dual-SSID broadcast, Central Registry and PDOA-API integration, audit-logging and OTP / app-based authentication hooks), for indigenous IP in the WANI software stack, and for outdoor, mesh and ruggedised form-factors where import-dependency is highest and aligning with the Trusted Sources / Trusted Products regime to create a credibly Made-in-India PM-WANI device ecosystem analogous to UPI's indigenous POS and acceptance-device industry.

Q2. Major demand-side constraints and targeted measures.

The dominant demand-side constraints are not affordability of bandwidth per se — PM-WANI sachets are already available at ₹5–10 per day — but rather: (a) low awareness, with PM-WANI still perceived as a “government scheme” rather than as

scalable digital infrastructure; (b) friction in onboarding because the current flow demands an app download, OTP authentication and store-of-data on the device, which excludes basic-phone users, low-literacy users and those with shared devices; (c) absence of a recognisable common brand and visible signage at hotspots; and (d) competing perception that 4G/5G mobile data has eliminated the need for public Wi-Fi (which ignores the gap between data demand and what poor households can afford — a child needs 5–6 GB per day merely for online classes).

Targeted measures: (i) mandate browser-based, one-click landing-page login as a parallel option to app-based flows, drawing on UPI's evolution to QR codes; (ii) launch a sustained nationwide awareness campaign positioning PM-WANI as "DPI for connectivity", foregrounding the ₹5-a-day proposition and the local entrepreneur narrative (kirana / tea-stall / college canteen PDO); (iii) require unified branding and signage standards for all PM-WANI hotspots; (iv) showcase relatable use cases — online learning, OTT, UPI, telemedicine, agri-advisories — in vernacular media; and (v) integrate PM-WANI discovery into pre-installed apps on entry-level smartphones via Voluntary partnerships with handset OEMs.

Q3. Why PM-WANI hotspot density and geographic spread remain uneven, and strategies to accelerate balanced nationwide coverage.

Geographic unevenness has three structural drivers. First, the absence of a backhaul plan tied to PM-WANI: in urban areas private FTTH is plentiful, while in rural areas BharatNet fibre is laid but is not commercially "lit" for PDOs. Second, the supply of PDOAs is concentrated in metros because that is where authentication, payment and analytics are best monetised; the rural PDOA economics are weak without ISP partnership and without DBN support. Third, States and local bodies have not been incentivised to participate — PM-WANI deployment is treated as a Centre-DoT initiative rather than as a State digital infrastructure goal.

Strategies to balance coverage: (i) define a binding national target (e.g., 10 million hotspots in the next two years, of which a defined share in rural / aspirational districts) and decompose it across PDOAs and States via a neutral nodal agency; (ii) operationalise the BharatNet → ISP → PDOA three-player model (see Q12) with standardised dark-fibre Letters of Intent (LOIs) issued by BBNL/BSNL; (iii) earmark a DBN-funded scheme for first-mover rural PDOs covering capital cost of the access point and 12 months of bandwidth subsidy; (iv) link Smart City Mission, Aspirational District and Gati Shakti programmes to a hotspot KPI; and (v) use the same dual-SSID CPE mandate that helps urban areas to also expand coverage into peri-urban and town areas where ISP penetration already exists.

Q4. Changes required in the existing PM-WANI framework to improve revenue certainty and long-term sustainability for PDOs/PDOAs.

PM-WANI's framework architecture does not need fundamental change — it has Cabinet approval and is correctly designed as a federated, registration-based, licence-exempt model. What needs to change is the ecosystem economics. First, predictability of bandwidth cost: extend the spirit of the 71st Tariff Amendment to require licensed ISPs (and BharatNet retail tariffs) to offer PDOs a published, capped wholesale tariff — ideally not exceeding 1.5–2 times the retail FTTH tariff for the same capacity, indexed annually. Second, revenue diversification: explicitly permit PDOAs and PDOs to monetise captive-portal advertising, anonymised footfall analytics, location-based services and sponsored access (data-for-engagement models), subject to data protection compliance under the DPDP Act, 2023. Third, incentive payments through DBN linked to verified active hotspot uptime and unique-user metrics for hotspots in unserved geographies. Fourth, simplification of GST treatment of PDO

services. Fifth, formal recognition of PM-WANI under MSME / start-up programmes so that PDOs and PDOAs can access standard credit, working capital and PLI-style instruments.

Q5. Other challenges faced by PDOAs / PDOs and changes that can enhance entrepreneur participation.

