Proptivity

THE CASE FOR NEUTRAL HOST

Closing the indoor connectivity gap

Executive Summary

This paper is addressed primarily to national regulators and mobile network operators, and secondarily to technically informed stakeholders in the real estate and property sectors. Its purpose is to set out why indoor mobile connectivity has become a distinct infrastructure challenge, why the traditional delivery model is structurally insufficient to meet growing demand, and why neutral host infrastructure should be understood as a necessary and complementary part of the solution.

Indoor mobile connectivity has become a critical component of modern digital infrastructure. While mobile networks were historically designed to provide outdoor population coverage, the majority of digital activity now takes place inside buildings. Offices, retail environments, healthcare facilities and public spaces have become the primary locations where connectivity is required. Industry data consistently indicate that approximately 80% of mobile data traffic is generated indoors.

This shift has created a structural gap between demand and delivery. Mobile network operators continue to optimise their investments around outdoor coverage and their own subscriber base. Property owners, by contrast, must ensure that buildings function for all users, regardless of operator, across shared and tenant spaces. As a result, **the party with the strongest incentive to ensure high-quality indoor connectivity rarely controls the means to deliver it.**

At the same time, several structural developments are increasing the difficulty of delivering indoor connectivity from outdoor networks:

- Modern energy-efficient buildings significantly reduce signal penetration
- 5G deployment increasingly relies on higher-frequency spectrum with weaker indoor propagation
- Performance requirements have shifted from basic coverage to high-capacity, low-latency connectivity across the entire indoor environment

These factors mean that indoor connectivity can no longer be treated as an extension of outdoor coverage. It requires dedicated indoor infrastructure. Despite this, dedicated indoor deployments remain limited. **According to third-party analyst research, fewer than 5% of commercial buildings across European markets currently have dedicated shared indoor mobile infrastructure in place.**

The core issue is not lack of demand or willingness to invest. Property owners increasingly recognise connectivity as a fundamental building requirement and are willing to fund solutions. The challenge lies in procurement, coordination and delivery. The operator-led model is constrained by limited economic incentives, operational complexity and fragmented execution processes.

Neutral host infrastructure has emerged as a response to these structural constraints. By introducing a single entity responsible for deploying and operating shared indoor infrastructure, the model simplifies delivery, centralises complexity and better aligns incentives across stakeholders. Property owners gain a clear path to securing building-wide connectivity. Operators gain efficient access to indoor environments without full capital commitment. Users receive consistent service regardless of provider.

The model also enables a transition from project-based deployment to scalable infrastructure delivery. Instead of treating each building as a unique coordination challenge, indoor connectivity can be standardised, repeated and expanded across portfolios.

From a regulatory perspective, this has important implications. Indoor connectivity should be recognised as a distinct infrastructure layer with different economics and deployment characteristics from outdoor networks. Policy frameworks should ensure fair and non-discriminatory access, prevent coordination bottlenecks and enable scalable multi-operator solutions.

Central conclusion

Indoor mobile connectivity is now essential infrastructure. The traditional delivery model is not sufficient to meet growing demand at scale. Neutral host infrastructure provides a practical, efficient and competition-neutral approach to closing this gap and enabling reliable indoor connectivity across modern buildings.

Background and Purpose

Mobile connectivity has become a fundamental component of modern digital infrastructure. While mobile networks were historically designed primarily to provide outdoor population coverage, the vast majority of digital activity now takes place indoors, within offices, retail environments, healthcare facilities, public buildings and homes. The quality of indoor mobile connectivity is therefore becoming increasingly important for productivity, service delivery and asset performance.

At the same time, a structural gap has emerged between where mobile services are used and how they are delivered. Mobile network operators typically plan and deploy their networks with a focus on national coverage, outdoor performance and the needs of their own subscribers. Property owners, by contrast, must ensure that buildings function for all tenants, employees, visitors and customers, regardless of which operator they use. This distinction is becoming more important in modern multi-tenant environments, especially as office and retail occupancy models become more flexible and tenant requirements change more frequently.

In practical terms, this means that the party with the strongest incentive to ensure good indoor performance is often not the same party that controls the mobile network. Operators are primarily accountable to their own subscribers and investment priorities. Property owners are accountable for the quality and attractiveness of the entire building environment. This creates a structural mismatch between supply responsibility and actual demand conditions indoors.

