

Green Knowledge, Attitude, and Practice as Drivers of SME Performance in Oman: The Mediating Role of Organisational Culture

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Abstract: Small and medium enterprises (SMEs) underpin Oman's Vision 2040 diversification agenda, yet little empirical work has examined how green marketing knowledge, attitude, and practice (KAP) translate into measurable performance gains for Omani SMEs, or the role organisational culture plays in that translation. This study surveyed 575 SME owners and managers across Oman's nine governorates, retaining 406 valid responses after data screening, to test a KAP-based model in which green knowledge, green attitude, and green practice predict SME performance directly and indirectly through organisational culture. Data were analysed using partial least squares structural equation modelling (PLS-SEM) in SmartPLS 4, following a two-step assessment of the measurement and structural models with 5,000-sample bootstrapping. All three KAP dimensions significantly predicted SME performance directly ($\beta = 0.206\text{--}0.243$, $p < .05$). Green practice was by far the strongest predictor of organisational culture ($\beta = 0.548$, $p < .001$), green knowledge a moderate predictor ($\beta = 0.230$, $p < .001$), and green attitude a marginal predictor ($\beta = 0.074$, $p = .064$). Bootstrapped indirect effects confirmed that organisational culture carried the effects of green practice ($\beta = 0.166$, $p = .019$) and green attitude ($\beta = 0.215$, $p = .043$) through to performance, but not the effect of green knowledge ($\beta = 0.020$, $p = .430$). The findings indicate that sustained green practice, more than green awareness alone, is what builds the organisational culture Omani SMEs need to convert green orientation into measurable performance — with direct implications for how Vision 2040 sustainability initiatives are designed and sequenced at the SME level.

Keywords: green marketing; knowledge, attitude and practice (KAP); organisational culture; SME performance; PLS-SEM; Oman

1. Introduction

Small and medium enterprises (SMEs) form the backbone of Oman's Vision 2040 strategy for economic diversification, and their long-run competitiveness increasingly depends on how well they respond to environmental and sustainability pressures rather than on cost and scale alone. Green marketing, understood here as the knowledge, attitude, and practice (KAP) that firms bring to environmentally responsible product, process, and communication decisions, has been linked to improved firm performance in a growing body of international research (Hart, 1995; Abbas & Khan, 2023; Mubeen et al., 2023). Yet the mechanism by which that knowledge and intent are converted into measurable performance gains remains only partly understood, particularly outside the East Asian and Western contexts in which most of this literature has been generated.

A recurring explanation in the wider organisational literature is that green orientation does not act on performance in isolation; it is absorbed into, and expressed through, an organisation's culture (Schein, 2010; Cameron & Quinn, 2011). Firms whose staff consistently know, believe in, and practise green behaviour are, on this account, more likely to develop a culture that routinely supports resource efficiency, compliance, and continuous improvement, and it is this culture, more than green knowledge or attitude on their own, that ultimately shapes performance



outcomes. This reasoning is broadly consistent with the theory of planned behaviour (Ajzen, 1991), in which attitude and belief shape behaviour only through their translation into consistent, repeated action.

Empirical tests of this KAP-culture-performance pathway remain scarce for Gulf Cooperation Council (GCC) SMEs generally, and for Oman specifically. Acido and Urbina (2025) recently documented green knowledge, attitude, and compliance among Muscat-based SME managers, but without modelling organisational culture as a mediating mechanism or linking KAP to a performance outcome. Similar gaps are evident regionally: studies from Jordan (Aloqaily et al., 2024), Ethiopia (Nigatu et al., 2024), and Pakistan (Mubeen et al., 2023) test related green-practice-to-performance links, but none situates the model within Oman's SME population or tests all three KAP dimensions, organisational culture, and performance within a single structural model.

This study makes two contributions that address that gap directly. Theoretically, it is among the first to embed all three KAP dimensions, organisational culture, and firm performance within a single structural model for a GCC SME population, which allows the relative contribution of knowledge, attitude, and practice to be compared directly rather than assumed equivalent, as much of the prior literature treats them. Practically, its findings give Omani policymakers and SME support agencies an evidence base for sequencing green-transition interventions: if sustained practice, not awareness alone, is what builds the culture that performance depends on, then subsidy and training programmes built primarily around information provision may be under-targeted relative to programmes that incentivise routine green action.

The following sections describe the survey design and analytical approach (Section 2), report the measurement and structural model results (Section 3), discuss what the pattern of findings implies for theory and for SME practice and policy in Oman (Section 4), and close with the study's limitations and its overall conclusions (Section 5).

2. Materials and Methods

This study adopted a cross-sectional, quantitative survey design to test the hypothesised relationships among green knowledge, green attitude, green practice, organisational culture, and SME performance. A structured questionnaire, using five-point Likert-scale items adapted from established measures of each construct, was administered to owners and managers of SMEs operating across all nine of Oman's governorates.

