

Search Engine Optimization and Internet Marketing Strategy Among Medium-Sized Companies in Bamenda, Cameroon: An Exploratory Study

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Abstract

Search engine optimization (SEO) is widely presented in the digital marketing literature as a cost-effective route to visibility for resource-constrained firms, yet empirical evidence on its effects among medium-sized enterprises in Central African urban economies remains scarce. This exploratory study examines the association between three SEO dimensions — on-page optimization, technical SEO, and user experience — and the internet marketing strategy of medium-sized companies in Bamenda, Cameroon. Following a data-quality review that identified and removed duplicate entries from the original survey file, the final analytic sample comprised 15 unique medium-sized company respondents. Descriptive statistics indicate that respondents rate their firms' practice of all three SEO dimensions favorably. However, a multiple regression analysis found no statistically significant relationship between any of the three predictors and internet marketing strategy outcomes ($R^2 = .088$, $F(3,11) = 0.355$, $p = .787$), and none of the three hypothesized effects were supported. All three standardized coefficients were positive in direction — user experience showed the largest, if still non-significant, association ($\beta = .218$) — consistent with the direction predicted by prior literature even though statistical significance was not reached. Given the small sample size relative to the number of predictors, these findings should be read as inconclusive rather than as evidence against an SEO–marketing strategy relationship, and the study concludes with a concrete recommendation for an adequately powered follow-up study.

Keywords: search engine optimization; internet marketing strategy; on-page optimization; technical SEO; user experience; medium-sized enterprises; Cameroon; sample size

1. Introduction

Search engine optimization has moved from a specialist technical practice to a mainstream pillar of digital marketing strategy. As search engines mediate an increasing share of how customers discover businesses online, a firm's position in organic search results shapes its visibility, credibility, and ultimately its ability to compete (Enge et al., 2015). For medium-sized enterprises, which typically operate with constrained marketing budgets relative to large competitors, SEO is often presented as a comparatively low-cost route to sustained visibility (Tomasi & Li, 2015).

Despite this, the empirical literature on SEO's effects is concentrated overwhelmingly in large-firm and developed-market contexts. Studies of SME-level SEO adoption in Sub-Saharan Africa, and in Central African urban economies specifically, remain scarce. Bamenda — Cameroon's third-largest city and the administrative and commercial center of the Northwest Region — presents a distinctive setting shaped by its own digital infrastructure, consumer behavior, and regional economic conditions.

This study set out to examine the effects of three SEO dimensions — on-page optimization, technical SEO, and user experience — on the internet marketing strategy of medium-sized companies in Bamenda. During data preparation, a review of the collected survey data identified that 15 of the 30 originally recorded entries were exact duplicates across all variables; these were removed prior to analysis, leaving a final analytic sample of 15 unique respondents. The study is reported here as an exploratory, underpowered study rather than a confirmatory test of its hypotheses, and its primary contribution is to establish a rigorous baseline and a concrete sampling target for future research in this setting, alongside the directional patterns observed in the available data.

1.1 Research Questions

Main research question: What is the relationship between search engine optimization and the internet marketing strategy of medium-sized companies in Bamenda?

Specific research questions: (i) What is the relationship between on-page optimization and internet marketing strategy? (ii) What is the relationship between technical SEO and internet marketing strategy? (iii) What is the relationship between user experience and internet marketing strategy?

1.2 Objectives

The main objective is to examine the relationship between search engine optimization and the internet marketing strategy of medium-sized companies in Bamenda. The specific objectives are to assess the relationship between on-page optimization, technical SEO, and user experience, respectively, and internet marketing strategy.

1.3 Hypotheses

H₁: On-page optimization has no significant effect on the internet marketing strategy of medium-sized companies in Bamenda.

H₂: Technical SEO has no significant effect on the internet marketing strategy of medium-sized companies in Bamenda.

H₃: User experience has no significant effect on the internet marketing strategy of medium-sized companies in Bamenda.

