

Towards Creativity Measurement in the Energy Industry

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Abstract. Creativity plays a critical role in how companies manage and strategically reposition during periods of change, including the current digital transformation and energy transition in the energy industry. However, a holistic framework is absent to systematically exploit ideas, evaluate and prioritize competing ideas with limited resources, and turn ideas into valuable and marketable products. Thus, companies need to be able to measure their creative ideas so that resources and R&D investments are far more effective. We implemented a new matrix-algebraic framework called Quantitative Creativity Scores (QCS) to evaluate innovative ideas and identify areas we need to improve to stay competitive. Specifically, we adapted the feature-attribute creativity matrices to represent innovative ideas. We then applied the idea operators, which use matrix-expressed ideas as operands, to calculate the quantitative creativity scores. Significant research has been conducted in salt body detection from seismic data, a vital task in hydrocarbon exploration and storage detection of new energy vectors like hydrogen. There has been a significant amount of research conducted in this area, making it a challenging topic for innovative research and development. We applied this QCS evaluation framework to evaluate two real-world novel salt-body detection workflows. Through this assessment, we can compare, evaluate, and quantitatively calculate which idea has the most potential for success and leverage the existing knowledge to drive further innovation. Our results demonstrate that this approach allows us to generate and evaluate new ideas in a repeatable and reproducible way, which can help us to identify and pursue creative ideas to exploit their market potential fully.

Keywords. Creativity; creativity management; creativity and novelty measurement; matrix-algebraic method.

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