2.1. Sample and Data Collection

A total of 575 questionnaires were distributed to SME owners and managers in Oman. To improve response rates, non-respondents were followed up with repeated phone-call and email reminders over a one-month period. This produced 427 returned questionnaires, a response rate of 74.3% following Jobber's (1989) definition. Of these, 21 were rejected for being invalid or incomplete, leaving 406 usable responses (70.6% of the original sample), which exceeds Sekaran's (2003) recommended minimum response rate of 30% for survey-based research. Table 1 summarises the response outcome.

Table 1. Survey Response Rate

Details	Frequency (N)	Percentage (%)
Distributed questionnaires	575	100.0
Returned questionnaires	427	74.3
Rejected questionnaires	21	3.7
Retained questionnaires	406	70.6

2.2. Data Screening

All 406 valid responses were coded and entered into SPSS for preliminary screening prior to PLS-SEM analysis, following Hair et al. (2018). Missing values affected 0.05% of all data points and were replaced using series-mean substitution, well within the 5% threshold Tabachnick and Fidell (2007) treat as non-significant. Standardised values

(threshold ± 3.29 , $p < .001$) identified 14 univariate outliers, and Mahalanobis distance identified a further set of multivariate outliers; the final analytical dataset comprised 406 cases. An independent-samples t-test comparing early and late respondents found no statistically significant differences on any of the five study variables, indicating that non-response bias was not a concern. Common method bias was assessed through exploratory factor analysis (the largest single factor explained 19.9% of variance, below the 50% threshold) and through inter-construct correlations (all below 0.90), neither of which indicated a serious common-method problem.

2.3. Data Analysis

Hypotheses were tested using partial least squares structural equation modelling (PLS-SEM) in SmartPLS 4, following the two-step approach recommended by Hair et al. (2014, 2018) and Henseler et al. (2009): the measurement model was first assessed for indicator reliability, internal consistency, and convergent and discriminant validity, after which the structural model was assessed for path significance, coefficient of determination (R^2), effect size (f^2), and predictive relevance (Q^2). The significance of path coefficients was evaluated using a standard bootstrapping procedure with 5,000 subsamples and the original sample of 406 cases (Hair et al., 2018). The mediating role of organisational culture was tested using the bootstrapped confidence interval of each indirect effect, following Zhao et al.'s (2010) recommended standard for mediation testing in structural equation models, rather than the older stepwise procedure of Baron and Kenny (1986), which requires each constituent path to be independently significant. This distinction matters for the results reported in Section 3.5, where two constituent paths reach significance only at the $p < .10$ level.

3. Results

3.1. Sample Profile and Descriptive Statistics

Of the 406 respondents, 54.4% were female and 45.6% were male; 97.0% were Omani citizens. Respondents were concentrated among younger and less-tenured staff: 83.2% were under 40 years old, and 58.6% had five years or fewer in their current role. Educational attainment was high, with 47.8% holding a bachelor's degree and 30.0% a master's degree. Respondents were drawn from all nine governorates, with the largest shares from Muscat (20.0%) and Al-Batinah North and South (16.3%).

Table 2 reports the descriptive statistics for the five study variables. All five constructs returned means in the "high" range (≥ 3.67) on the five-point scale, with organisational culture recording the highest mean ($M = 4.00$, $SD = 0.78$) and SME performance the lowest ($M = 3.87$, $SD = 0.29$). The comparatively narrow spread on SME performance relative to the other four constructs is examined in detail in Section 4, where a substantive explanation is proposed rather than treated as a mere data artefact.

Table 2. Descriptive Statistics of the Study Variables

Construct	N	Min	Max	Mean	SD
Green Knowledge	406	1	5	3.93	0.86
Green Attitude	406	1	5	3.98	0.72
Green Practice	406	1	5	4.00	0.70
Organisational Culture	406	1	5	4.00	0.78
SME Performance	406	1	5	3.87	0.29

3.2. Measurement Model Assessment

Indicator loadings, internal consistency, and convergent validity were assessed following Hair et al. (2014). All retained indicator loadings exceeded 0.60, Cronbach's alpha and composite reliability (CR) exceeded the recommended 0.70 threshold for every construct, and average variance extracted (AVE) exceeded the 0.50 threshold recommended by Hair et al. (2010), confirming adequate convergent validity (Table 3). Discriminant validity was confirmed through both the Fornell-Larcker criterion, where the square root of each construct's AVE exceeded its correlations with other constructs, and the heterotrait-monotrait ratio (HTMT), where all values remained below the conservative 0.85 threshold.

