Agile Methodologies as Drivers of Organizational Culture in Digital Transformation Projects

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Abstract. Organisations are increasingly adopting agile methodologies to accelerate digital transformation, yet outcomes remain inconsistent when agile is viewed solely as a delivery technique rather than a cultural mechanism. This study explores how agile practices influence organisational culture during transformation and identifies the conditions under which benefits are realised. Using an explanatory mixed-methods design, the study combined a survey (N = 315) with 18 semi-structured interviews. After ensuring scale reliability, bivariate correlations and linear/multiple regressions were conducted in IBM SPSS, while interview transcripts were thematically coded to explain the quantitative findings. Agile practices were positively linked to a supportive culture (Pearson r ≈ .32), with simple regression indicating that agile significantly predicted culture ($R^2 ≈ 0.10$). A multiple regression predicting digital-transformation outcomes from agile and culture revealed a significant model ($R^2 ≈ 0.40$), where agile was the stronger predictor and culture made a smaller yet meaningful contribution. Qualitative insights highlighted how cadence, visibility, and iteration normalised collaboration, transparency, and rapid feedback. Practically, managers should focus on culture outcomes in agile roadmaps, institutionalise essential routines, and reduce structural hand-offs for sustained transformation.

Keywords: Agile methodology, Digital transformation, Organisational culture, Agility, Digital culture

1. INTRODUCTION

Agile methodologies provide a disciplined way to manage the uncertainty of digital transformation (DT) by decomposing work into short, iterative increments that raise adaptability, visibility, and responsiveness to market change [1]. DT refers to the strategic use of digital technologies to reconfigure processes, structures, and value delivery across the enterprise, not only the technology stack but also the operating model and ways of working [2], [3], [4]. Because DT spans systems, processes, and people, outcomes depend as much on organizational culture as on tools and platforms.

Prior work shows a reciprocal relationship between DT and culture: transformation efforts reshape norms and routines, while pre-existing norms can either enable or constrain adoption [5], [2]. Programs underperform when organizations emphasize tools and roadmaps but neglect cultural alignment, role clarity, and learning mechanisms. Effective agile implementation therefore requires a shift in shared mindsets and routines (cadence, transparency, feedback) supported by training and structures that remove hand-offs and bottlenecks [6], [7]. At the same time, legacy governance, sequential approvals, and fragmented systems remain common obstacles, especially in medium-to-large organizations operating at scale [8], [4], [2].

Empirical studies link agile practices with collaboration, time-to-market, and perceived quality improvements [9], [7], while cultural factors such as openness and learning orientation are frequently cited as enablers of DT success [4], [10], [11]. However, three gaps persist: (i) agile is often treated primarily as a delivery technique, with limited quantification of how agile practices predict cultural conditions; (ii) few studies model agile and culture together as predictors of DT outcomes using parsimonious, practitioner-oriented analyses outside full SEM; and (iii) there is limited mixed-methods evidence explaining how day-to-day routines (cadence, visibility, iteration) translate into cultural change in medium-to-large organizations.

Accordingly, this study (1) quantifies the association between agile practices and organizational culture, (2) estimates the joint predictive power of agile and culture on DT outcomes using interpretable regression models, and (3) triangulates the statistics with thematic insights from interviews to explain mechanisms and boundary conditions in real

Vol. 7, No. 4, December 2025

ISI *Journal of*
Information Systems and Informatics

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organizations. The focus on medium-to-large organizations improves external validity for settings where scale, governance, and inter-team dependencies complicate adoption.

South Africa's diverse workforce and the need to bridge historical inequalities make the adoption of Agile and digital practices especially significant. Embracing these approaches can advance greater inclusivity, collaboration, and skills development, which are vital for harnessing the country's full potential. As organizations in South Africa strive to compete both locally and globally, there is a strong demand for increased adaptability, innovation, and customer-centric approaches and all these are core tenets of Agile methodologies. Furthermore, South Africa's journey with Agile and digital transformation provides valuable insights into how organizations can leverage modern methodologies to drive sustainable change in complex and dynamic environments. The remainder of the paper reviews related literature, details the mixed-methods design and measurement, reports quantitative and qualitative findings, and concludes with practical recommendations, limitations, and avenues for future research.

