

EXPECTED OUTCOMES AND CONTRIBUTIONS - THE AGILE-AI-DIGITAL TRANSFORMATION PIPELINE

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Abstract.

Most studies examine Agile, AI, and Digital Transformation as parallel-independent phenomena, overlooking their sequential interdependence. No prior study has tested all three as a causally ordered pipeline culminating in Environmental Sustainability Performance within a single integrated SEM framework. The moderating role of Digital Leadership within this pipeline has received very limited empirical attention (Reyna-Vargas, 2024).

The nexus of digital innovation and environmental responsibility is one of the most strategic issues facing organizations in the 21st century. Pressured by mounting pressures related to climate change, resource exhaustion, and increasing regulations, global organizations are shifting from merely 'symbolic sustainability commitments' to tangible and operational green performance (Iqbal & Ahmad, 2021; Martens & Carvalho, 2017). However, there has always been and will continue to be a notorious and consistent "intent-practice" gap: the gap between green strategies that are designed at the organizational level, and the actual environmental outcomes at the operational level. Three forces that appear especially salient include Agile practice, Artificial Intelligence (AI) capabilities, and Digital Transformation (DT).

Key words:

Agile practices, AI capabilities, digital transformation, environmental sustainability, digital leadership,

This research builds upon the dynamic capabilities theory to identify and empirically test sequential causal chain: Agile Practices, AI Capabilities, Digital Transformation, Environmental Sustainability, Performance in one PLS-SEM model and assesses the measurement model for each construct (Outer Loadings, CR, AVE, HTMT).10 Practical contribution. The research develops recommendations for managers and policy-makers concerning the effective sequence of the application of Agile practices, development of AI capabilities, investment in the digital transformation, and its eventual generation of measurable environmental performance benefits.

For managers and project leads.The ordering of the Agile AI DT ES pipeline carries practical implications for management. Investing in the development of Agile culture (iteration, retrospectives, self-organizing teams) before investing in AI development is essential to successful implementation. AI initiatives, if implemented prior to the establishment of an Agile framework will be largely ineffective. Investment in the development of digital transformation capabilities within an organization will then lead to a tangible positive impact on the environment.

For policy makers.Investment in the digital transformation, when preceded by the establishment of the Agile and AI capabilities, will lead to significant positive environmental performance changes ($f = 0.361$). Frameworks for policy will be most effective when they promote the adoption pathway rather than investment of each technology individually.

For survey researchers. The detection of the redundancy of the ES item pair is a good indication of the need to always check the raw data from any online survey company prior to the analysis. With only a simple inter-item correlation check prior to the data analysis, one would be able to discover the data duplication immediately. It should become a routine for any researcher running PLS-SEM or any factor analysis to check the presence of pairs of items correlated at $r=1.000$ as part of an initial data screening quality check.

The current study had 4 limitations, which can also be regarded as avenues for future research.

ES measurement. It is noted that using the 2-item ES scale was not ideal even though acceptable CR and AVE was achieved. Future research should test the 5-item ES scale which is given in Annex 1 and test if all the items load properly before drawing the conclusions for H3, H5, H6 and H7.

AP and AI convergent validity. Since AVE values were below 0.50 for Agile Practices and AI Capabilities, any findings regarding AP and AI should be considered as preliminary. The full set of plain language items as presented in Annex 1 should be used for future study and ensure outer loadings to be > 0.70 before conclusions are drawn regarding the variables.

Moderation (H6). As the moderating role of Digital Leadership did not gain support in the current data wave. It is suggested for future research to: (a) use the full 5-item ES scale, (b) test the use of observer rated digital leadership items to mitigate self-reported bias, and (c) target a much larger sample, as moderation is usually associated with higher power requirement than main-effects tests.

Cross-sectional design. The present research uses cross-sectional data and consequently the causality could only be tested as far as SEM path analysis allowed. Testing a longitudinal model of the Agile AI DT ES pipeline would give more definitive results.

Adabiyotlar, References, Литературы:

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