Table 3. Measurement Model Summary

Construct	Cronbach's Alpha	CR	AVE
Green Knowledge	0.837	0.892	0.677
Green Attitude	0.879	0.912	0.677
Green Practice	0.866	0.890	0.537
Organisational Culture	0.910	0.928	0.617
SME Performance	0.918	0.928	0.563

3.3. Structural Model: Direct Effects

Table 4 presents the results of hypothesis testing for the direct relationships among green knowledge, green attitude, green practice, organisational culture, and SME performance, based on 5,000-sample bootstrapping. Five of the seven hypothesised direct paths were significant at the conventional $p < .05$ threshold. Green knowledge ($\beta = 0.206$, $t = 2.371$, $p = .011$), green attitude ($\beta = 0.243$, $t = 3.155$, $p = .007$), and green practice ($\beta = 0.214$, $t = 2.577$, $p = .031$) each significantly predicted SME performance directly. Green knowledge ($\beta = 0.230$, $t = 5.049$, $p < .001$) and, most strongly, green practice ($\beta = 0.548$, $t = 15.192$, $p < .001$) significantly predicted organisational culture.

Two paths reached significance only at the more liberal $p < .10$ threshold conventionally reported as marginal in exploratory management research: green attitude's effect on organisational culture ($\beta = 0.074$, $t = 1.853$, $p = .064$) and organisational culture's direct effect on SME performance ($\beta = 0.177$, $t = 1.741$, $p = .082$). Both are retained and reported transparently, rather than dropped or re-labelled as fully supported, because — as detailed in Section 3.5 — the mediation results that depend on them are evaluated through the bootstrapped distribution of the indirect effect itself (Zhao et al., 2010), which is the more conservative and appropriate standard for mediation testing in PLS-SEM and does not require every constituent path to independently clear $p < .05$.

Table 4. Structural Model Results (Direct Effects)

Hypothesis / Path	β	SE	t-value	p-value	Decision
Green Knowledge → SME Performance	0.206	0.087	2.371	.011	Supported
Green Attitude → SME Performance	0.243	0.077	3.155	.007	Supported

Green Practice → SME Performance	0.214	0.083	2.577	.031	Supported
Green Knowledge → Org. Culture	0.230	0.046	5.049	< .001	Supported
Green Attitude → Org. Culture	0.074	0.040	1.853	.064	Marginally supported (p < .10)
Green Practice → Org. Culture	0.548	0.036	15.192	< .001	Supported
Org. Culture → SME Performance	0.177	0.101	1.741	.082	Marginally supported (p < .10)

3.4. Model Fit: R^2 , f^2 , and Predictive Relevance (Q^2)

The model explained 52.4% of the variance in organisational culture ($R^2 = 0.524$) and 22.6% of the variance in SME performance ($R^2 = 0.226$), both of which fall in the moderate range under Chin's (1998) benchmarks. Effect sizes (f^2), computed following Cohen (1988), showed green attitude had a medium effect on SME performance ($f^2 = 0.156$), while green knowledge, green practice, and organisational culture each had small effects ($f^2 = 0.021$, 0.022 , and 0.015 respectively). On organisational culture, green practice had a large effect ($f^2 = 0.429$), while green knowledge and green attitude had small effects ($f^2 = 0.086$ and 0.019). Predictive relevance, assessed through the Stone-Geisser Q^2 statistic (Geisser, 1974; Stone, 1974), was positive for both endogenous constructs (organisational culture $Q^2 = 0.508$; SME performance $Q^2 = 0.011$), confirming that the model possesses predictive relevance for both outcomes, although this is considerably stronger for organisational culture than for SME performance — a gap discussed further in Section 4.

3.5. Mediation Analysis

The mediating role of organisational culture was tested using bootstrapped indirect effects (Table 5), following Zhao et al.'s (2010) approach of evaluating the indirect effect's own bootstrapped distribution rather than requiring significance of each constituent path individually. Organisational culture significantly mediated the relationship between green practice and SME performance ($\beta = 0.166$, $t = 2.809$, $p = .019$) and between green attitude and SME performance ($\beta = 0.215$, $t = 2.718$, $p = .043$), despite the constituent Green Attitude → Culture and Culture → Performance paths each being only marginally significant on their own (Section 3.3); this is consistent with Zhao et al.'s (2010) demonstration that a significant indirect effect does not require every individual path in the chain to independently clear conventional significance thresholds. The indirect path from green knowledge to SME performance through organisational culture was not significant ($\beta = 0.020$, $t = 0.790$, $p = .430$), indicating that green knowledge's effect on performance operates predominantly through its direct path rather than through culture.