2. METHODS

2.1. Design and rationale

A convergent mixed-methods design was used: a quantitative survey provided the primary evidence and semi-structured interviews supplied explanatory depth. This design allows estimation of the strength of associations among agile practices, organisational culture, and digital-transformation (DT) outcomes while explaining the mechanisms through which cadence, visibility, and iteration reshape day-to-day behaviour in medium-to-large organisations. Analyses were conducted in IBM SPSS v30 to produce reliable composite scores and interpretable effect sizes with full diagnostics (coefficients, confidence intervals, assumption checks). Structural equation modelling is reserved for future work when larger multi-organisation samples permit latent/path models with formal fit testing.

2.2. Research Design and Steps

Figure 1 presents the research design, outlining both qualitative and quantitative phases over six steps. Qualitative data was collected using questionnaires and surveys, then analyzed after sampling and consolidated into findings. Additionally, semi-structured

interviews contributed further qualitative perspectives, which were coded, analysed, and integrated. Once all results were combined, the researcher interpreted the overall findings.
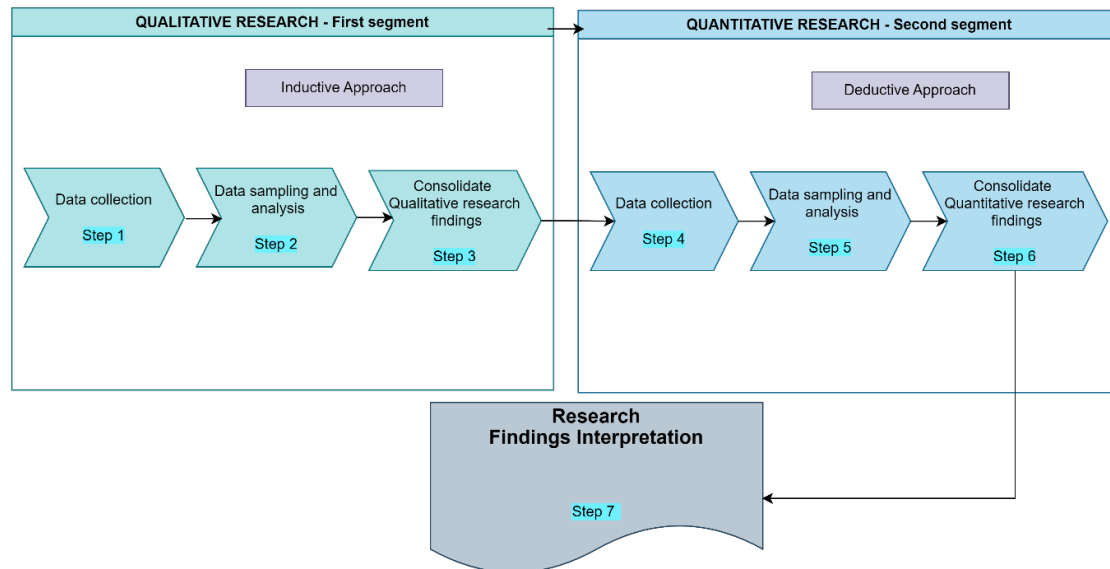

Figure 1. Overall research design / steps

2.3. Setting, sampling, and participants

The sampling frame comprised software firms and IT functions in non-IT firms that had undertaken agile-enabled DT and employed ≥100 staff. Eligible respondents had ≥3 years' exposure to agile or DT. Roles included executives, senior managers, sponsors, project/programme managers, business analysts, architects, software engineers and key users. Data were collected electronically over three months: 397 questionnaires were distributed and 315 complete responses retained (usable response ≈79%). In parallel, 18 interviews were conducted; saturation was reached by the ninth interview and later interviews were used to test theme stability.

2.4. Instrument and measures

The questionnaire contained demographics (education, type of industry, size of the organisation, position or role, agile methodology experience in years and overall IT experience in years), followed by Likert-scale blocks derived from peer-reviewed literature on agile practice, culture and DT. Item pools covered: (i) agile practices (iteration, transparency, collaboration, customer focus, responsiveness); (ii) culture

(cultural shift with agile/DT, alignment, recognition, openness, communication, learning); and (iii) DT outcomes (responsiveness/time-to-market, perceived quality, customer value).