1.4 Significance of the Study

Beyond its contribution to the limited literature on SEO in emerging Central African markets, this study documents a rigorous, transparent data-quality process and establishes a concrete, power-justified sampling target that future researchers examining this question in comparable settings can build on directly.

2. Literature Review

2.1 Conceptual Framework

Search engine optimization refers to the set of practices aimed at improving a website's visibility and ranking in organic (unpaid) search engine results (Enge et al., 2015). It is conventionally decomposed into on-page optimization — the strategic placement of keywords, meta tags, and content quality signals within a page — and technical SEO, which concerns the crawlability, indexability, site speed, and mobile responsiveness of the underlying site infrastructure (Google, 2023). User experience, while conceptually distinct from SEO in the narrow sense, is treated here as a third dimension because search engines increasingly weight engagement signals — bounce rate, dwell time, mobile usability — as ranking factors, making UX and SEO practically inseparable in contemporary digital marketing (Nielsen Norman Group, 2022).

Internet marketing strategy, the dependent construct, is understood as the integrated use of digital channels — websites, search engines, social media, and email — to attract, engage, and convert target audiences (Kotler & Armstrong, 2017; Olson et al., 2021). Olson et al. (2021) argue that digital marketing effectiveness increasingly depends on how well a firm integrates technical, content, and customer-experience capabilities rather than on any single channel in isolation — a framing consistent with this study's treatment of SEO as a multidimensional construct.

2.2 Theoretical Grounding

This study draws on three complementary theoretical lenses. Rogers' Diffusion of Innovations Theory frames SEO adoption among medium-sized firms as a diffusion process shaped by relative advantage, compatibility, complexity, trialability, and observability. The Technology Acceptance Model (Davis, 1989) contributes a firm-level analogue: perceived usefulness and perceived ease of use of SEO tools and practices shape the intention to adopt and sustain them, particularly relevant given that many medium-sized firms lack dedicated technical marketing staff. Information

Processing Theory offers a complementary lens on the user-experience dimension, explaining why website structure, navigation clarity, and cognitive load affect how visitors process content and ultimately convert.

2.3 Empirical Literature and Research Gap

Empirical evidence broadly supports a positive relationship between SEO practices and firm-level marketing outcomes, though the evidence base is concentrated in large-firm and developed-market settings, typically with substantially larger samples than the present study. Tomasi and Li (2015), in a multi-case study of SMEs, found that improved SERP rankings were associated with increased site visitors, longer average visit duration, greater user engagement, and higher annual sales revenue. Lewandowski et al. (2020), analyzing a large set of Google search results, demonstrated that on-page and technical SEO signals measurably shape organic ranking outcomes. A recent meta-analysis by Usmany et al. (2024), synthesizing ten studies conducted between 2022 and 2024, found a consistently significant and substantively large effect of SEO implementation on organic rankings and website traffic (effect size $d = 1.049$).

On the user-experience dimension, Jongmans et al. (2022) provided experimental evidence that website visual design affects website evaluation through a sequential mediation of usability and pleasure. Notably, all of these studies rely on either large observational samples, case-based triangulation, or controlled experimental designs — approaches with substantially more statistical power than a 15-respondent cross-sectional survey can offer. This gap in sample size and design, rather than a gap in topic, is what the present study's findings must be read against.

What this literature does not address is whether these relationships hold among medium-sized firms operating in Central African regional urban economies. Medium-sized companies in Bamenda have not previously been the subject of empirical SEO research, despite the city's significant concentration of SME economic activity — a gap this study begins to address, while also demonstrating why an adequately powered sample is a precondition for answering the question conclusively.

3. Methodology

The study adopted a descriptive survey design, combining structured quantitative measurement with the ability to capture a representative snapshot of current SEO practice among the target population (Blumberg et al., 2014). The study was conducted in Bamenda, the capital of Cameroon's Northwest Region and the country's third-largest city, selected for its high

concentration of medium-sized enterprise activity and the researcher's contextual familiarity with the setting.

