

From Infrastructure to intelligence:

AI AND THE RISE OF SELF-AWARE NETWORKS

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MOST TELECOM OPERATORS WOULD AGREE THAT THEY HAVE NO SHORTAGE OF DATA AND REPORTS, BUT FEW WOULD SAY THEY CAN DO MUCH WITH THEM. AS NETWORKS GROW IN SCALE AND COMPLEXITY, THE GAP BETWEEN INFORMATION AND INSIGHT ONLY GETS WIDER — AND MORE DASHBOARDS WON'T CLOSE IT. WHAT'S NEEDED IS INFRASTRUCTURE THAT CAN INTERPRET WHAT IT SEES, HIGHLIGHT WHAT MATTERS AND INTERVENE BEFORE SMALL ISSUES BECOME EXPENSIVE PROBLEMS. WITH AI, WE'RE ALREADY STARTING TO MAKE SELF-AWARE NETWORKS A REALITY.

BREAKING THE CYCLE OF POOR DATA QUALITY

Across the fibre sector, critical network data remains fragmented, underused and riddled with inconsistencies. Construction photos, permit files, field notes, GIS designs and maintenance records are being generated in real time, yet they often end up in disconnected systems, rarely standardised and only occasionally reviewed.

The industry's data quality problem is making it difficult for operators to maintain an accurate network overview. For example, it's not unusual for a company to be unsure whether a cable runs above or below ground. Some still rely on third-party mapping tools; others send teams into the field to verify infrastructure that already exists. And even when information is captured, it's often logged in ways that make it hard to reuse, creating a cycle of deteriorating data quality.

The consequences are expensive, particularly when crews end up repeating work because of misinterpreted as-builts or incorrect service connections. Routine errors in fieldwork caused by poor data quality delay deployments, drive up rework costs, erode customer satisfaction and damage investor confidence.

GETTING THE BASICS RIGHT WITH AI

AI is already helping network operators improve data quality by focusing on the fundamentals: making sure what gets built in the field is accurately captured in the network model. For years, field teams executed tasks with little or no verification, allowing discrepancies to build up between what's recorded in the digital twin and what really exists on the ground.

Today, AI-powered computer vision technology is preventing this by ensuring fieldwork is completed as intended. Field workers take photos of assets they've installed, and AI checks those images against design specifications. Is the closure sealed properly? Are cables routed as expected? Has someone left litter in a cabinet? The goal isn't just error detection but closing the gap between the design and reality on the ground.

When fieldwork photos are uploaded to a network management system in real time, AI can also compare them against the system of record to see if there's a mismatch. Once issues are detected, AI flags the discrepancy and can either update the data automatically or have a human in the office review it. Each image becomes a verified snapshot of the network at the point it was last visited, showing which cables are plugged into which ports in a cabinet, the exact location of utility boxes, the condition of power lines, etc.

DRIVING OPERATIONAL INTELLIGENCE

Establishing a baseline for data quality is the prerequisite for generating actionable insight. Once they have an accurate digital twin, operators can move beyond just using AI to record what's happening — they can begin to capture data deterioration and plan strategies for mitigation.

The more field images network operators collect, the more capable image recognition models become at identifying early signs of degradation long before they cause service issues. Over time, AI will learn to rank these issues by maintenance urgency, expected lifespan or compliance risk. This will lead operators to prioritise work based on what's actually happening in the field, not what's pencilled into an inspection schedule.

As AI models become more embedded in day-to-day workflows, they also start closing the loop between analysis and action. If a fibre break is detected, AI can automatically reroute the service, generate field tasks, assign the right crew and make sure the necessary tools, training and certifications are in place. The result is faster repairs and a much lower chance of having to do the job twice.

TURNING DIGITAL TWINS INTO REVENUE ENGINES

The same AI capabilities that improve build quality and lifecycle management can also be applied to revenue growth. By layering commercial data onto a real-time view of the network, AI can help operators shift from managing infrastructure to monetising it.

Integrating geospatial, demographic and business data, AI can score near-net buildings based on proximity, serviceability and commercial value. This enables sales teams to target the right opportunities, while planning teams gain a clear view of where it makes sense to expand. Monetisation intelligence gives operators a dynamic model that continuously ranks opportunities based on real-world constraints like construction complexity and ROI.

FACING FAMILIAR HEADWINDS

Of course, the industry isn't there just yet. AI adoption in telecom still faces hurdles in legacy systems that silo data and make it difficult for AI models to access the complete picture. Organisational barriers add another layer of complexity, as planning, build and operations teams often work in isolation.

However, progress doesn't require grand reinvention. The operators moving fastest are starting small with use cases like image analysis, asset tagging and build verification. These targeted use cases demonstrate value quickly, build internal confidence and create a foundation for broader adoption. The key is to focus on what AI can improve today and build from there.

MOVING FROM INFRASTRUCTURE TO INTELLIGENCE

The telecom industry has long treated networks as static infrastructure: something to be designed, built, documented and maintained through manual oversight. AI fundamentally changes the rules of the game. It's enabling networks to become active systems in which infrastructure observes itself, learns from its environment and participates in its own optimisation.

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