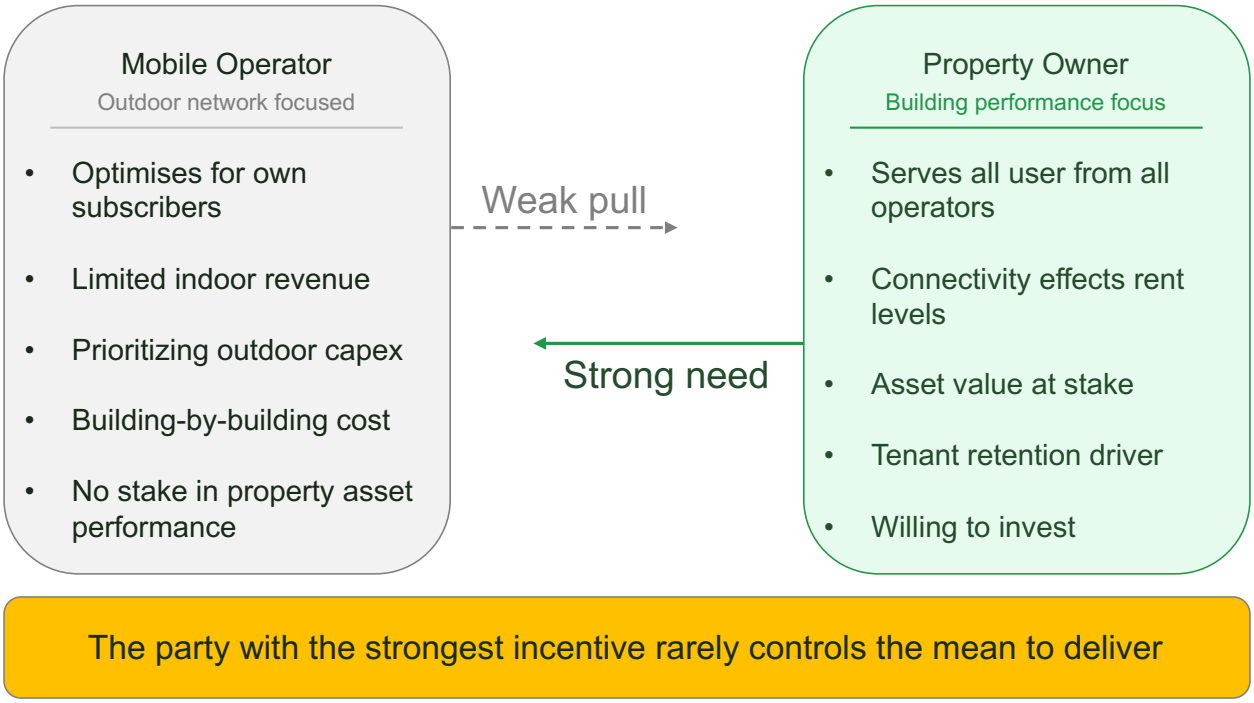

Figure: Structural mismatch between indoor demand and delivery responsibility

Indoor mobile infrastructure remains relatively limited today. In most markets, dedicated indoor systems have historically been deployed mainly in locations with very high public visibility or concentrated footfall, such as stadiums, airports, subways and large shopping centres. Beyond these environments, indoor deployments tend to be confined to selected premium multi-tenant office assets funded by property owners, or single-tenant enterprise buildings supported by a lead operator. According to third-party analyst research, fewer than 5% of commercial buildings across European markets currently have purpose-built indoor mobile infrastructure in place.

This limited deployment is not primarily due to lack of demand. Rather, it reflects a combination of cost, complexity and misaligned value capture. In many markets, the indoor solutions most commonly available have been analogue extensions of outdoor networks, often based on legacy Distributed Antenna System (DAS) architecture. These systems can be expensive, infrastructure-heavy and difficult to adapt when building requirements or technology standards change. At the same time, property owners and tenants often need to coordinate with multiple parties and operators to secure a multi-operator indoor solution, even though they typically lack the technical expertise, organisational capacity or commercial leverage to do so efficiently.

The purpose of this paper is therefore twofold.

First, it examines the structural conditions that are making reliable indoor mobile connectivity more difficult to deliver through traditional models.

Second, it explains why alternative delivery models, and particularly neutral host infrastructure, are increasingly necessary to meet the needs of property owners, tenants and society.

The intention is to inform regulators, operators and real estate stakeholders, and to clarify why neutral host approaches should be understood as a complementary and enabling model rather than a disruptive or adversarial one.

Definition: Neutral host infrastructure operator

A neutral host infrastructure operator is an entity that deploys, owns and operates shared active indoor radio access infrastructure, making it available to two or more mobile network operators under equal, non-discriminatory terms. The neutral host is not a mobile operator and holds no retail spectrum licence.

It operates as a wholesale infrastructure provider between the building owner and the licensed operators, with no commercial stake in any individual operator's subscriber base.

This is distinct from a single-operator in-building system, from passive signal distribution infrastructure, and from roaming arrangements. Each operator connects its own licensed spectrum and network independently via the shared infrastructure layer.

Key points from this chapter

- Indoor mobile connectivity is increasingly part of core building infrastructure.
- Operators and property owners face different incentives and responsibilities indoors.
- Fewer than 5% of commercial buildings currently have purpose-built indoor mobile infrastructure .
- The current market model is challenged by cost, complexity and coordination barriers.
- Neutral host models have emerged as a response to this structural mismatch.

Why Indoor Connectivity Has Become Harder to Deliver

Indoor connectivity challenges are not the result of a single factor. They reflect a convergence of three reinforcing developments: fundamental changes in how and where mobile services are used, structural changes in building design, and the propagation characteristics of 5G spectrum. This chapter examines each in turn, and explains why together they make it increasingly difficult to deliver acceptable indoor performance from outdoor networks alone.

How mobile usage has shifted indoors

Industry estimates consistently indicate that approximately 80% of mobile data traffic is generated indoors.

This figure has been cited across multiple industry and regulatory contexts and is broadly consistent with operator-reported data on indoor traffic share.

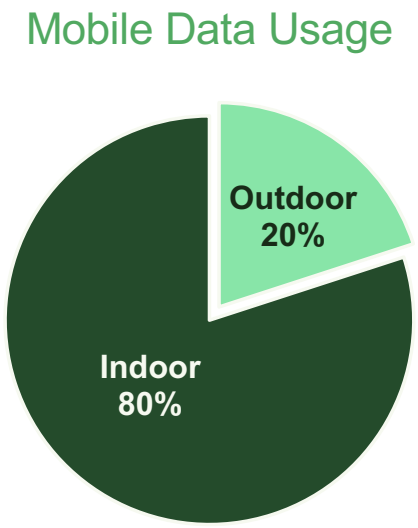

Figure: Mobile Data Usage (Ericsson mobility report)

This is not a marginal shift. It means that the environments in which people now depend most heavily on mobile connectivity are no longer streets, roads or open outdoor areas, but buildings of all kinds. Indoor environments have become the primary location of digital activity, and performance expectations have followed accordingly.

Users increasingly expect reliable performance throughout the entire indoor journey: arriving in a garage -> moving through a lobby -> entering a lift -> working at a desk -> shopping inside a store or accessing services in a basement or service corridor.