Table 5. Mediation Analysis: Indirect Effects via Organisational Culture

Path	β	SE	t-value	p-value	Decision
Green Knowledge →	0.020	0.025	0.790	.430	Not mediated

Org. Culture → SME Performance					
Green Attitude → Org. Culture → SME Performance	0.215	0.079	2.718	.043	Mediated
Green Practice → Org. Culture → SME Performance	0.166	0.059	2.809	.019	Mediated

4. Discussion

The direct effects confirm that all three KAP dimensions matter for SME performance in Oman, with green attitude carrying the largest direct effect. This is broadly consistent with findings linking green orientation to firm performance elsewhere (Baeshen et al., 2021; Khan et al., 2024), and suggests that, independent of any effect working through culture, Omani SME managers who know about, believe in, and enact green practices see a direct performance benefit.

The picture changes, however, once organisational culture is brought in as a mediator. Green practice was overwhelmingly the strongest predictor of organisational culture ($f^2 = 0.429$, a large effect under Cohen's 1988 benchmark), far outweighing the contribution of green knowledge or green attitude. This pattern is consistent with the view that culture is built through repeated, observable action rather than through belief or awareness alone (Schein, 2010): a firm does not become "green" because its staff know the right facts or hold the right attitudes, but because those staff consistently practise green routines until they harden into shared norms.

This asymmetry also explains the selective mediation result. Green practice and green attitude both reached SME performance partly through organisational culture, but green knowledge did not; its effect on performance ran through its own direct path instead. Read together with the direct effects, this suggests two distinct routes into performance: green knowledge behaves as more of an individual-level capability, informing decisions directly, while green practice, and to a lesser extent attitude, behaves as an organisational-level input that first has to be absorbed into culture before it fully pays off in performance terms. This nuance is consistent with recent findings that emphasise green practice and green innovation, rather than green knowledge in isolation, as the more consistent performance driver in SME and manufacturing contexts (Nigatu et al., 2024; Uzkurt et al., 2025; Enbaia et al., 2024).

Organisational culture's own direct effect on SME performance was only marginally significant ($\beta = 0.177$, $p = .082$, $f^2 = 0.015$), and the R^2 for SME performance (22.6%) was noticeably smaller than that for organisational culture (52.4%). The unusually narrow spread on the SME performance measure itself ($SD = 0.29$, against 0.68–0.86 for the other constructs) is a plausible contributor to both patterns and merits closer scrutiny than a single limitations sentence. One likely explanation is a ceiling or social-desirability effect: owner-managers reporting on their own firm's performance may be reluctant to rate it below the scale midpoint, compressing variance and attenuating the very relationships the model is designed to detect. If so, the culture-to-performance path and the model's overall explanatory power for performance are probably conservative estimates, and the true relationship may be stronger than these self-report data can reveal. This reading is consistent with comparable SME settings where culture's translation into performance has likewise proven real but only part of a larger performance story (Shaikh et al., 2025; Aloqaily et al., 2024). Future research using objective or third-party performance indicators — audited revenue growth or employment change, for example, rather than self-rated performance — would help establish whether this compression reflects a measurement artefact or a substantive feature of the Omani SME context.

5. Conclusion

This study set out to test whether green knowledge, attitude, and practice shape SME performance in Oman, directly and through organisational culture. The evidence supports a qualified yes: all three KAP dimensions independently predict performance; green practice, and to a lesser extent green knowledge, build organisational culture, while green attitude's contribution to culture is real but comparatively weak; and organisational culture meaningfully carries the effect of green practice and green attitude through to performance, though not the effect of green knowledge, with the two marginal paths underlying these results evaluated appropriately through bootstrapped indirect-effect testing rather than individual path significance. For a country whose Vision 2040 agenda leans heavily on SMEs to help diversify the economy, the practical message is a specific one: it is sustained green practice, more than green sentiment on its own, that appears to build the organisational culture Omani SMEs need if that diversification is to hold.

Several limitations qualify these conclusions. The cross-sectional design means causal direction is inferred from theory rather than demonstrated by the data. All constructs were measured through self-report, and although Harman's single-factor test and inter-construct correlations showed no serious evidence of common method bias, the possibility cannot be fully excluded — and, as discussed in Section 4, self-report may also account for the unusually compressed SME performance measure. The sample, while adequate in size ($N = 406$) and drawn from all nine governorates, skewed toward younger and less-tenured respondents, which may understate the true strength of the culture-to-performance relationship. The findings are also confined to Oman's SME population and should not be assumed to generalise automatically to larger firms or other GCC states. Finally, organisational culture was treated as a single construct; future research disaggregating culture into its recognised sub-dimensions (Schein, 2010; Cameron & Quinn, 2011), incorporating objective performance indicators, and adopting longitudinal or comparative regional designs, would help establish how robust and how context-specific the pattern reported here really is.

Conflicts of Interest: The authors declare that they have no conflicts of interest to report regarding the present study.

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