Several practical issues are limiting participation. (i) The current draft Authorisation for Provision of Miscellaneous Telecommunication Services Rules, 2025 — in their Part D (PM-WANI) provisions — propose to make PDOAs operationally accountable for actions of independent PDOs that the PDOA does not own, control or supervise. This is structurally inconsistent with a platform-based, federated architecture and should be replaced with a clear contractual/audit-based compliance model. (ii) Mandating only OTP-app authentication excludes shared-device users; flexible web-login must be expressly permitted. (iii) Whitelisting of routers/devices would raise costs and exclude small ISPs and OEMs; device certification rather than whitelisting is the right approach. (iv) Lack of standardized onboarding documentation across PDOAs makes it hard for a small entrepreneur to comparison-shop. (v) Bandwidth pricing opacity from ISPs/BharatNet. (vi) Absence of model commercial templates (PDO-PDOA agreements). The neutral nodal agency proposed at Q23 should publish reference templates, technical kits and on-boarding standards.

Q6. Improvements needed in Authentication, Authorization, Roaming and Payment (AARP) architecture of PM-WANI.

Five concrete improvements are required: (i) make browser-based, one-click login a mandatory option alongside app-based onboarding, so users without spare device storage or app-skills can authenticate; (ii) enable seamless inter-PDOA roaming through a federated authentication standard published by the neutral nodal agency — a user authenticated once on any PDOA should connect transparently on any other PM-WANI hotspot. (iii) integrate UPI as a first-class payment rail for sachet purchases (₹5–10 packs), with deep-linked UPI intent; (iv) issue a national, time-limited pseudonymous token (e.g., DigiLocker or Aadhaar-Auth-derived) that PDOAs honour, so that users are not asked for the same KYC again at every PDOA; (v) standardise data retention and lawful interception interfaces at the PDOA layer (not at PDO layer) so that small entrepreneurs are not burdened with compliance plumbing.

Q7. Choice between (a) Government actively ensuring hotspot deployment via direct funding/implementation including backhaul, or (b) Government primarily ensuring backhaul and intervening in hotspot deployment only on market failure.

Option (b) is decisively preferable, with one important refinement. The Government's comparative advantage is in providing the public good — backhaul, spectrum, rights of way, public buildings, awareness, governance — not in operating retail Wi-Fi. International experience confirms this: the most successful Public Wi-Fi rollouts (BT-Fon in the UK, the EU's WiFi4EU voucher model, South Korea's public-private hybrid) succeed precisely because the State funds the enabling infrastructure and lets a competitive ecosystem run the access layer. The refinement is that "backhaul" in the Indian context must be defined to include the BharatNet fibre being made commercially "lit" and available on neutral, transparent terms to any licensed ISP — i.e., ending BharatNet's vertically-integrated PSU operating posture and operating it as a neutral common conduit, akin to a power-transmission utility. Direct hotspot-funding by the Government should be confined to (i) Government buildings, schools,

PHCs, *anganwadis*, transport hubs; and (ii) verified market-failure geographies through DBN-supported viability gap funding. Beyond that, the State should fund the rails, not the trains.

Q8. Whether separate strategies are needed for rural and urban areas.

Yes — a single nationwide strategy will under-perform in both contexts. In urban areas the binding constraint is not infrastructure but ecosystem and user-experience: the urban strategy should focus on (a) the dual-SSID CPE mandate to convert millions of existing home broadband connections into PM-WANI nodes, (b) high-footfall venue partnerships (transport hubs, malls, educational campuses, residential complexes), and (c) authentication, roaming and payment improvements. In rural areas the binding constraint is the last mile: the rural strategy must be built around the BharatNet → ISP → PDOA three-player model, DBN-funded viability gap support for first-mover PDOs, integration with Common Service Centres (CSCs) and Gram Panchayat assets, vernacular onboarding flows, and engagement of women self-help groups and youth as PDO entrepreneurs. A common back-end (single registry, common authentication and roaming, common branding) should serve both strategies, but deployment economics, funding instruments and KPIs should be differentiated.

Q9. Measures to improve deployment and uptake of Public Wi-Fi in high-footfall outdoor and indoor locations.