Performance is no longer judged at the edge of a building. It is judged throughout it.

This shift is especially visible in commercial real estate. Office buildings now support highly mobile work patterns, cloud-based collaboration, video meetings and a growing number of connected devices. **Mobile connectivity is increasingly a primary connectivity layer rather than a fallback option used only when Wi-Fi is unavailable**.

Wi-Fi is not a universal substitute

Wi-Fi continues to play an important role within enterprise environments. It remains a critical access layer for internal corporate systems and private tenant-controlled networks. However, Wi-Fi is not always the preferred or sufficient solution in environments where many users from different organisations need to be supported simultaneously.

This is particularly true in shared spaces such as restaurants, retail premises and the common areas of buildings including garages, lifts, stairs, gyms, basements and entrances. In these environments, users are unlikely to want to discover, trust and authenticate to a local Wi-Fi network simply to obtain basic connectivity. More broadly, security requirements in enterprise environments increasingly favour mobile connectivity over unmanaged or third-party Wi-Fi networks, and some organisations are actively testing or deploying 5G-enabled laptops as a secure complement to traditional IT access.

Safety and building infrastructure

Reliable mobile coverage is not only a matter of convenience or productivity. In commercial buildings, it can also be essential to ensure that emergency services can be reached anywhere within a building if an incident occurs. This is particularly relevant in basements, garages, stairwells and other spaces where coverage is often weakest. In some jurisdictions, minimum indoor coverage standards for emergency communication are already required by regulation or are under active consideration.

Beyond safety, mobile connectivity now supports work, commerce and building infrastructure simultaneously, placing different demands on the network and reducing the tolerance for weak or intermittent performance across any part of the indoor environment.

Why buildings are becoming harder to serve from outside

Energy-efficient construction reduces signal penetration

Modern buildings are increasingly designed to meet strict energy efficiency requirements, driven by both regulation and commercial cost optimisation. These requirements have led to the widespread use of construction materials that significantly limit the ability of radio signals to penetrate from outside.

Typical materials include low-emissivity (low-E) glass, dense concrete structures and high-performance insulation composites. Measurements published by the 3GPP and ETSI standards bodies indicate that **low-E glass alone can introduce signal attenuation in the range of 20 to 40 dB at frequencies relevant to current mobile deployments, compared with 2 to 5 dB for standard glass.**

In practical terms, this can reduce the received signal level inside a modern building by a factor of 100 to 10,000 relative to the outdoor environment immediately outside the facade. The implication is direct: reliance on outdoor macro networks is no longer sufficient to guarantee acceptable indoor service quality. Connectivity must increasingly be delivered from within the building itself.

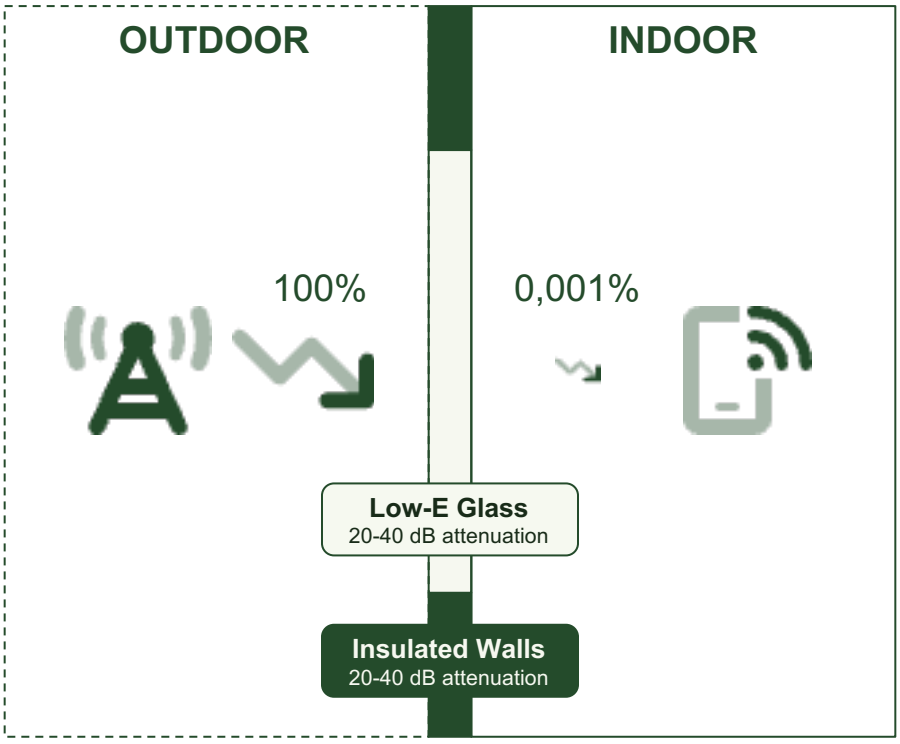

Figure: Low-E glass reduces outdoor signals with more than 99,99%

5G deployment on higher frequencies amplifies the problem

The transition to 5G introduces a compounding structural challenge. New 5G deployments are increasingly concentrated in mid-band and upper-mid-band spectrum, including the 3.5 GHz band now widely deployed across the world.

These frequencies provide significantly greater capacity than legacy 2G and 3G spectrum, but they also have materially weaker propagation characteristics. They attenuate more quickly over distance, are more easily blocked by physical obstacles, and penetrate building materials less effectively than lower-frequency signals.

This means that even where outdoor 5G coverage appears strong, indoor performance may still be poor. **The transition to 5G does not solve the indoor coverage challenge. It structurally deepens it.**

Performance requirements continue to rise

Alongside these physical constraints, the technical requirements placed on indoor networks have changed substantially. Historically, indoor coverage was evaluated primarily on the ability to support voice services and basic data. Today, expectations are significantly higher.

