

Preliminary Multi-Criteria Evaluation of Assessment Methods and Tools for the Digital, Open, and Sustainable Transformation of Manufacturing Enterprises*

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Abstract

In the face of dynamic technological, environmental and social changes, manufacturing companies are faced with the need to transform towards digitalization, open innovation and sustainable development. Despite the growing number of tools supporting this process, there is a lack of a comprehensive analysis of their usefulness in various transformation paths. The article fills this gap through a multi-criteria assessment of available methods and tools, enabling companies to better select solutions tailored to their needs. The study uses a comparative analysis based on seven criteria: effectiveness, usability, costs, flexibility, technical support, availability and available additional resources. Each criterion was assigned a weight reflecting its importance to the organization. The results indicate that the tools for assessing digitalization are characterized by the highest effectiveness and usefulness, with the best rated ones being, among others, "Fraunhofer IPK" and "Industry 4.0-Readiness". In the area of open innovation, the "100%Open - Open Organisation test" tool stands out, while in the area of sustainable development - "Fachcheck Nachhaltigkeit" and "SME Compass". Overall, sustainability tools received lower ratings, mainly due to limited flexibility and support. The study provides a basis for further analyses aimed at defining the strategic orientation of individual tools, which will enable them to be better adapted to the specifics of manufacturing companies.

Keywords: digitalization, open innovation, sustainability, manufacturing