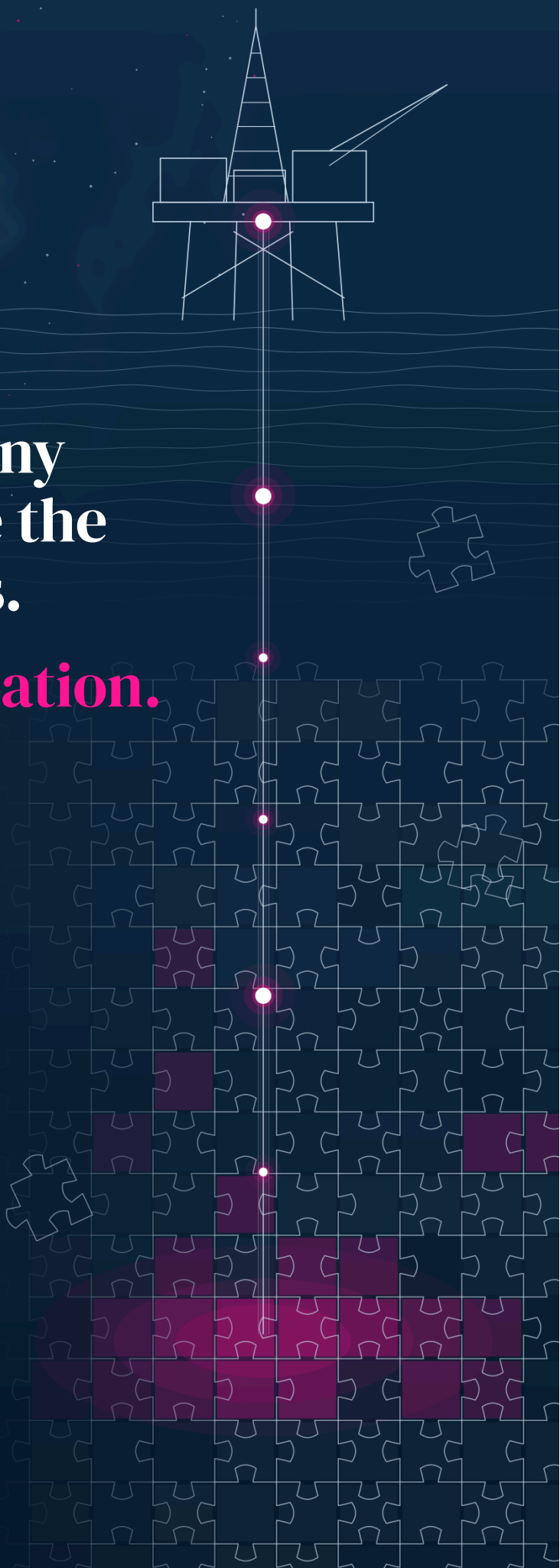
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You Already Know Where the Next Discovery Is

Allow AI to Finish the Puzzle Before You Buy Another Box

Massimo Virgilio | MVC

Abstract

Your company believes there is more oil and gas to discover. It has to. If the remaining exploration potential were negligible, the rational response would not be to improve exploration; it would be to stop exploring. The continued existence of exploration portfolios, acreage positions, seismic programs and exploration wells therefore rests on a simple premise: material discoveries remain to be made.

At the same time, the basins in which those discoveries will be made are not blank spaces. They have been observed for decades. Seismic has been acquired and reacquired. Wells have been drilled. Gravity and magnetic data, electromagnetics, remote sensing, deformation measurements and geochemical observations have been acquired. Geological studies, petrophysical analyses, basin models, interpretations and previous decisions have accumulated. Operators have entered and exited. Licences have been relinquished. Partners and competitors have generated information that later became public, tradable or otherwise accessible. The quality, density and relevance vary enormously, but the important point remains: the exploration world is already heavily observed.

Put those two statements together. There are discoveries left, and many of the places containing them have already been observed in one form or another. On the Norwegian continental shelf, for example, the Norwegian Offshore Directorate estimates that 22% of total resources remain undiscovered, with 60% of those undiscovered resources in areas already open for petroleum activity.[1] The uncomfortable consequence is that some of the evidence associated with future discoveries may already have been acquired. Your company may own part of it. It may have inherited part of it. A former operator or competitor may have acquired another part that is now accessible. Some may sit in public repositories.

But the next discovery is probably not sitting intact in a forgotten folder waiting to be found. Think instead of a puzzle whose pieces have been accumulated for decades and scattered across thousands of boxes. One piece is a seismic observation. Another is an old well result. Another is a pressure anomaly, a regional study, a discarded interpretation, a relinquishment report, a production analogue or an assumption embedded in a presentation written fifteen years ago. Some pieces are internal. Some are external but reachable. Some were rejected because the picture imagined at the time was different. No individual piece contains the discovery. **The discovery is the picture that may emerge when the right pieces are finally assembled.**

And yet, when the picture remains incomplete, the exploration reflex is often to buy another box of pieces: another seismic survey, another dataset, another study, another measurement. Sometimes that is necessary. But buying more pieces before understanding what can already be assembled from the pieces you possess is not automatically better exploration. It can simply make the pile larger.

Artificial intelligence changes what is possible. It can search, retrieve, compare and correlate information at a scale no exploration team can reproduce manually. Increasingly, AI agents can move beyond retrieval: they can query databases, read technical documents, call APIs and deterministic scientific engines, execute defined workflows, test relationships, expose contradictions and iterate from one question to the next.

But this is not another paper about what AI can do for exploration. **It is about you and what your company must do before AI can do it.** AI cannot assemble pieces it cannot reach, understand or use. If data remain fragmented across databases and documents, if interpretation context remains trapped in specialist applications, and if scientific engines and workflows remain accessible only through human-operated interfaces, then a more capable AI simply becomes a better puzzle solver staring at locked boxes.

This is why digital transformation is the subject of this paper. In particular, the transformation of **data and application workflows**. Data must be liberated, abstracted and connected so that information can be discovered with context, semantics and provenance. Applications must stop being isolated destinations and expose the data, functions, calculations and scientific engines that AI agents and people need to invoke across workflows. Digital transformation puts the pieces on the table and makes the tools usable. Only then can AI help assemble the picture.

The provocation is therefore not “invest in AI.” It is more demanding: **transform the digital environment in which AI is expected to operate. Before you buy another box of data, make it possible for AI to work properly on the puzzle you have already paid for.**