Modern applications require high and consistent data throughput, low latency, and stable connections across the entire indoor environment, including non-primary areas such as basements, stairwells and storage corridors. Smart building technologies, automation systems and connected infrastructure all depend on reliable connectivity in locations that were previously considered secondary.

The tolerance for weak or intermittent performance has therefore reduced significantly. A network that would have been considered adequate five years ago may now fall short of what tenants, building operators and enterprise customers expect as standard.

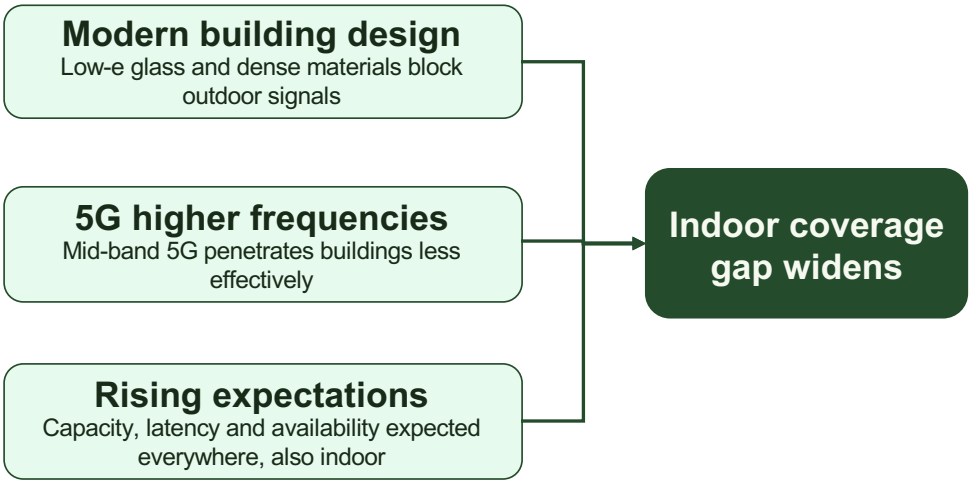

Figure: Three structural drivers reinforce indoor coverage gap

Core conclusion

Indoor mobile connectivity can no longer be treated as an extension of outdoor network coverage. It must be delivered through dedicated indoor infrastructure designed specifically for the indoor environment.

Key points from this chapter

- Approximately 80% of mobile data traffic is generated indoors.
- Buildings are now the primary location of digital activity, and performance expectations are indoor-first.
- Wi-Fi remains important but is not an adequate universal solution for shared spaces and multi-operator environments.
- Mobile connectivity now supports work, commerce and building infrastructure simultaneously.
- Modern construction materials can reduce indoor signal levels by a factor of 100 to 10,000 relative to the outdoor environment.
- Higher-frequency 5G spectrum compounds the indoor penetration problem, increasing structural dependence on dedicated indoor infrastructure.
- Rising performance requirements reduce the tolerance for weak or intermittent indoor coverage.

Market Reality: Misalignment Between Supply and Demand

Property owners are willing to invest

Across commercial real estate, connectivity has shifted from a desirable feature to a fundamental building requirement. For most property owners today, reliable indoor mobile coverage is increasingly viewed in the same category as electricity, water and heating. It is expected to work everywhere, for everyone, at all times.

This shift is driven by a combination of tenant expectations, increasing digitalisation of workplaces, and the growing importance of smart building strategies. Competition between buildings has intensified, and connectivity has become a clear differentiator for attracting and retaining tenants. As a result, property owners are not only open to investing in indoor mobile infrastructure. **In many cases, they are actively seeking solutions and failing to find them.**

The core market problem
The problem is not willingness to pay. The problem is the ability to buy.
Despite strong demand, the process of procuring indoor mobile coverage remains complex and frequently unsuccessful.

Property owners must typically engage multiple mobile operators, each with different priorities, timelines and technical approaches. This leads to lengthy and uncertain processes, where outcomes are difficult to predict. In practice, landlords frequently face:

- Lengthy procurement cycles with no defined end point
- Multiple parallel discussions with different operators
- Repeated technical assessments with inconsistent outcomes
- No guaranteed multi-operator solution at the end of the process

The result is a clear disconnect between the demand for indoor connectivity and the market's current ability to deliver it efficiently.

Limitations of the operator-led model

The root cause of this disconnect lies in how indoor mobile infrastructure has historically been delivered. Mobile operators are structured to optimise large-scale network investments, focusing on maximising population coverage and capacity through outdoor macro networks where investments can be standardised and scaled. Indoor deployments do not fit this model well.

They are inherently local, building-specific and dependent on property access. Each project requires coordination with landlords, site-specific design and ongoing operational management. This makes them significantly more complex and less scalable than outdoor infrastructure.

From a business perspective, this creates a fundamental challenge. The additional revenue generated from indoor users is limited, while the cost of deploying infrastructure inside buildings can be substantial. Even in shared infrastructure scenarios, the financial return for operators is often insufficient to justify large-scale investment. The incentive structure is also asymmetric.

For mobile operators, revenue per user is relatively low and largely independent of where the user is located. Whether a user has excellent indoor coverage or not does not significantly change operator income. For property owners, the situation is very different. Connectivity directly influences tenant satisfaction, rental levels, occupancy rates and long-term asset value. The revenue a landlord derives per employee or tenant through leasing can be many times higher than the telecom revenue an operator derives per subscriber.