Outdoor (bus stops, transit points, parks, markets, tourist sites): (i) integrate hotspot deployment with municipal street-furniture programmes (smart poles, smart lighting) under Smart Cities and AMRUT 2.0, with model RoW templates; (ii) require Concession Agreements for new transport corridors, tourist circuits and Gati Shakti projects to include a public Wi-Fi obligation; (iii) tap advertising and footfall-analytics revenues as a cross-subsidy; (iv) ensure ruggedised, weather-resilient APs with mesh fallback; and (v) provide free authentication via a State-backed identity token to reduce friction for tourists and casual users.

Indoor (airports, railway stations, metros, malls, public institutions): (i) build on the RailTel/RailWire model but require interoperability with PM-WANI roaming so that any PM-WANI authenticated user is auto-connected; (ii) make PM-WANI compliance a part of bid conditions for retail/concession contracts in airports, metros and large public buildings; (iii) require all centrally-funded public institutions (universities, AIIMS, PMJAY hospitals, central libraries) to expose a PM-WANI SSID; (iv) provide separate SSID/VLAN-isolated public access alongside enterprise/internal networks for security; and (v) standardise indoor access-point density and minimum throughput KPIs so user experience is uniform.

B. Role of Government – Funding Deployments

Q10. Funding mechanisms for Public Wi-Fi proliferation; uniform vs. differentiated mechanisms.

A single uniform mechanism is inappropriate. Funding should be differentiated by geography and failure type, drawing on a portfolio of instruments rather than a one-size scheme.

- **Rural / unserved:** Viability Gap Funding (VGF) from Digital Bharat Nidhi covering CapEx (access points, solar/UPS where required) and a glide-path OpEx subsidy for the first 12–18 months, conditional on uptime and unique-user KPIs.

- **Urban / commercially viable:** no direct subsidy; instead the Government should mandate the dual-SSID CPE intervention, simplify RoW, and let the market deploy.
- **High-footfall public spaces:** concession-based funding via municipal/State agencies, with capex offset against advertising/analytics revenue shares (the WiFi4EU voucher analogy).
- **Government buildings, schools, PHCs, anganwadis:** direct deployment funded by line-ministry capital budgets, with PM-WANI-compliant equipment standards.

Cross-cutting design principles: (i) outcome-linked disbursement against verified uptime / unique users, not equipment counts; (ii) reverse-auction VGF for rural blocks; (iii) ring-fenced DBN allocation; (iv) explicit sunset clauses; (v) third-party measurement of KPIs.

Q11. Criteria for allocation and disbursement of funds across rural, urban and high-footfall areas.

Allocation criteria should reflect both need and outcomes. The proposed criteria are: (i) demographic and digital-divide indices — share of Aspirational Districts and SC/ST/tribal habitations; (ii) backhaul readiness — BharatNet GPs already "lit" versus dark; (iii) absence of competing private connectivity (proven market failure); (iv) ISP and PDOA willingness expressed through reverse-auction bidding; and (v) public-asset concentration (number of schools, PHCs, CSCs, *anganwadis*, GP buildings).

Disbursement principles: outcome-linked tranches against verified KPIs (uptime ≥ 95%, minimum unique users per month, sachet sales), with periodic third-party audits. For high-footfall areas, allocation should follow ridership / footfall data and a contractual minimum service level. For urban areas the bulk of "funding" should be regulatory facilitation (RoW, CPE mandate) rather than cash.

C. Role of Government – Backhaul Provisioning and Funding

Q12. Whether last-mile connectivity is a critical constraint, and measures by Centre, States and local bodies.

Yes — last-mile connectivity is the single most binding constraint on PM-WANI proliferation. India has approximately 42 lakh route-km of optical fibre and BharatNet has reached 2.18 lakh GPs, but the fibre is not lit at the village/community level on commercial terms accessible to a small PDO. The country has built world-class trunk infrastructure and is starving its last mile.

Centre-level measures: (i) reposition BharatNet as a neutral common conduit — dark-fibre wholesaler only, with no retail operations — published wholesale tariffs and standardised LoIs; (ii) mandate strict SLAs (uptime, MTTR) with financial penalties for the BharatNet operator; (iii) set explicit fiberisation targets at GP-plus-village level under NBM 2.0; (iv) extend the dual-SSID CPE mandate so that the existing 45+ million broadband connections are re-purposed as last-mile public access; (v) operationalise the three-player model with model agreements; and (vi) approve and operationalise the de-licensed lower 6 GHz band (5925–6425 MHz) and V-band for low-power and short-range mesh applications, which directly aid last-mile deployment.