The target population consisted of medium-sized companies operating in Bamenda. Based on the sampling frame, Yamane's (1967) formula indicated a minimum sample of approximately 28 firms at a 5% margin of error and 95% confidence level, and 30 questionnaires were administered accordingly.

Data quality note: a review of the returned dataset during analysis identified that 15 of the 30 recorded entries were exact duplicates of other entries across every variable, including demographic fields. These 15 duplicate records were removed prior to analysis. The final analytic sample therefore comprises 15 unique respondents — below both the original data-collection target and the sample size needed for adequately powered multiple regression (see Limitations). This is reported transparently here, and the study's conclusions are framed accordingly as exploratory rather than confirmatory.

A stratified random sampling technique was used to ensure each medium-sized firm in the target population had an equal probability of selection. Data were collected via a structured, three-part questionnaire (demographic information, SEO practices, and internet marketing strategy outcomes) using five-point Likert-scale items, distributed using a drop-and-pick method. Instrument validity was established through face and content validity review by the research supervisor and a statistician. Reliability, assessed via Cronbach's alpha on the final 15-respondent sample, was acceptable for user experience ($\alpha = .755$) but below the conventional .70 threshold for on-page optimization ($\alpha = .550$), technical SEO ($\alpha = .551$), and internet marketing strategy ($\alpha = .611$) — a further reflection of the small sample's limits and a caution against over-interpreting item-level results for those constructs.

The relationship between SEO dimensions and internet marketing strategy was modeled using ordinary least squares regression:

$$IMS = \beta_0 + \beta_1(OPO) + \beta_2(TSEO) + \beta_3(UX) + \mu$$

where IMS is internet marketing strategy, OPO is on-page optimization, TSEO is technical SEO, UX is user experience, and μ is the error term. Descriptive statistics, one-sample t-tests, bivariate correlations, and OLS regression were computed, with variance inflation factors used to assess multicollinearity.

4. Results

4.1 Sample Profile (n = 15)

Characteristic	Distribution
Gender	Male 73.3% (11), Female 26.7% (4)

Education	High school 40.0%, Degree 6.7%, HND 46.7%, Masters 6.7%
Firm size (employees)	1–5: 40.0%, 6–10: 40.0%, 11–20: 20.0%
Familiarity with SEO	Very familiar 53.3%, Somewhat familiar 26.7%, Not familiar 20.0%

4.2 Descriptive Statistics

Construct	M	SD
On-page optimization (OPO)	1.567	0.448
Technical SEO (TSEO)	1.733	0.438
User experience (UX)	1.650	0.498
Internet marketing strategy (IMS)	2.000	0.432

Lower values on this scale indicate stronger agreement. Respondents rated their firms favorably across all three SEO dimensions, broadly consistent with the pattern reported in the original data collection.

4.3 One-Sample t-Tests (test value = 3)

Construct	t(14)	p	Mean difference
OPO	–12.395	< .001	–1.433
TSEO	–11.206	< .001	–1.267
UX	–10.495	< .001	–1.350
IMS	–8.966	< .001	–1.000

All four constructs differed significantly from the scale midpoint, confirming that respondents' ratings clustered on the favorable side of the scale rather than around a neutral midpoint. This finding held even at the reduced sample size, since one-sample tests against a fixed reference point require considerably less power than a multi-predictor regression.

4.4 Regression Results

Predictor	B	β (standardized)	t	p
(Constant)	1.479	—	2.551	.027
On-page optimization	0.049	0.051	0.163	.874
Technical SEO	0.076	0.077	0.192	.851
User experience	0.189	0.218	0.564	.584

Model fit: $R^2 = .088$, Adjusted $R^2 = -.160$, $F(3, 11) = 0.355$, $p = .787$. None of the three predictors reached statistical significance, and the overall model did not explain a meaningful share of variance in internet marketing strategy at conventional thresholds. Variance inflation factors (OPO = 1.19, TSEO = 1.95, UX = 1.81) indicated no problematic multicollinearity, so the null result is not an artifact of predictor redundancy. On this basis, the study fails to reject H_1 , H_2 , and H_3 : no statistically significant effect of on-page optimization, technical SEO, or user experience on internet marketing strategy was detected in this sample.