2.5. Reliability analysis

Internal consistency was screened with Cronbach's α, supported by corrected item–total correlations and "α if item deleted," with $α ≥ .70$ as the adequacy threshold. Core scales met or exceeded this criterion (e.g., culture principles $α ≈ .89$; agile practices $α ≈ .73$; culture-support factors $α ≈ .71$). The results, presented in Table 1, show that the overall questionnaire achieved a Cronbach's Alpha value of 0.91 and a standardised value of 0.92 across all 73 items. This demonstrates excellent reliability and internal consistency, confirming that the items were cohesively structured and consistently measured their intended variables.

Table 1. Overall reliability statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.911	.916	73

In addition to the overall reliability, the internal consistency of each construct was examined individually. Table 2 shows the Cronbach's Alpha coefficients for the four major constructs. The Agile Impact construct obtained an alpha of 0.74, indicating acceptable internal consistency. The Culture construct achieved a coefficient of 0.86, which is considered good, while Digital Transformation Success produced a coefficient of 0.70, also regarded as acceptable. Lastly, Leadership Total achieved a Cronbach's Alpha of 0.82, which demonstrates good reliability. Collectively, these values confirm that all constructs exceeded the minimum threshold of 0.70, thereby meeting the standard for reliable measurement in social science research.

Table 2. Cronbach's Alpha coefficients for the four major constructs

Construct	Cronbach's Alpha	Cronbach's Alpha (Standardised Items)	No. of Items	Interpretation
Agile Impact	0.74	0.74	8	Acceptable
Culture (All)	0.86	0.82	25	Good
Digital Transformation Success	0.7	0.7	8	Acceptable
Leadership Total	0.82	0.81	31	Good

Construct	Cronbach's Alpha	Cronbach's Alpha (Standardised Items)	No. of Items	Interpretation
Overall Instrument	0.91	0.92	73	Excellent

2.6. Validity analysis

Construct validity was examined using exploratory factor analysis (Principal Axis Factoring, Oblimin rotation). Factorability was confirmed via KMO and Bartlett's tests; items with loadings ≥ .40 and minimal cross-loadings were retained. Composite scores were computed as means of retained items: Agile_Practices, Culture_Mean, and DT_Outcome_Index, as shown in Table 3.

Table 3. KMO and Bartlett's Test of Sampling Adequacy

Construct	KMO	Bartlett's Test Sig.	Interpretation
Agile Impact	0.751	< 0.001	Adequate sample adequacy; valid for factor analysis
Culture	0.892	< 0.001	Excellent adequacy; strong correlations
Leadership	0.842	< 0.001	Good adequacy; consistent factor structure
Digital Transformation Success	0.807	< 0.001	Adequate adequacy; reliable factor structure

The results of the KMO and Bartlett's tests are summarised in Table 3.1, which shows that all constructs exceeded the minimum threshold of 0.70, confirming that the dataset was appropriate for factor extraction. Bartlett's Test was significant ($p < 0.001$) for all constructs, meaning that sufficient correlations existed among items within each construct.

2.7. Quantitative analysis and diagnostics

Analyses progressed from descriptives and bivariate correlations to regression aligned to the research questions. For RQ1, Culture_Mean was regressed on Agile_Practices to estimate the extent to which agile predicts cultural conditions. For the DT model, DT_Outcome_Index was regressed on Agile_Practices and Culture_Mean to assess their

joint and unique contributions. Assumptions were checked using residual histograms and Normal P–P plots (normality), standardised residuals vs. standardised predicted values (homoscedasticity), variance-inflation factors (multicollinearity; all VIF < 5), and Cook's distance (influence; all < 1).

2.8. Qualitative strand and integration

Interview transcripts were analysed thematically using a hybrid approach: deductive codes aligned to the three constructs (agile routines, culture, outcomes) and inductive codes captured emergent patterns. Constant comparison and an audit trail supported trustworthiness. Integration occurred at interpretation, using interview themes to explain statistical patterns (e.g., weaker and later-emerging cost effects, the role of leadership modelling and structural frictions).

2.9. Ethics

Ethical clearance was granted by the University of South Africa (Faculty of Science, Engineering & Technology). Participation was voluntary under informed consent; data were anonymised, stored securely, and findings are reported in aggregate.

