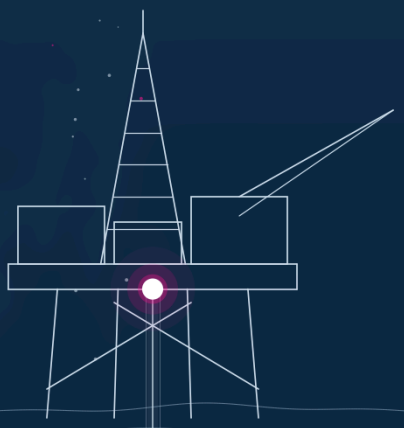
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Your asset has been teaching you for years how to optimize your production.

Before asking AI to help you, make what you know usable by AI.

This is not another paper about how AI can help your oil and gas production.
It is about what you must do to help AI optimize it for you.

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Before Asking AI to Help You, make What You Know Usable by AI.

Massimo Virgilio | MVC

- **This paper is not about how AI can help you. It is about how you must help AI so it can help you optimize your Oil and Gas production.**
- **Your asset has been teaching you for years.** Operating changes, interventions and failures contain evidence for better decisions.
- **That evidence remains fragmented.** Knowledge is scattered across systems, applications, documents and disciplines.
- **Digital transformation makes it usable by AI.** Make information accessible with its context intact, and expose the engineering tools needed to test hypotheses.
- **Value comes from validated action and learning.** Engineers assess proposed changes; operating teams execute them and measure the results.
- **Look inside first.** Before seeking another external answer, unlock the knowledge your company already owns.

1. The Production Paradox

You can buy a more capable AI or commission another study. But can either use the production knowledge your company already owns?

Can AI retrieve why a choke setting was changed, whether the gain lasted and which facilities conditions applied? Can it connect a failed intervention to the diagnosis that justified it? Can it distinguish a physical production loss from a change in allocation? Can it call the engineering calculation needed to test a proposed explanation? If those steps depend on searching folders, reopening isolated applications and finding the engineer who remembers, the limitation is not simply the intelligence of the AI. It is the environment your organization has given it.

The field has been teaching your company for years. Wells have been tested, pumps adjusted, injection redistributed and interventions executed. Engineers have built models, tested explanations and documented outcomes. You paid for that experience through studies, operating expenditure, downtime and failed attempts as well as successful ones. Yet much of it remains unavailable as a connected body of knowledge.

This is not an invented software problem. Sankaran and colleagues describe limitations of siloed analytical tools and personal spreadsheets, and report an integrated surveillance deployment across deepwater assets [1]. The production paradox is that an extensively observed asset can remain poorly understood collectively. AI does not remove that paradox merely by becoming more capable.

AI cannot investigate histories it cannot reach, connect records whose meaning it cannot establish, or test hypotheses with engineering tools it cannot invoke. Missing access, context and interfaces are problems for you to address through digital transformation.

The examples that follow show what this requires: accessible information with its meaning intact, controlled access to engineering calculations, and people accountable for decisions and outcomes.

Before asking AI to optimize your production, make the knowledge and engineering tools it needs accessible and usable.

2. Your Asset as a Living Experiment

Every producing asset accumulates observations about its own behaviour. A choke change alters the operating point. An injection change may be followed by a pressure or fluid response. A workover changes a completion. A pump adjustment changes lift conditions. A shutdown and restart reveal behaviour that steady operation may conceal.

These episodes make the asset a living experiment, but not a controlled one. Several conditions can change together. A production gain following a workover may coincide with lower separator pressure. An apparent decline may reflect revised allocation rather than a physical loss. An injection response can be obscured by simultaneous changes in producer controls. Before-and-after comparison alone cannot establish causation: the causal-inference literature distinguishes the observations available from the assumptions required to infer the effect of an action [2].

Consider a well with declining liquid rate and increasing pump power. The current trend suggests a problem but does not identify it. Earlier episodes, fluid measurements, pump operating records, maintenance reports and well tests may help distinguish competing explanations. A validated engineering calculation can then test whether a proposed operating change is physically credible.

Likewise, an intervention described as successful because of its initial peak rate may have delivered little sustained value after downtime, cost and subsequent decline are considered. An unsuccessful treatment may contain the strongest warning against repeating it on a similar completion.

Experience is not automatically organizational knowledge. Argote and Miron-Spektor frame learning through the interaction of experience and organizational context [3]. The production implication is to retain reasoning and conditions alongside results.

If operating changes, conditions and outcomes remain disconnected, your asset keeps teaching lessons your organization cannot reliably reuse.