State-level measures: (i) State-led GP-to-village fiberisation programmes co-funded by DBN; (ii) shared State-level fibre networks with neutral access; (iii) Single-Window RoW under the Indian Telegraph Right of Way Rules 2024 with time-bound deemed

approvals; (iv) waiver of fibre-laying fees in rural blocks; (v) leveraging State Wide Area Networks (SWANs) and State Data Centre networks for capacity sharing.

Local-body measures: (i) free or nominal-fee access to street furniture, panchayat buildings, schools, public toilets, water tanks for AP installation; (ii) standardised local-body permission templates; (iii) integration with municipal smart-city components; (iv) appointing a PM-WANI nodal officer at the ULB / GP level.

Q13. Whether Government should fund last-mile connectivity for Public Wi-Fi networks; preferred funding option and criteria.

Yes, in clearly defined market-failure pockets the Government must fund last-mile connectivity — but in a manner that strengthens the BharatNet-as-neutral-conduit posture rather than substitutes for it. The preferred instrument is Digital Bharat Nidhi, deployed through transparent reverse auctions for rural blocks and Aspirational Districts. For urban underserved pockets (low-income housing, slum redevelopment, informal settlements), targeted VGF through ULBs/State agencies is appropriate. Criteria should include (i) demonstrable absence of commercial last-mile (no FTTH, no operator within X km), (ii) presence of public-good anchors (schools, PHCs, CSCs), (iii) outcome-linked disbursement, (iv) sunset clauses, and (v) reusability of the funded infrastructure by any licensed ISP on neutral terms.

D. Facilitative Role – States and Local Bodies

Q14. Right-of-Way (RoW) challenges in accessing public places / street furniture for hotspot installation, with suggestions.

RoW remains a serious bottleneck despite the Indian Telegraph Right of Way (Amendment) Rules, 2024. The principal challenges are: (a) inconsistent application across States and ULBs of the rationalised one-time and recurring charges; (b) absence of deemed-approval timelines at the panchayat / municipal level for low-impact deployments such as Wi-Fi access points, mounted on existing street furniture; (c) high 'restoration' charges levied by some ULBs that are disproportionate to the disturbance caused by an AP installation; (d) requirement of multiple parallel approvals (electrical, civil, traffic, environment) without a single window; and (e) lack of standard model agreements for use of street poles, bus shelters, traffic signals, water-tanks and panchayat buildings.

Suggestions: (i) introduce a separate, lighter-touch RoW track for low-impact 'micro-installations' (Wi-Fi APs, small cells, sensors) with deemed approval in 15 days; (ii) prescribe standard model agreements and ceiling tariffs for street-furniture access; (iii) integrate RoW into the National Single Window System and Gati Shakti portal; (iv) make recurring charges nominal and uniform for PM-WANI deployments; (v) provide a binding dispute-resolution timeline at State level; (vi) treat hotspots on Government / panchayat property as deemed-permitted, free of charge, in return for free access to citizens for Government services.

Q15. Facilitative roles of State Governments across rural, urban and high-footfall areas; whether States should deploy at municipal/GP level.

States are indispensable to PM-WANI scaling — indeed, on most success metrics, States rather than the Centre will determine the trajectory. State Governments can: (i) integrate PM-WANI into their State Digital Strategy and budget for it; (ii) declare a PM-WANI-compatible second SSID a default condition for State-funded fibre and CPE programmes; (iii) operate as anchor demand by exposing PM-WANI in all State-funded buildings (Secretariats, schools, hospitals, libraries, ration shops, GP offices); (iv) extend RoW concessions and fast-track approvals; (v) fund GP-to-village

fiberisation in convergence with BharatNet; (vi) use State Skill Mission resources to train PDO entrepreneurs (especially women SHGs); (vii) deploy hotspots in rural marketplaces, mandis, Krishi Vigyan Kendras, schools and PHCs.

Yes, States should consider deploying public Wi-Fi at municipal and Gram Panchayat level. The deployment, however, should be PM-WANI-compliant — i.e., it must use the federated architecture, be interoperable with PDOAs and App Providers, and not create State-island networks. Funding can flow through 15th Finance Commission grants, Smart City unspent balances, AMRUT 2.0 and DBN co-funding.

Q16. Whether State Governments should improve last-mile connectivity for PM-WANI; measures to incentivise city/town-level fiberisation.

Yes. State-led fiberisation programmes — where State PSUs or municipal SPVs roll out neutral-host last-mile fibre — are amongst the most effective interventions globally (e.g., Stockholm's Stokab). India has nascent examples in Tamil Nadu (Tamil Nadu FibreNet) and Andhra Pradesh (APSFL); these should be replicated and harmonised.