3. RESULTS AND DISCUSSION

3.1. Descriptive statistics and respondent profile

This section reports the descriptive patterns from the survey (n = 315), followed by correlational tests and regression models aligned to the study objectives. Where relevant, effect sizes and model diagnostics are interpreted to avoid over-reliance on significance alone. Respondents were drawn largely from large organisations (≈91%) across multiple industries, with notable representation from government/parastatals and technology. Most had substantial exposure to agile (typically 5–15 years) and to the IT domain (10–20 years), indicating an experienced sample capable of evaluating agile and transformation practices.

3.2. Perceived relationship among agile, culture and digital transformation

Across items, agreement clustered at the top two response categories, indicating strong endorsement that agile adoption interacts with organisational culture and supports

digital transformation. The relationship among agile, culture and digital transformation as shown in Figure 2.
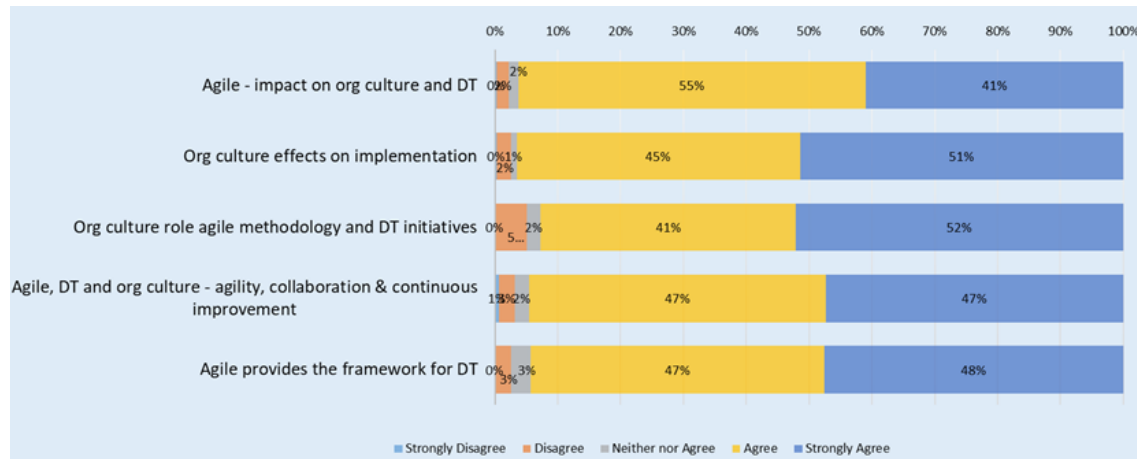

Figure 2. Perceived DT outcomes (% Agree/Strongly Agree). Higher endorsement for responsiveness and quality than cost reduction (n = 315).

Perceptions of DT outcomes are summarised in Figure 1. Participants consistently reported that culture shapes agile utilisation and, reciprocally, that agile routines reinforce collaborative and learning norms that underwrite transformation. These perceptions are visible in Figure 1, with text emphasising that agile, culture and digital transformation operate as a mutually reinforcing system rather than isolated levers.

3.3. Cultural shifts observed during agile adoption

Findings indicate that effective agile implementation coincides with cultural shifts towards openness to change, visible work, cross-functional dialogue and continuous learning. Agreement was highest for the need to assess and adapt culture, and for the importance of training and structure alignment, confirming that culture is not a by-product but a prerequisite and pathway for realising agile benefits.

3.4. Agile's reported impact on transformation outcomes

Participants affirmed that agile improves transparency of work in progress, speeds feedback, increases responsiveness to market shifts, and enhances perceived product quality; cost reduction, while positive, showed comparatively lower endorsement, consistent with efficiency gains emerging after flow stabilises. This pattern informs the later effect size discussion and the policy implications.

