

Response to the Reviewers to the Report on applsci-3620702

Title of the paper: applsci-3620702: Artificial Intelligence adoption in SMEs: A TOE–DOI Framework for Strategic Challenges and Actionable Pathways (E Sánchez, R Calderon and F.Herrera).

The main changes introduced in the new version of the paper are the following ones:

- We have updated the review nature of the paper in title, abstract and introduction. New title *“Artificial Intelligence adoption in SMEs: Survey based on TOE–DOI Framework, primary Roadmap and Challenges ”*
- We have added a new subsection 3.5 *“ Case of analysis: Comparative Firm-Size Dynamics in AI Adoption using TOE”*.
- We have included *Figure 1. Illustrative AI Adoption Process in SMEs (TOE–DOI Aligned)*.
- We have added a new section 4 *“Empirical Insights from Sectorial and Regional and Studies”*.
Section 4 shows an empirical view, focusing on recent empirical studies in diverse regional and sector contexts to enhance the practical foundation.
- We have extended the new section 5.9 (previous 4.9) *“5.9. Strategically Leveraging Generative AI to Democratize Capabilities and Drive Innovation: Open-weight LLM Adoption.”* The current description is wide and covers all the discussed points by reviewers and provides complete information for their use.
- We have added a new section 6 *“6. Structured Primary Roadmap for Effective AI Adoption in SMEs”*, extracting previous subsection 4.11 to present a new section with a primary Roadmap, including the *Figure 2. AI Adoption primary Roadmap for SMEs*, to show it graphically.
- Section 7, *“7. Discussion: Lessons Learned, Limitations and Future Research Directions”*, has been reorganized as two subsections with enumerated points.
- Section 8, *Conclusions*, has been rewritten, reflecting the current content.

The changes in the paper are written in blue color.

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REVIEWER 1

RV: Reviewer
AA: Author Answers

RV: The article appears more like a review paper rather than an empirical research study. It would be advisable to clearly state this at the beginning of the work and possibly expand the analysis with empirical studies or practical cases that include quantitative data.
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AA: We have updated the title, abstract and introduction to reflect this approach as review.

We have expanded the analysis with the new section 4.
4 “*Empirical Insights from Sectoral and Regional and Studies*”.

RV: The article lacks sufficient graphical material. It is recommended to add visualizations such as:

- Diagrams of AI implementation processes, indicating key stages and obstacles.
- Comparative tables with quantitative performance indicators for different AI technologies and implementation approaches.
- Graphical schemes illustrating the integration of the TOE–DOI model into specific business processes.

AA: We have included two figures for sections 3 and new section 6 to provide this visualization.

The tables reflect a summary of sections.

Quantitative performance indicators have been introduced in new Table 1, new section 4.
Table 1. Summary of Empirical AI Adoption Studies in SMEs with Quantitative Indicators

RV: The number of analyzed studies is insufficient. It is recommended to expand the range of empirical studies reviewed and analyze their outcomes more thoroughly. Include additional examples of successful and unsuccessful practices with quantitative performance indicators to enhance the practical applicability of conclusions.

AA: As we have mentioned

We have added Section 4, “*Empirical Insights from Sectoral and Regional Studies*,” which presents recent empirical evidence across various sectors and regions to strengthen the paper’s practical foundation.

Table 1 highlights variations in AI adoption strategies and presents quantitative indicators such as productivity gains, revenue increases, or ROI improvements—offering strong support for the practical relevance of the proposed framework.

RV: Quantitative characteristics: To better understand future development prospects, it is advisable to present quantitative assessments of existing solutions' effectiveness, such as productivity growth rates in enterprises following AI implementation, cost reductions, and ROI indicators.

AA: Current new section 4 introduces the recent studies and Table 1 a summary of them, including quantitative characteristics.

The studies analyze various geographic regions, including Europe, Asia, Africa, and America, and cover a diverse range of sectors such as manufacturing, finance, retail, and sustainability-focused companies. This comparative summary draws attention to the specific technological, organizational and environmental dimensions emphasized by the TOE–DOI framework, while also illustrating how enablers and barriers manifest themselves across different economic and regulatory landscapes.

Each row in the table highlights key insights derived from regional and sectoral studies, *”including practical outcomes such as increased productivity, increased revenue growth, or improvements in sustainability. Several entries incorporate quantitative performance indicators, such as variance explained in strategic models or percentage gains in efficiency, thus reinforcing the external validity and applicability of the proposed framework”*. The table also captures the variation in adoption strategies, ranging from modular deployment and ecosystem collaboration to skills development and leadership-driven transformation. This comparative layer is intended to guide policymakers, practitioners, and researchers in designing more context-sensitive and scalable approaches to AI integration in SMEs.

We hope this regional and by sector study reflects the requirement.

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RV: Conclusion: The article can be recommended for publication after addressing these recommendations, particularly by expanding the empirical base and strengthening the visual representation of the material.

AA: We have followed the recommendations of the reviewer. Thanks to the positive suggestions, the paper has been improved considerably.

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