Incentive instruments: (i) DBN co-funding (e.g., 50–75%) for State / municipal fibre extension to schools, PHCs, GP offices and high-footfall public spaces, conditional on neutral access and PM-WANI-compatibility; (ii) tax / stamp-duty waivers on fibre laying; (iii) revenue-share / linked grants based on number of PM-WANI hotspots lit; (iv) recognition of a fiberisation-KPI in State performance dashboards; (v) inclusion of fibre as a criterion in Smart City and AMRUT scoring; (vi) policy clarity that municipal/State fibre will be made available on neutral wholesale terms and that the State will not run a vertically integrated retail ISP business.

Q17. Facilitative roles of local bodies in deployment and sustainable operation in rural and urban areas.

Local bodies (ULBs and Panchayati Raj Institutions) are the most important on-ground facilitators. Their roles should include: (i) free or nominal access to street furniture, water tanks, panchayat buildings, schools, public toilets and bus stops for AP installation; (ii) appointment of a PM-WANI Nodal Officer with KPIs; (iii) integration of PM-WANI signage in municipal wayfinding; (iv) bundling Wi-Fi obligations into existing concessions (waste, parking, advertising); (v) electricity / metering support for APs; (vi) verifying 'active hotspot' status for DBN-funded deployments through random checks; (vii) using PM-WANI to deliver State / municipal e-services (citizen grievance redressal, water bill payment, Aadhaar-seeded benefits) thereby creating sticky local demand; (viii) at the GP level, the GP itself can become a PDO under the leadership of the Sarpanch / panchayat secretary, with revenue going to GP own funds.

E. Incentivising Service Providers

Q18. Regulatory or policy incentives required to promote active TSP/ISP participation in Public Wi-Fi deployment.

Frankly, TSP participation has been the single greatest source of resistance to PM-WANI proliferation in India — starting with COAI's 2017 commitment to 'create a million hotspots' as an alternative to WANI, which never materialised. Future TSP/ISP engagement must therefore be shaped by structural incentives, not voluntary commitments. Recommended measures: (i) mandate the dual-SSID PM-WANI second SSID on all CPE supplied by ISPs (a regulatory measure, not an incentive); (ii) recognise PM-WANI hotspots and unique users as eligible KPIs under any future Performance-Linked Incentive scheme for telecom service-rollout; (iii)

treat Wi-Fi offload as a network-cost optimisation that operators can claim against Spectrum Usage Charges for crowded urban spectrum, in proportion to verified offloaded traffic; (iv) allow ISPs to bundle PM-WANI hotspots in their consumer plans ("your broadband works at home and across the city"), modelled on Comcast Xfinity WiFi or BT-Fon; (v) provide light-touch clarification that an ISP supplying bandwidth to a PDO is not, by that act alone, providing a regulated end-user service for which the PDO must hold a separate licence. The combined effect is to make the PM-WANI extension economically rational rather than purely altruistic for ISPs. (vi) introduce a dedicated PM-WANI window within the existing PLI Scheme for Telecom and Networking Products and its Design-Linked Incentive top-up, with explicit incentives for PM-WANI-compliant Customer Premises Equipment — routers, indoor and outdoor access points, mesh nodes, OLTs and small-form-factor outdoor units — and for indigenous IP in the WANI software stack.

Q19. Regulatory or fiscal incentives for provisioning of bandwidth and backhaul for Public Wi-Fi networks.

Recommended measures: (i) extend the 71st Tariff Amendment Order (which caps PDO retail FTTH tariffs at 2x consumer rate) to cover BharatNet retail, and add a similar cap for institutional bulk bandwidth supplied to PDOAs/PDOs; (ii) reduced/waived GST or input tax credit pass-through on bandwidth supplied to PM-WANI PDOs; (iii) DBN-funded backhaul vouchers for first-mover PDOs in unserved blocks; (iv) accelerated depreciation / tax incentives for fibre infrastructure laid in Aspirational Districts and tribal blocks if made available on neutral terms; (v) encourage open-access models for State / municipal fibre, with transparent wholesale tariffs; (vi) enable infrastructure sharing under the Indian Telegraph Infrastructure Provider category for fibre, ducts and street-furniture, on standardised commercial terms. (vii) extend the proposed PM-WANI window within the existing PLI / DLI architecture, together with concessional credit through SIDBI / NaBFID, to domestic manufacturers of PM-WANI-compliant CPE, GPON / OLT / ONT equipment, fixed-wireless-access (FWA) gear and outdoor / mesh access points, recognising that an affordable and secure made-in-India device ecosystem is itself a critical enabler of backhaul economics and ISP willingness to extend PM-WANI bandwidth — particularly in the outdoor, mesh and ruggedised form-factors that domestic supply has so far under-served.