3.5. Correlation analysis (Agile ↔ Culture)

Bivariate tests showed a positive association between agile practices and organisational culture (Pearson r ≈ .32, two-tailed p < .001), with a smaller but significant Spearman coefficient, supporting robustness to mild non-normality. Substantively, higher adoption of agile routines co-occurs with stronger cultural attributes of collaboration, transparency and learning orientation. The positive association is illustrated in Figure 3. Effect-size view, an r around 0.32 is moderate, signalling practically meaningful but not exclusive dependence appropriate given culture has multiple antecedents.
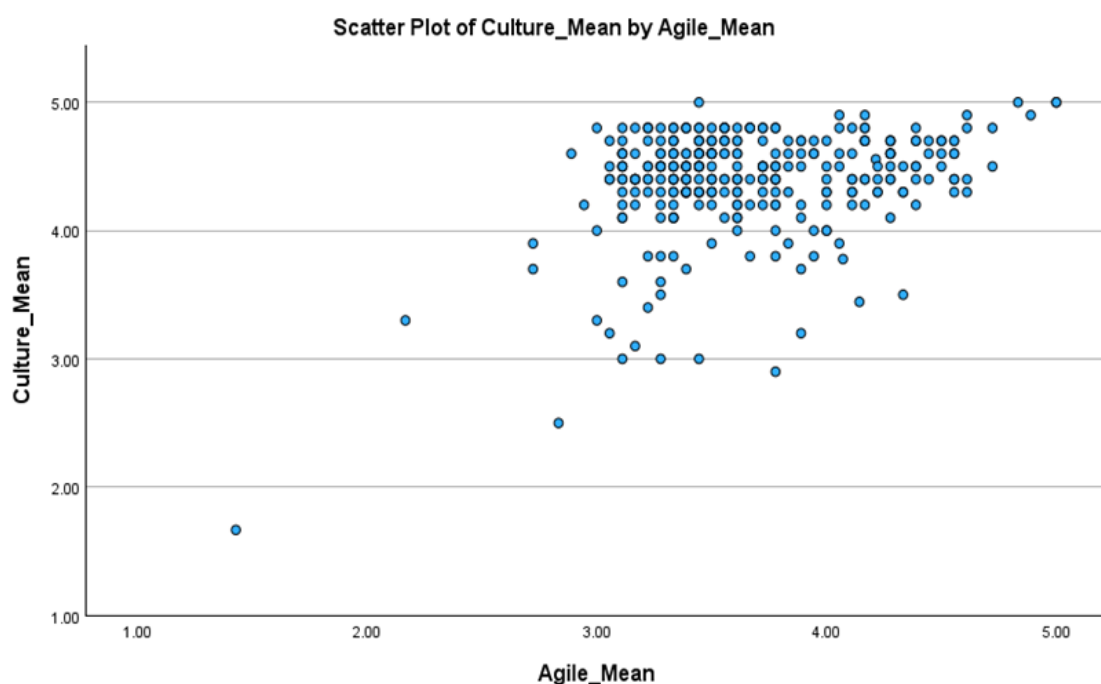

Figure 3. Culture composite plotted against Agile composite (n = 315); positive trend consistent with r ≈ 0.32.