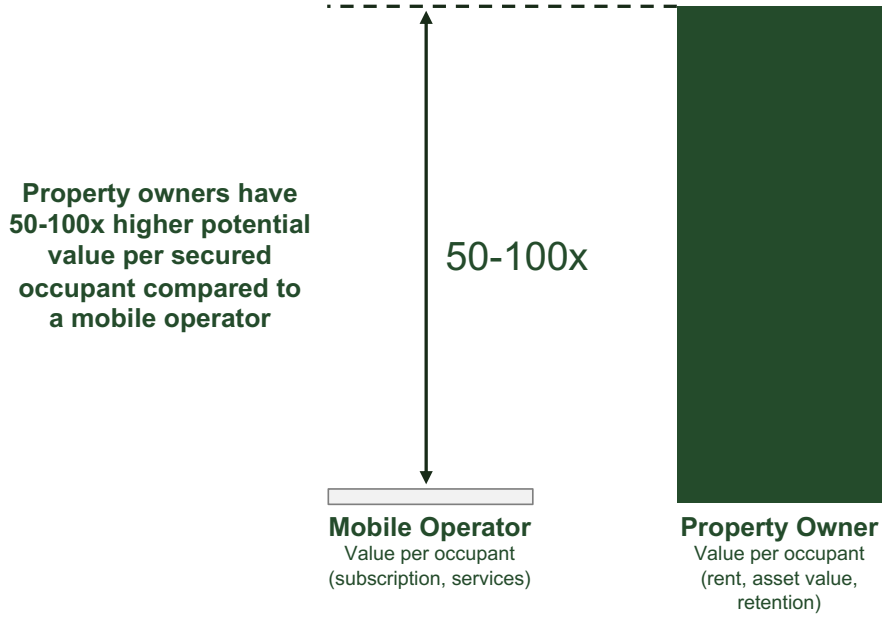

Figure: Property owners have up to 100x higher return from investing in indoor infrastructure

This creates a persistent incentive mismatch: the party with the strongest financial motivation to ensure high-quality indoor connectivity is not the party that can control the operator services. That is one of the central reasons the current model under-delivers.

Operational and structural constraints

Beyond economics, the operator-led model is constrained by how deployments are executed in practice. Indoor coverage projects require coordination between multiple operators, vendors and stakeholders, with separate installation phases, multiple site visits and fragmented technical approvals. Industry assessments have documented average deployment timelines for multi-operator passive DAS ranging from 12 to 24 months per building even where funding and access are committed.

The situation becomes more fragmented still when deployments are split between landlord-controlled common areas and individually leased tenant spaces. This leads to coverage that varies across the same building and requires separate agreements to complete, resulting in an inconsistent overall user experience.

Why an operator acting as neutral host does not fully resolve the problem

In some deployments, a mobile operator takes on a neutral host-like role by deploying indoor infrastructure that other operators can also access. This can simplify certain aspects of the project and may be appropriate in specific circumstances. However, it does not fully remove the underlying structural problem.

An operator acting in this capacity still has its own subscriber base, commercial priorities and capital allocation logic. The core issue is not the willingness of any individual operator, but the absence of structural independence. When the party controlling indoor infrastructure has an inherent interest in the performance of one operator relative to others, questions of equal treatment, investment prioritisation and long-term neutrality are difficult to resolve reliably. Specifically:

- The incentive to invest equally in coverage quality for competing operators is limited
- The motivation to extend infrastructure into areas not directly tied to that operator's own customer base may be weak
- Coverage quality in tenant areas may depend on the commercial relationship between the operator and individual tenants, rather than on building-wide requirements

These questions become especially relevant in multi-tenant buildings where different tenants, visitors and employees use different operators, and where configurations change over time. The structural independence of the infrastructure provider is therefore not a technical detail. It is central to whether the model can deliver consistently neutral outcomes.

From a regulatory and competition perspective, this distinction also matters. An operator acting as infrastructure gatekeeper inside a building may create questions around equal access and fair treatment that are difficult to address through commercial arrangements alone.

Key distinction

The question is not whether an operator can act as a neutral host in individual cases. It is whether operator-led hosting can deliver structurally neutral, scalable outcomes across the broader building stock. The evidence suggests it cannot, for the same reasons that operator-led outdoor sharing arrangements require careful regulatory oversight.

Conclusion: a model that cannot scale

The current challenges in indoor connectivity are not driven by lack of demand or lack of technology. They are the result of a delivery model that is not aligned with market realities. Property owners are willing to invest and have strong economic incentives to do so. Mobile operators face structural, economic and operational limitations that make large-scale indoor deployments difficult to justify.

This creates a persistent gap between supply and demand. In its current form, the operator-led model is not capable of delivering indoor mobile connectivity at the scale required by modern buildings. What is needed is not incremental improvement, but a fundamentally different approach to how indoor infrastructure is deployed, financed and operated.

Key points from this chapter

- Property owners recognise indoor connectivity as a fundamental building requirement and are actively seeking solutions.

- The procurement challenge is structural, not a matter of individual operator willingness.
- Operator-led models face a persistent incentive misalignment that limits indoor deployment at scale.
- Operator-hosted neutral hosting can work in specific cases but does not resolve the structural independence problem.
- Resolving this requires a delivery model where incentives and responsibilities are better aligned.

The Neutral Host Model: A Scalable Solution

The limitations of existing delivery models

In most buildings today, indoor mobile connectivity is delivered through one of three approaches, each of which has clear limitations that prevent it from scaling across the broader building stock.

The most common scenario remains **no dedicated indoor solution at all**, with coverage relying entirely on outdoor networks. As modern buildings increasingly block outdoor signals, this leads to predictable and worsening performance gaps. **Single-operator deployments**, typically driven by the requirements of a large enterprise tenant, may deliver acceptable performance within one tenant's footprint but do not address shared areas, visitors or users on other operators. **Landlord-funded passive DAS systems** are multi-operator capable but were designed for a different generation of requirements. They are not well suited to delivering high-capacity indoor 5G, are difficult to evolve, and remain resource-intensive and time-consuming to deploy. In practice, buildings either receive no upgrade, receive a partial or tenant-specific solution, or face deployment cycles of 12 to 24 months even where funding is committed.