Bivariate correlations were directionally consistent with theoretical expectation — user experience showed the strongest association with internet marketing strategy ($r = .284$, $p = .304$), followed by

technical SEO ($r = .243$, $p = .383$) and on-page optimization ($r = .145$, $p = .606$) — though none reached significance at this sample size.

5. Discussion

The null result reported here should not be read as evidence that SEO is unrelated to internet marketing strategy among medium-sized companies in Bamenda. With three predictors and 15 observations, this study is markedly underpowered relative to conventional guidance for multiple regression: Green (1991) recommends a minimum of approximately $50 + 8m$ observations (where m is the number of predictors) to test overall model fit, and $104 + m$ to test individual predictors reliably — implying a minimum of roughly 74 respondents for a three-predictor model of this kind, nearly five times the sample retained here after data-quality screening.

Read against that backdrop, the directional pattern in the data is informative even though it does not reach significance. All three standardized coefficients were positive, and user experience showed the strongest association — consistent with Jongmans et al. (2022), who found that visual design shapes website evaluation through usability and pleasure, and with the broader argument that search engines' growing weight on engagement signals has made UX practically inseparable from SEO outcomes (Nielsen Norman Group, 2022). The ordering also loosely tracks the meta-analytic evidence in Usmany et al. (2024) and the SME-specific findings of Tomasi and Li (2015), both of which found significant positive effects of SEO practice on marketing-relevant outcomes at much larger sample sizes. The most defensible interpretation is that this study's design and topic are sound, but its achieved sample size is not yet sufficient to detect effects of the size reported in the wider literature.

6. Conclusion and Recommendations

This study examined the relationship between on-page optimization, technical SEO, and user experience and the internet marketing strategy of medium-sized companies in Bamenda, Cameroon. Following removal of duplicate records identified during data-quality screening, the analysis proceeded on a final sample of 15 unique respondents. No statistically significant effects were detected for any of the three predictors, and all three null hypotheses were retained. However, the consistent positive direction of all three associations — particularly for user experience — is consistent with the wider literature and suggests the relationships are worth testing with an adequately powered sample rather than dismissed.

The study's central practical recommendation is methodological: a follow-up study should target a minimum of 75–80 respondents, consistent with Green's (1991) guidance for a three-predictor regression model, and should build in duplicate-detection checks during data entry rather than after collection is complete. Substantively, medium-sized companies in Bamenda should continue investing in SEO education, periodic website audits, and user-experience improvements on the strength of the wider empirical literature (Tomasi & Li, 2015; Usmany et al., 2024), even though this study's own sample could not statistically confirm the relationship at conventional significance thresholds.

7. Limitations

The principal limitation of this study is its small final sample size ($n = 15$), which followed the removal of 15 duplicate records identified during data-quality review of the originally collected 30-entry dataset. This sample is well below the threshold recommended for reliable multiple regression with three predictors (Green, 1991), and the null findings reported here should be interpreted as inconclusive rather than as evidence against an SEO–marketing strategy relationship. Reliability for two of the four constructs (on-page optimization, technical SEO) fell below the conventional .70 threshold for Cronbach's alpha, a further consequence of the reduced sample. The cross-sectional design also precludes causal inference, and self-reported measures introduce potential common-method bias. Future research should prioritize a properly powered sample collected with duplicate-detection safeguards built into the data-collection process itself.

8. Declarations

Ethics: Participation was voluntary and anonymous; no identifying information was collected, and participants were informed of the study's purpose prior to completing the questionnaire.

Competing interests: The author declares no competing interests.

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Data availability: The final analytic dataset ($n = 15$, post duplicate-removal) is available from the corresponding author upon reasonable request.

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