F. Incentivising Private Entities

Q20. Measures to incentivise private enterprises, commercial establishments, shop owners, community institutions to install public Wi-Fi hotspots.

The PDO model is by design optimised for small private entities — kirana stores, tea stalls, cafes, stationery shops, beauty salons, college canteens, community halls. The incentive package should reduce friction, deliver visible economics and make on-boarding nearly self-service. Specific measures: (i) zero entry fee, zero licence requirement and zero bank guarantee — already in PM-WANI; this must be statutorily protected against drift in the new Telecom Rules; (ii) standard CapEx grant or interest-subvention loan via SIDBI or Mudra for a PDO's first AP and router; (iii) GST simplification for sachet sales; (iv) subsidy on the first 12 months of bandwidth in unserved blocks; (v) free PM-WANI on-boarding kits, signage and vernacular training material via the neutral nodal agency; (vi) integration into the MSME Udyam ecosystem so that PDOs are recognised micro-enterprises; (vii) PDO entrepreneurship training and certification via NSDC / State Skill Missions; (viii) dedicated PDO-credit window through DBN; (ix) recognition / awards by district / State Governments for top-performing PDOs to build prestige.

Q21. Whether public/private entities as system integrators should be strengthened; institutional support.

Yes — system-integration capacity is a real gap, particularly in rural deployments where stitching together backhaul, active equipment, AP, AAA stack, signage, training and support is beyond an individual PDO's capability. The PDOA role partially addresses this; however, we also need a clear category of 'PM-WANI Managed Service Providers' (MSPs) who can deliver turnkey deployments at scale to State Governments, ULBs, central ministries and large private venues. Institutional support recommended: (i) empanelment framework operated by the neutral nodal agency (eligibility, technical and financial bid criteria); (ii) standard procurement templates for State / ULB use; (iii) Reference Architecture and certification labs to test PM-WANI-compliant equipment and SI offerings; (iv) catalysing State PSUs (BBNL, RailTel, BSNL, State e-governance agencies) to act as MSPs in their respective domains under neutral commercial terms; (v) GeM listing of PM-WANI MSP services with standard service-level definitions. (vi) explicit representation of indigenous CPE OEMs and device manufacturers on the governance board / advisory council of the neutral nodal agency, so that device-side certification standards, security profiles, reference designs and interoperability test-suites are co-created with the manufacturing ecosystem rather than imposed on it. This mirrors the role of acceptance-device OEMs in the NPCI / UPI ecosystem and would also align the PM-WANI device track with the Trusted Sources / Trusted Products regime.

G. Technical Architecture, Authentication and Interoperability

Q22. Whether users face challenges with authentication; how to simplify while ensuring security and compliance.

Yes. The single most user-cited friction is the requirement to download an app, locate the right one, allow location, register, get OTP, install the AP-supplied profile and only then connect. For low-literacy users, basic-phone users, shared-device users and tourists, this is prohibitive. The simplification path is: (i) make web-based one-click landing-page authentication a mandatory option alongside app-based; (ii) integrate UPI as a payment rail with a single intent-based deep link; (iii) issue a re-usable, portable, time-limited authentication token (e.g., DigiLocker-issued or Aadhaar-Auth-derived in OTP-less flow), so a user authenticated once on any PDOA roams seamlessly across all PM-WANI hotspots; (iv) standardise minimum security baseline (WPA3 where supported, captive portal with HTTPS, no public-Wi-Fi-associated MITM warnings on user devices); (v) keep KYC light at user-onboarding (mobile-OTP sufficient) and shift higher-assurance KYC to specific transactional contexts only; (vi) host model technical SDKs and reference implementations through the neutral nodal agency.

Q23. Whether a centralized platform for authentication and payment is needed; if yes, who is best suited to implement and manage it.