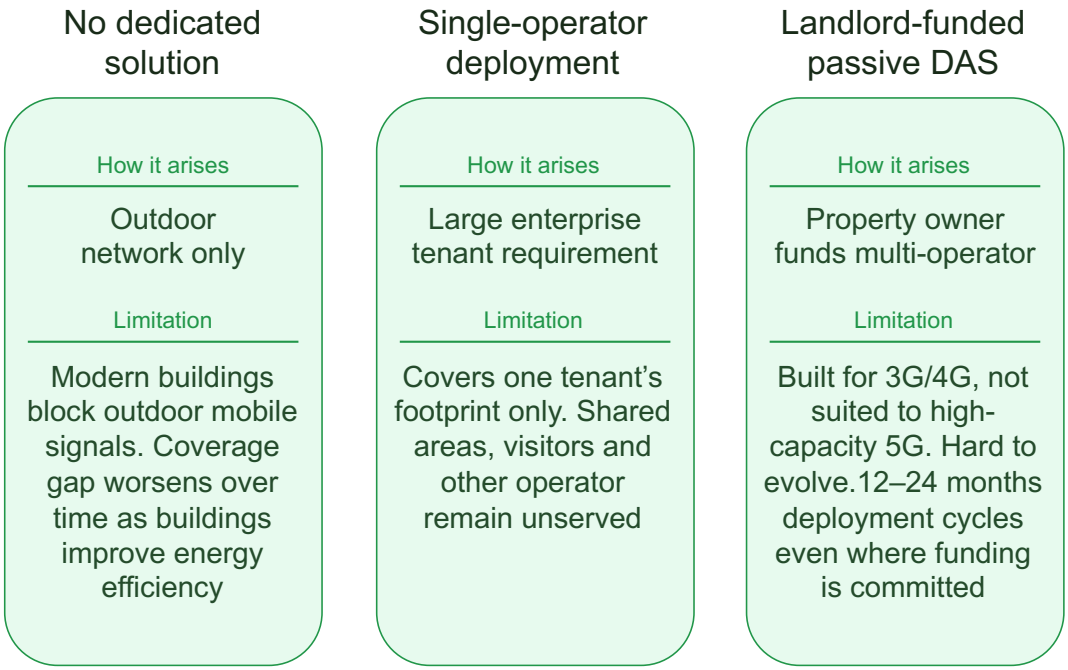

Figure: The limitations of the most common indoor mobile delivery models

The role of the neutral host model

The neutral host model addresses the technical, operational and economic constraints described across this paper by introducing a single independent entity responsible for delivering and operating shared indoor infrastructure.

This changes the delivery dynamic in several important ways.

First, it simplifies deployment. Property owners interact with one infrastructure provider instead of multiple operators and vendors. Deployment becomes a coordinated process rather than a sequence of parallel and fragmented activities.

Second, it centralises complexity. Integration with multiple operators becomes part of the infrastructure provider's core capability rather than something each landlord must manage independently. The operator engagement model shifts from a procurement challenge for property owners to a wholesale access arrangement between infrastructure provider and operators.

Third, and most importantly, it resolves the structural independence problem. Because the neutral host has no stake in any individual operator's subscriber base, it has a consistent commercial incentive to provide equal service quality to all connected operators. This is the fundamental difference from operator-led hosting.

Fourth, the model is compatible with the type of digital indoor infrastructure required for modern 5G performance. By moving beyond legacy analogue approaches toward scalable small-cell digital architecture, it creates a foundation not just for coverage, but for long-term indoor capacity and quality.

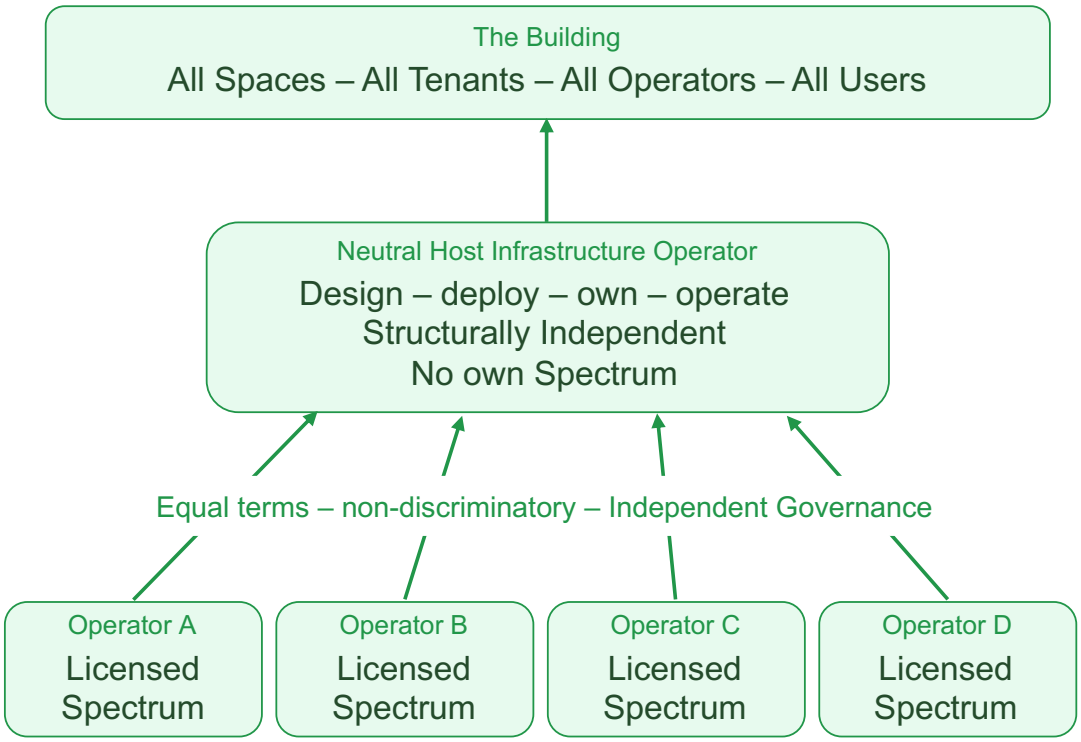

Figure: Neutral host model – one infrastructure layer serving all operators and all users

