Reinventing Quality Problem Solving in the Manufacturing Industry: A Scoping Review of Traditional Approaches' Limitations

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Abstract. Quality problem solving is a key factor in industrial performance. However, despite the widespread use of traditional quality problem solving approaches, they remain insufficient in addressing the evolving requirements of the manufacturing industry. This scoping review, conducted in accordance with PRISMA-ScR guidelines, examines these approaches within the manufacturing context. A systematic search of relevant databases covering the period 2018-2024 initially retrieved 304 papers, of which 12 were selected after applying inclusion and exclusion criteria. The analysis highlights recurring limitations of traditional approaches, including insufficient knowledge capitalization and transfer, cognitive biases and subjectivity, slowness and operational inefficiency, difficulties in managing multiple problems simultaneously, and weaknesses in causal analysis. In light of these findings, this study proposes an AI-driven framework to overcome these limitations, providing both practical and academic value for advancing quality management in industry.

Keywords. Quality problem solving, Root cause analysis, Quality management, Manufacturing