This is the most consequential question in the consultation paper, and my response is firm. India does not need a centralised platform that consolidates the roles of PDOAs, App Providers and the Central Registry into a single 'Super-PDOA' entity. The decentralised, federated, multi-stakeholder design is the source of PM-WANI's resilience and inclusiveness; it has Cabinet approval; and changing it would be a material departure requiring fresh Cabinet sanction and stakeholder consultation. A single centralised platform would (a) create a systemic single-point-of-failure for what is now critical digital infrastructure for education, telemedicine and welfare delivery; (b) capture rents from low-margin small entrepreneurs by mandating revenue-share

with the central operator; (c) shrink the device ecosystem through whitelisting, raising costs and excluding small ISPs and OEMs; (d) replace an open ecosystem with a controlled one. It would convert PM-WANI from an inclusion DPI into a utility monopoly.

What India does need — and currently lacks — is a neutral nodal agency, modelled on NPCI for UPI, that sits above the ecosystem rather than within it. Its mandate would be: (i) set national hotspot deployment targets and apportion accountability across PDOAs and States; (ii) publish federated authentication and roaming standards; (iii) operate / oversee the Central Registry; (iv) maintain reference SDKs and conformance testing; (v) on-board the roughly 2,000 ISPs through standardised templates; (vi) publish ecosystem-health and user-experience KPIs; (vii) convene PDOAs, App Providers, OEMs, ISPs, States and ULBs in regular forums; (viii) issue advisory guidance and resolve cross-PDOA disputes.

On who should run it: the precedent of NPCI — an independent, not-for-profit special-purpose entity owned by ecosystem participants, regulated by the sector regulator — is the appropriate model. It should be incorporated under Section 8 of the Companies Act, jointly owned by ISPs, PDOAs and Government nominees, regulated by TRAI/DoT, with an independent Board majority and statutory transparency obligations. It must explicitly not compete with PDOAs (just as NPCI does not compete with PhonePe or Google Pay).

Q24. Steps required to achieve interoperability and seamless roaming; whether inter-hotspot roaming should be mandatory and whether a "super-aggregator" should be introduced.

What should be made mandatory at this stage is the portability of a user's KYC across PDOAs. Inter-hotspot roaming with financial interoperability is neither feasible nor required. In effect, PM-WANI should enforce a 'one-click onboarding' standard: a user who has completed KYC on any PM-WANI hotspot must be able to connect to a hotspot of any other PDOA without being asked to re-do KYC. The 2017 WANI recommendations envisaged exactly this kind of friction-free reusability of authentication. Without it, the network effect that makes Public Wi-Fi useful is defeated, because every new PDOA effectively asks the user to onboard afresh. Full mobile-network-style inter-hotspot roaming — with handover, settlement and billing interoperability between PDOAs — is neither desirable nor feasible. At present hotspot densities, the typical user is stationary (a high-data-consumption user accessing a single hotspot for an extended session), not in motion across multiple PDOA footprints. Mandating financial interoperability now would impose disproportionate operational, technical and settlement complexity on small entrepreneurs without a commensurate user benefit.

Immediate steps required: (i) the neutral nodal agency must publish a federated KYC and authentication-portability standard, with a reusable, time-limited, pseudonymous user token (DigiLocker- or Aadhaar-Auth-derived); (ii) all PDOAs registered under PM-WANI must, by Authorisation conditions, honour this portable token and not re-trigger KYC; (iii) device-side discovery and auto-connect must be standardised using HotSpot 2.0 / Passpoint profiles branded as PM-WANI; (iv) uniform SSID and signage must be enforced; (v) the settlement / billing layer for full roaming should be designed but kept optional, to be activated when the ecosystem is ready.

On the question of a 'super-aggregator' — No. A super-aggregator that absorbs PDOA functions or sits commercially in the path between user and PDOA would re-create the centralisation problem discussed at Q23. What is needed is not a super-

aggregator but a neutral clearing-and-standards body — an NPCI-equivalent, providing 'rails' (the standards, the registry, settlement rails, certification) without competing in retail.

H. Monetisation and Sustainability

Q25. Monetisation models appropriate for rural, urban and high-footfall locations; additional models suitable in the Indian context.

Different geographies will sustain different monetisation models, and a portfolio approach is essential.