3.6. Simple regression (Agile → Culture)

A linear regression model with Culture as the dependent variable (DV) and Agile as the independent variable (IV) was significant (F(1,313) ≈ 36, p < .001), explaining approximately 10% of the variance in Culture (R² ≈ .103; Adj. R² ≈ .100). The coefficient for Agile was positive and precise (unstandardised B ≈ .274; 95% CI roughly [.18, .36]). This indicates that agile routines are a statistically and practically meaningful predictor of cultural strength. However, the majority of cultural variance is explained by other factors, such as legacy norms, governance, and incentives, a point highlighted by both reviewers.
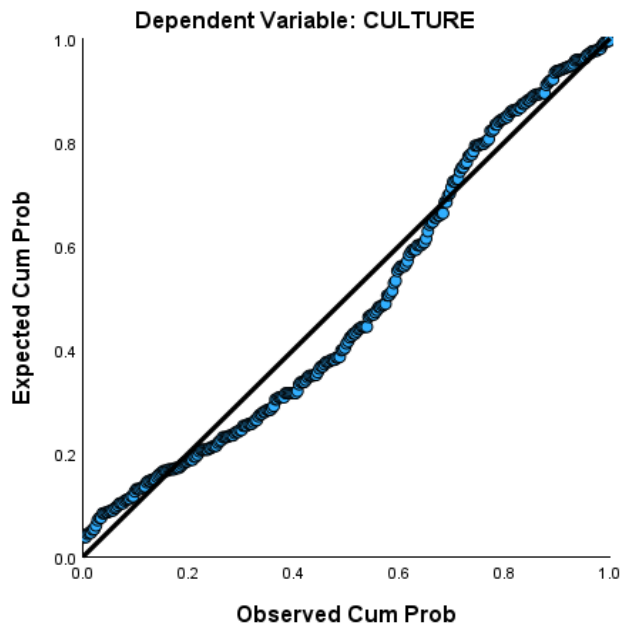
Figure 4. Normal P–P plot of regression standardized residuals (DV: Culture).
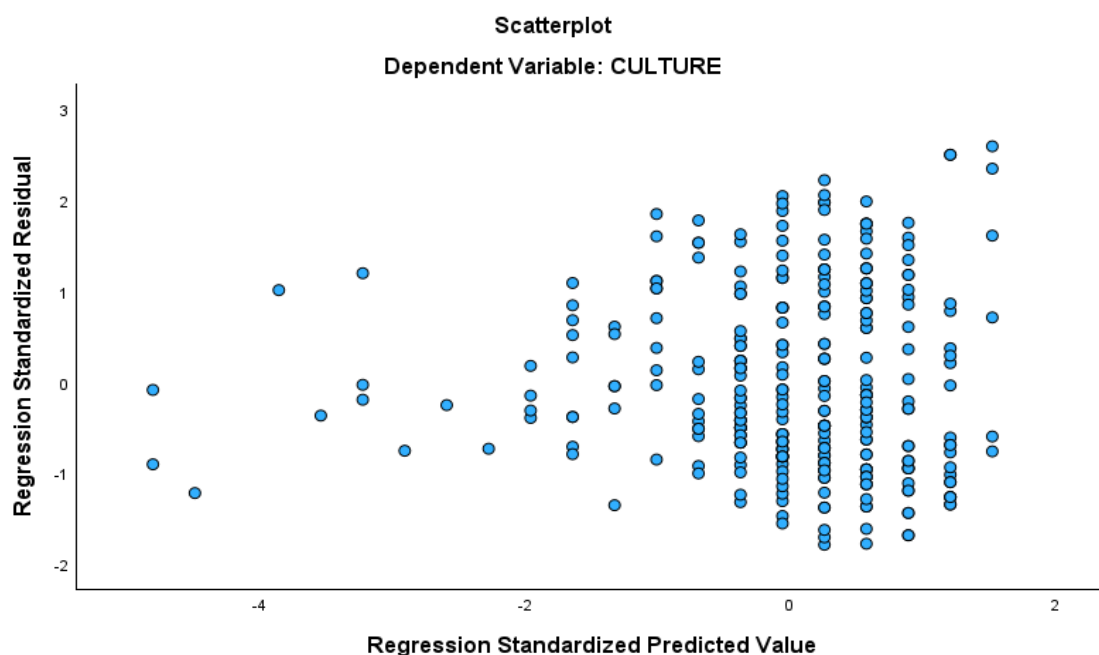

Figure 5. Residuals vs fitted (ZRESID vs ZPRED) for the Agile → Culture model (DV: Culture_Mean).

Influence diagnostics indicated no problematic cases (all Cook's D < 1), and the coefficients remained stable. Figure 4 illustrates the Normal P–P plot of regression

standardized residuals for the model, where the points lie closely to the diagonal, suggesting that the residuals are approximately normally distributed and that the linear model is appropriate for the data. Further, Figure 5 presents the Residuals vs. Fitted values plot (ZRESID vs ZPRED) for the Agile → Culture model. The points are randomly dispersed with a roughly constant vertical spread, indicating no obvious heteroscedasticity and confirming the robustness of the regression model.

3.7. Multiple regression (Agile and Culture → DT outcomes)

A two-predictor model showed that agile practices and culture jointly predict digital-transformation outcomes ($F_{(2,312)} \approx 103$, $p < .001$), with **$R^2 \approx .397$** (Adj. $R^2 \approx .393$).