From project-based delivery to scalable infrastructure

Perhaps the most important shift enabled by the neutral host model is the transition from project-based delivery to scalable infrastructure deployment. In the traditional model, each building is effectively treated as a standalone project. Technical design, operator coordination, commercial agreements and deployment processes are repeated again and again.

In a neutral host model, deployment can be standardised and repeated across multiple buildings and countries, allowing for faster rollout across portfolios, more predictable costs and timelines, more consistent technical standards, and simpler governance for landlords and operators alike. Over time, this creates the conditions for indoor mobile connectivity to be treated not as a bespoke technical exception, but as a repeatable infrastructure layer within modern buildings.

The United Kingdom offers a practical illustration of what standardisation can unlock. The Joint Operator Technical Specification for Neutral Host In-Building (JOTS), developed collaboratively by the UK's mobile network operators, established a common technical framework for how shared indoor infrastructure connects to operator networks.

By removing the need to negotiate integration terms building by building, JOTS significantly reduced deployment friction and has contributed to the UK becoming one of the fastest-growing markets for shared indoor mobile infrastructure in Europe.

The model is operator-led rather than independently operated, and does not fully resolve the structural incentive misalignment described in this paper. But it demonstrates clearly that when operators agree on a common technical standard, deployment accelerates, and that the coordination problem is solvable where the will exists to address it.

Benefits for Stakeholders

The shift toward neutral host indoor infrastructure realigns incentives across the ecosystem. The table below summarises the key benefits for each stakeholder group.

Stakeholder	Key benefits
Property owners	Single procurement point replacing multiple operator engagements. Improved asset value and tenant retention. Building-wide coverage including shared areas. Future-ready infrastructure layer supporting smart building services as requirements evolve.
Mobile operators	Indoor coverage expansion without disproportionate capital expenditure. Access to previously hard-to-reach environments at scale. Improved customer experience and reduced churn. Platform for enterprise 5G services including secure mobile access and connected devices.
Enterprises and tenants	Secure, reliable mobile connectivity available to all users regardless of operator. Reduced dependence on unmanaged Wi-Fi. Supports mobile-first working patterns, 5G laptop deployment and customer-facing digital operations.
Society	Broader digital infrastructure extended to where people actually spend their time. Improved safety through reliable indoor emergency communication. Support for smart building and city applications. Reduced environmental footprint through shared rather than duplicated infrastructure.

Key points from this chapter
• The neutral host model simplifies deployment by centralising operator integration with a single independent provider.
• Structural independence is the defining characteristic: the neutral host has no stake in any individual operator's subscriber base. • This resolves the incentive problem that limits operator-led hosting at scale. • Digital small-cell architecture enables the performance levels required for modern 5G environments. • Standardised deployment across portfolios enables a transition from project-based to infrastructure-based delivery.

Policy Implications

The market and technical realities described in this paper have direct implications for regulatory policy. Indoor mobile connectivity requires a policy framework that is distinct from the frameworks governing outdoor mobile networks. The economics, the stakeholders and the delivery mechanisms are different, and policy that treats indoor connectivity as a secondary consequence of outdoor network deployment will continue to produce the under-delivery that characterises the current market.

The following section sets out four principle-based areas where regulatory attention is needed. These principles are applicable across markets and are intended to provide a framework that regulators can adapt to their specific national contexts and existing legislative instruments.

1. Recognise indoor connectivity as a distinct infrastructure layer

The most fundamental policy shift needed is conceptual. Indoor connectivity should be formally recognised as a distinct infrastructure layer, separate from traditional outdoor mobile network deployment. This matters because the economic logic, the stakeholder responsibilities and the deployment models are fundamentally different.

Outdoor mobile networks are national-scale assets, regulated primarily through spectrum licensing and coverage obligations designed to serve population-level demand. Indoor connectivity is closer in character to other building-level infrastructure such as power distribution, structured cabling or heating systems. It is deployed asset by asset, funded through building economics and serves a defined set of users within a defined physical boundary. Applying outdoor network regulation directly to indoor infrastructure creates mismatches in incentive design, cost allocation and accountability.

In practice, this recognition should shape how coverage obligations are written, how spectrum conditions treat indoor performance, and how building access rights for infrastructure providers are defined. **Coverage obligations should specify indoor performance thresholds, not only outdoor signal levels at the building boundary.** Without this, operators can satisfy regulatory requirements while indoor users experience consistently poor service.

2. Ensure fair and non-discriminatory access for independent infrastructure operators

For a neutral host model to function as intended, independent infrastructure operators must be able to connect to mobile operator systems on fair, transparent and non-

discriminatory terms. This includes access to operator integration interfaces, clearly published and standardised technical interconnection specifications, and equal treatment in the quality and priority of that access across all operators using the shared infrastructure.

Without this principle being enforceable, the neutral host model cannot deliver its intended benefits. An independent infrastructure provider that faces barriers to integrating one operator cannot offer building owners a genuine multi-operator solution. The value proposition of the model depends entirely on its ability to serve all operators on equal terms. Where this access is conditional, delayed or subject to commercially discriminatory terms, regulators should have clear mechanisms to intervene.