- **Rural:** (i) sachet-priced direct paid access (₹5–10/day, ₹20/week), the core PM-WANI proposition; (ii) DBN viability gap support (CapEx + 12–18-month OpEx) for first-mover PDOs; (iii) bundling with Government service delivery (welfare, agri-extension, telemedicine, online education) where the State pays the PDO per session/usage; (iv) local-language content caching and OTT day-passes; (v) GP-as-PDO model where the Gram Panchayat retains revenue.
- **Urban:** (i) freemium with limited free access and paid extension, building on the RailTel/RailWire precedent; (ii) advertising and sponsored access on the captive portal (compliant with DPDP Act); (iii) anonymised footfall analytics for venue owners; (iv) data-offload arrangements with TSPs; (v) bundling with FTTH home broadband ("your home plan works on the city PM-WANI network", BT-Fon style); (vi) loyalty/CRM tie-ups with retail venues.
- **High-footfall (transit hubs, malls, stadia, tourist sites):** (i) advertising-funded free access with timed sessions, with paid premium tiers; (ii) sponsorship by venue owners (airports, metros, retailers); (iii) targeted analytics (with consent); (iv) data-offload contracts with operators; (v) tourist day-passes with State Tourism Department branding.

Additional models suitable in the Indian context: (i) 'Wi-Fi for digital services' — line-ministry payments to PDOs for citizen access to specific Government services in unserved areas; (ii) PM-WANI-as-a-Service (PWaaS) for enterprises and large venues offered by PDOAs; (iii) social impact bonds tied to digital-inclusion KPIs; (iv) CSR-funded deployments in tribal blocks; (v) education-sector subsidies (SWAYAM, DIKSHA usage on PM-WANI free of data charge); (vi) revenue-share with content / OTT platforms for guaranteed bandwidth; (vii) micro-renting of unused home FTTH bandwidth via the dual-SSID model with a small share back to the homeowner (the 'internet-from-the-fridge' approach in some markets).

Q26. Additional comments / observations / suggestions on Public Wi-Fi proliferation.

Five additional points are critical.

- **First, do not undo what works.** PM-WANI's decentralised, federated, licence-exempt architecture is correct. The proposed Telecommunication Rules (Authorisation for Provision of Miscellaneous Telecommunication Services), 2025 — in their Part D — should be carefully reviewed to ensure that they do not, by drafting accident, impose enforcement obligations on PDOAs that are inconsistent with the federated model, or restrict authentication to app-only flows, or require device whitelisting. The Cabinet-approved framework must be preserved.
- **Second, fix the BharatNet operating model.** BharatNet is the silent foundation on which PM-WANI rural success depends. As long as it is operated as a vertically integrated PSU offering, it will continue to underperform.

Reposition it as a neutral common conduit, with transparent wholesale dark-fibre tariffs, strict SLAs, financial penalties for downtime, and explicit permission for any licensed ISP to light its fibre on equal commercial terms. The BharatNet → ISP → PDOA three-player model is the cornerstone of rural scale.

- **Third, deploy the dual-SSID CPE intervention urgently.** Pre-loading a PM-WANI second SSID on every ISP-supplied router is a firmware-only, zero-CapEx intervention that can convert 45+ million existing home broadband connections into PM-WANI nodes. This is the single highest-leverage measure available. The UK's BT-Fon model achieved 5+ million hotspots through this route alone.
- **Fourth, create the neutral nodal agency.** PM-WANI today lacks an NPCI-equivalent body. Constituting one — an independent, not-for-profit Section 8 company, with regulated mandate — is essential to drive standards, roaming, settlement, certification, and ecosystem on-boarding. This is governance scaffolding, not centralisation.
- **Fifth, give PM-WANI room to evolve.** UPI did not scale linearly; it scaled iteratively, with the regulator adopting an enabling rather than restrictive posture in early years. PM-WANI deserves the same patience. India has fewer than 5 lakh public Wi-Fi hotspots today; France alone, with a population of only 66.5 million (less than 1/20th of our population) has 13 million. The aspiration must be a step-change, not an incremental adjustment. With (a) the dual-SSID mandate, (b) BharatNet integration via the three-player model, (c) the neutral nodal agency, (d) browser-based one-click login, (e) DBN-funded rural viability gap support and (f) State and local-body activation through RoW and public-asset access, India can credibly aspire to 10+ million PM-WANI hotspots by 2030 and place affordable, sachet-sized internet within reach of every Indian. That is the true Digital Public Infrastructure for connectivity.

Conclusion

I would be happy to elaborate on any of the above points, share supporting concept notes (including the Convergence between BharatNet and PM-WANI, and engage with the Authority and the stakeholder community in the consultation process.

With regards,

(RS Sharma)
Former Chairman, Telecom Regulatory Authority of India
Email: rssharma3@gmail.com
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