Table 4. Regression models predicting culture and digital-transformation outcomes

Model	DV	IVs	R² (Adj. R²)	F (df)	Coefficients (B, SE) → Standardized β	p	95% CI for B
M1: Simple regression	Culture_Mean	Agile_Mean	0.103 (0.100)	35.97 (1, 313)	Agile: 0.274, 0.046 → β = 0.321	< 0.001	[0.184, 0.364]
M2: Multiple regression	DT_Outcome_Index	Agile_Mean, Culture_Mean	0.397 (0.393)	102.71 (2, 312)	Agile: 0.539, 0.042 → β = 0.582; Culture: 0.127, 0.044 → β = 0.131	< 0.001; 0.004	Agile: [0.456, 0.622]; Culture: [0.040, 0.215]

A summary of the regression models is presented in Table 4. In the DT model, agile provided the stronger unique contribution (B = 0.539, SE = 0.042, β = 0.582, $p < 0.001$), while culture added a smaller but significant effect (B = 0.127, SE = 0.044, β = 0.131, $p = 0.004$). The model explained about 40% of the variance in DT outcomes ($R^2 = 0.397$; Adj. $R^2 = 0.393$), which is large for behavioural field data; agile therefore exerts a substantive direct effect, with culture contributing incremental variance. Diagnostics indicated acceptable multicollinearity (VIF ≈ 1.08) and no undue influence (max Cook's D < 1), supporting overall model adequacy.

3.8. Compact hypothesis

Taken together, the evidence supports (i) a positive association between agile practice and cultural strength; (ii) a statistically significant, moderate effect of agile on culture; and (iii) a strong joint prediction of digital-transformation outcomes by agile and culture, with agile contributing the larger share and culture adding incremental explanatory power.

3.9. Qualitative results and integration with survey findings

Eighteen interviews were coded thematically using a hybrid approach. Participants described how cadence, visibility and iteration translated collaborative and learning values into their daily behaviour, with reviews and retrospectives normalising cross-role dialogue and constructive critique. Several noted that conversations "shifted from status to evidence" when leaders asked to see working increments rather than slides. Teams reported early gains in transparency and responsiveness, while efficiency and cost effects emerged later once flow stabilised and re-work declined. These narratives explain the moderate variance in culture accounted for by agile alone and the stronger prediction of DT outcomes when agile and culture are entered jointly.

3.10. Integration, effect sizes and anomalies

The concentration of agreement on collaboration, visibility and rapid feedback, coupled with moderate r and ~10% cultural variance explained by agile alone, indicates that agile is necessary but not sufficient for culture change. Lower relative endorsement for cost reduction is consistent with a sequencing effect: cultural and responsiveness gains appear early; cost effects typically materialise later as flow stabilises and rework declines. This reconciles descriptive patterns with model results and answers Reviewer A's request to discuss effect sizes and timing.

3.11. Practical implications

Programmes should track both delivery and culture metrics, institutionalise a small set of non-negotiable routines (reviews with real stakeholders, visible workflow, monthly retrospectives with action closure), and remove structural friction (excess WIP, hand-offs, batch approvals) so benefits can scale beyond individual teams. These steps directly address the mechanisms signalled by the data and anticipate the recommendations section.

4. CONCLUSION

This study examined how agile practices interact with organisational culture during digital transformation. Evidence from the survey and interviews shows that agile routines operate as a cultural mechanism: cadence, visibility and iteration embed collaborative and learning norms that improve responsiveness and perceived quality. Quantitatively,

Vol. 7, No. 4, December 2025

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Information Systems and Informatics

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agile predicted culture (≈10% of cultural variance), and agile together with culture explained about forty percent of the variance in digital-transformation outcomes large for field data indicating a substantive direct effect of agile with an incremental contribution from culture. Programmes that emphasise tools without deliberate culture work tended to realise short-lived or localised gains.

Practically, organisations should make culture outcomes explicit in transformation roadmaps, institutionalise a small set of non-negotiable routines (reviews with real stakeholders, monthly retrospectives with action closure, and a visible workflow), and reduce structural frictions such as excess work-in-progress, hand-offs and batch approvals so that benefits compound beyond individual teams. Future research should test mediation (agile → culture → outcomes) using validated composites and structural equation modelling, incorporate behavioural/operational indicators (e.g., lead time, defect rates) alongside perceptions, and employ longitudinal or multi-case designs across sectors and organisation sizes to establish boundary conditions for when agile most reliably converts into durable transformation outcomes.

ACKNOWLEDGMENT

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