Most existing regulatory frameworks contain provisions relating to non-discriminatory access to electronic communications infrastructure. The question is whether those provisions have been designed and interpreted with shared indoor infrastructure in mind. In most markets they have not. Regulatory guidance specifically addressing the interconnection rights of neutral host infrastructure operators, and the obligations of MNOs to provide access on reasonable terms would reduce ambiguity and lower barriers to market entry for independent providers.

3. Prevent operator coordination from becoming a deployment bottleneck

One of the most concrete barriers to indoor deployment is the time and complexity involved in securing cooperation from multiple operators. Even where a property owner has committed funding and an independent infrastructure provider is ready to deploy, projects can stall for extended periods while waiting for operator engagement, technical approvals and commercial agreements. This is not a theoretical risk. It is a documented pattern in markets where neutral host deployment has been attempted at scale.

Policy should address this directly. Where operator cooperation is required for a shared indoor infrastructure deployment, that cooperation should be governed by defined response timelines for technical integration requests, standardised commercial terms for providing access to shared indoor infrastructure, and escalation mechanisms where cooperation is withheld or unreasonably delayed.

The goal is not to compel operators to subsidise infrastructure that does not serve their commercial interests. It is to ensure that where property owners are willing to fund independent indoor infrastructure, and where an independent provider is ready to deliver it, operator cooperation cannot be withheld in ways that block deployment indefinitely. The distinction between commercially motivated delay and structurally motivated obstruction is one that regulators are well positioned to define and enforce.

4. Enable scalable, multi-operator indoor solutions through building regulation

Policy frameworks should actively support the deployment models that are most capable of delivering indoor connectivity at scale. This means creating conditions that favour shared, multi-operator indoor infrastructure over fragmented single-operator solutions, and reducing the physical and administrative cost of deployment through building regulation.

Building regulations and construction standards represent an underused tool for accelerating indoor connectivity infrastructure. Requiring or incentivising indoor infrastructure readiness in new commercial construction — through pre-installed conduit, designated equipment spaces and standardised connectivity pathways — significantly reduces the cost and disruption of subsequent deployment. Several markets have already introduced equivalent requirements for electric vehicle charging infrastructure, establishing a precedent that is directly applicable here.

Saudi Arabia provides the most developed example of how building regulation can be used to systematically address the indoor connectivity gap. Under the Communications, Space and Technology Commission's Regulations for Establishing and Providing Telecommunications Services in Real Estate (RT19, January 2025), any building of seven floors or more, with two or more basement floors, with floor areas of 3,000 square metres or more per floor, or designed to accommodate 1,000 or more occupants simultaneously, is required to include a purpose-built indoor mobile infrastructure system supporting at least three operators. The regulation requires operators to approve shared indoor infrastructure designs within 30 days of submission, prohibits exclusivity arrangements, mandates equal access for all service providers, and requires property owners to bear the cost of infrastructure without being permitted to charge operators for access or space. Taken together, these provisions demonstrate that a comprehensive building regulation framework for indoor connectivity is both practically achievable and compatible with competitive market structures.

Planning and permitted development frameworks should similarly be reviewed to simplify the installation of indoor infrastructure equipment in commercial buildings. Where public buildings, hospitals, transport facilities and other assets with a public-interest dimension are involved, public procurement guidelines should be updated to recognise shared indoor infrastructure models and evaluate them on a level footing with single-operator alternatives.

Taken together, these building-level measures reduce the marginal cost of each deployment, improve the economics of the neutral host model, and create conditions in which indoor connectivity can be treated as a standard building service rather than a bespoke project.

Summary of policy principles

1. Recognise indoor connectivity as a distinct infrastructure layer with its own regulatory framework, separate from outdoor network obligations.

2. Require fair, transparent and non-discriminatory access for independent infrastructure operators to MNO integration interfaces.

3. Establish defined timelines and escalation mechanisms to prevent operator coordination from blocking shared indoor deployments.

4. Update building regulations to require infrastructure readiness in new commercial construction and simplify indoor deployment across existing buildings.

Key points from this chapter

- Indoor connectivity requires a dedicated regulatory framework, not an extension of outdoor network policy.
- Fair access for independent infrastructure operators to MNO integration interfaces is a prerequisite for the neutral host model to function.
- Operator coordination must be time-bound and governed to prevent deployment bottlenecks.
- Building regulations should be updated to support indoor infrastructure readiness in new and refurbished commercial buildings.
- These measures are complementary to, not in conflict with, operators' existing commercial interests.

Conclusion

Indoor mobile connectivity has become a structural requirement across the full range of buildings where people live, work and interact.

Three compounding forces,

1. modern construction materials blocking outdoor signals,

2. 5G spectrum migrating to frequencies with weaker indoor penetration,

3. steadily rising performance expectations,

have made it impossible to treat indoor connectivity as a by-product of outdoor network deployment. Fewer than 5% of commercial buildings currently have purpose-built indoor infrastructure in place, and the operator-led model is not structurally suited to closing that gap. The incentive to invest sits with property owners; the responsibility for delivery has historically rested with operators whose business case is often insufficient.

Neutral host infrastructure is the practical and necessary response. It provides an independent infrastructure layer through which operators can extend service indoors efficiently and through which property owners can secure the connectivity their buildings require.

Structural independence is not incidental to the model, it is the reason the model works where operator-led approaches do not. From a regulatory perspective, the implication is clear: indoor connectivity must be recognised as a distinct infrastructure category, with policy frameworks that ensure fair access for independent providers, govern operator coordination obligations, and support scalable shared infrastructure through building regulation.

Central conclusion

Indoor mobile connectivity should no longer be treated as a secondary by-product of outdoor network coverage. It is core infrastructure for modern buildings, and it requires dedicated delivery models and a policy environment that enables them to scale.

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