Network Rail machine learning project forecasting

IMPLEMENTED 2020 ONWARDS · TRANSPORT AND LOGISTICS · UK · BAND D · CLAIMED ONLY

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Network Rail tested nPlan's machine learning forecasting on two large projects and in 2020 said it would roll it out to 40 projects, then all projects. Its reported result is a retrospective estimate of savings; results from the rollout are not reported.

ABOUT THIS SYNOPSIS

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Facts and figures are as reported by the sources listed below, which may be incomplete, self-reported or out of date. Check the original source before relying on any figure.

The impact band, proof marker and SEAM view are MarLuc's opinion. The organisation is not a MarLuc client and has not reviewed or endorsed this synopsis. Names and trademarks belong to their owners.

NOTICE WORDING LAST UPDATED 16 NOVEMBER 2026

AT A GLANCE

AI used: Machine learning (deep learning) forecasting of project schedules and risk, from nPlan.

Implemented: 2020 onwards. Grade: band D, Task support, Claimed only.

Headline result, as reported: Trial on two projects worth over £3bn found up to £30m of savings could have been made on one of them, by Network Rail's account (2020)

1 · The case

The facts, as reported by the 4 sources listed at the end. Where a source is silent, the field says "Not reported".

Organisation

Network Rail. Owner and operator of Britain's railway infrastructure, including 20,000 miles of track and 30,000 bridges, tunnels and viaducts. It manages and delivers thousands of projects a year in its Railway Upgrade Plan. Canvas block: 4. Operations and process. Also 6. Data and technology.

Business challenge

The challenge. Network Rail wanted accurate cost and time forecasts to reduce the risk of project overruns and improve reliability for passengers. The supplier argues that the established method, quantitative schedule risk analysis, gives generally inadequate results and takes ten

Who implemented it

nPlan (Software vendor): Supplied the machine learning forecasting and risk analysis software.

Technology (SEAM pillar E)

SEAM types: T8 Predictive / ML models. Deployment: Not reported. Vendors and products: nPlan, nPlan risk analysis and assurance.

Where it was built in: Applied to project schedules: the model learns from past projects by comparing planned and actual performance at activity level, then forecasts outcomes and flags risks to project teams.

What changed

Before: schedule risk assessed through quantitative schedule risk analysis, which relies on workshops and takes months, per ENR. After: machine learning forecasts from historical project data flag risks to project teams, by Network Rail's account. Whether the rollout reached all projects: Not reported. [1] [2] [3] [4]

What it cost

Not reported

What it saved

Retrospective trial estimate: savings of up to £30m could have been achieved on the Great Western Main Line, mainly by flagging unknown risks, by Network Rail's account. Construction Management called it a theoretical saving. Realised savings: Not reported. [1] [2] [3] [4]

Governance and control

Forecasts flag risks to project teams, who mitigate them. Network Rail's programme director (affordability) spoke for the partnership. Accountable owner, validation of forecast accuracy and review: Not reported.

S2 · Accountable owner · Not reported
Not reported.

A1 · Safe use · Not reported
Not reported.

A2 · Human in the loop · Claimed
Flagged risks go to project teams, who mitigate them before they occur, by Network Rail's account. [1]

A3 · Monitoring and assurance · Not reported
Not reported.

A4 · Vendor AI · Not reported
Not reported.

A5 · Agent controls · Not reported
No agents described.

A6 · Standards and regulation · Not reported
Not reported.

What worked, what did not, what is unproven

WORKED

– The trial flagged risks that project teams had not seen, by Network Rail's account.

– The Transpennine Route Upgrade said the tool let it analyse more schedules more often, which it said it lacked the resources to do with the established method.

DID NOT

– Not reported

UNPROVEN

– Whether the rollout reached all Network Rail projects by mid-2021.

– Realised savings or fewer overruns on live projects.

– Forecast accuracy, which no source opened reports independently.

Timeline

Oct 2020 Network Rail reports trial results and plans rollout to 40 projects, then all projects by mid-2021 [1]

Nov 2022 Transpennine Route Upgrade agrees a deal with nPlan for AI forecasting and risk management [4]

2 · Grade and SEAM assessment

MarLuc's opinion, made on the evidence above. How cases are graded: marluc.co.uk/case-studies/how-we-rate

Level of change and impact

Claimed: C. Grade: D, Task support. Proof: Claimed only. Level of change: Task support.

Task support (Level 1, band D), claimed as process change (band C). Forecasts inform project teams; no change in project outcomes is published.

Graded D, claimed C. The forecasts support project teams, who decide what to do about flagged risks. The trial result is a retrospective estimate, and no results from the wider rollout are published. A rail upgrade programme said it intended to replace its established risk method with the tool, which would be a process change if shown.

The SEAM view and lessons learnt

The design keeps people at the decision point: the model flags risks and project teams act on them. The gap is evidence. The headline saving is a retrospective estimate, and no later results are published. A larger organisation adopting predictive project tools should track forecasts against outturn on live projects before relying on them.

1. Track forecasts against actual outcomes on live projects.
2. Report realised savings separately from retrospective estimates.
3. Keep project teams accountable for acting on flagged risks.

Evidence

Score 1 of 4. Self-reported: Network Rail's announcement, and statements by the supplier and a programme client in trade press; no independent evaluation.

Evaluation method. Self-reported company figures: a retrospective trial on two projects, announced by Network Rail in October 2020.

Sources disagree. Network Rail says up to £30m of savings could have been achieved; Construction Management described it as a theoretical saving. Bent Flyvbjerg of Oxford's Saïd Business School told ENR that high-quality data helps de-bias projects, but that leaders also need ambition to beat the historical track record.

Status. Unclear: rollout to all projects was planned for mid-2021; no later Network Rail results found in sources opened. The Transpennine Route Upgrade agreed a deal with nPlan in 2022.

3 · Original sources

Read these in full. To challenge a fact or a grade, use the contact form at marluc.co.uk or the link on https://marluc.co.uk/case-studies/network-rail-nplan-project-forecasting

[1] Network Rail: Network Rail using innovative technology to transform project planning and delivery (October 2020)
https://www.networkrailmediacentre.co.uk/news/network-rail-using-innovative-technology-to-transform-project-planning-and-delivery

[2] Construction Management: Machine learning identifies £30m saving for Network Rail (October 2020)
https://constructionmanagement.co.uk/machine-learning-identifies-30m-saving-network-rai/

[3] ENR: nPlan promises better risk management through AI for $11B UK rail project (November 2022)
https://enr.com/articles/55472-nplan-promises-better-risk-management-through-ai-for-11b-uk-rail-project

[4] KHL Construction Europe: UK rail turns to artificial intelligence (November 2022)
https://www.khl.com/news/uk-rail-turns-to-artificial-intelligence/8024457.article

Network Rail website: https://www.networkrail.co.uk

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