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Determinants of Digital Marketing Effectiveness for Sustainable Tourism Industry in Malaysia

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Abstract: This study examines what drives the effectiveness of a digital marketing model for Malaysia's sustainable tourism industry. Grounded in the Technology Acceptance Model and sustainability principles, it tests five factors: perceived usefulness, perceived ease of use, perceived cost, greater return, and efficiency. Survey data from 261 tourism-sector respondents were analysed in SPSS. All five variables correlated positively and significantly with sustainable tourism adoption ($p < 0.001$), with efficiency showing the strongest relationship ($r = 0.808$). The regression model was statistically significant ($F = 103.703$, $p < 0.001$) and explained 67% of the variance ($R^2 = 0.670$). Preliminary diagnostic checks showed only minor deviations from normality; given the sample size ($N = 261$) and the tolerance of multiple regression to modest departures from normality, the data were treated as suitable for parametric analysis. The study extends the Technology Acceptance Model to a sustainable tourism setting, validates the key determinants of digital adoption empirically, and gives policymakers and industry stakeholders a data-driven basis for digital transformation and long-term sustainability planning in Malaysia's tourism sector.

Keywords: Digital Marketing, Sustainable Tourism, Technology Acceptance Model (TAM), Tourism Industry, Malaysia Tourism Sector.

I. INTRODUCTION

Few sectors matter as much to Malaysia's economy as tourism. Its natural landscapes and cultural sites pull in visitors from home and abroad, and the industry is widely credited with driving regional growth and seeding new local businesses [1]. Two decades of sustained investment have built Malaysia's standing as a global tourism destination and a major earner of national income. Close to a quarter of the national workforce now works in the sector; DOSM figures put its 2019 contribution at 15.9 per cent of GDP, or RM240.2 billion in Gross Value-Added across the Tourism Industries (GVATI) [2].

Despite this contribution, and despite the global shift toward sustainable practices, Malaysia's sustainable tourism industry has not reached its full potential, largely because digital marketing strategies for the sector remain underdeveloped. Promoting sustainable tourism options online matters more as travel behaviour moves online, yet existing digital marketing models rarely build in sustainability principles or reflect what makes sustainable tourism in Malaysia distinct. The sector also faces broader pressure: digitalisation and innovation are needed to revitalise it through technology, economic uncertainty threatens the recovery of international tourism, and operators must still adjust to post-COVID-19 travel expectations. Rising oil prices, inflation, possible interest rate hikes, high debt levels, and ongoing supply chain disruptions add further strain to that recovery.

These pressures point to the need for integrated digital marketing strategies that build both supply and demand within the industry, a priority set out in the Tourism Malaysia Marketing Plan for 2022-2026 [3]. That plan calls for embracing digitalisation to reinvigorate the sector, alongside more specific measures: familiarisation trips for media, bloggers, influencers, and travel agents, and a sharper focus on niche segments such as nature-based products, rural tourism, and outdoor activities. Such measures could help the industry adjust to post-COVID-19 travel demand and support its longer-term recovery. A digital marketing model built specifically for Malaysia's sustainable tourism industry, that gap is what this study sets out to fill.

II. LITERATURE REVIEW

A. Digital Marketing in Tourism

Among tourism's promotional strategies, digital marketing has moved the fastest as the marketplace globalised [4]. Smartphones and other devices now put electronic marketing platforms within reach of most travellers [5] a shift that has reshaped competition across the industry [6] and changed how tourism services are perceived, consumed, and accessed [7], [8]. Destinations and tourism enterprises worldwide have responded by paying closer attention to digital channels; several scholars go further and call for destination marketing frameworks that build digital strategy in from the outset, since doing so strengthens competitiveness [6], [9], [10]. Digital marketing platforms carry particular value for sustainable tourism specifically, earlier work suggests [11], yet how these tools should be applied to support sustainability and responsible practice in Malaysia remains an open question, the gap this study tries to narrow.

B. Sustainable Tourism in Malaysia

As the tourism industry has matured, sustainability has moved from a peripheral concern to a central one. UNWTO frames it as tourism that weighs its current and future economic, social, and environmental effects against the needs of tourists, the industry, the environment, and local communities [12]. Malaysian research on the topic has grown accordingly, destination management, stakeholder engagement, environmental analysis, but it clusters heavily around the hotel industry, leaving other tourism stakeholders comparatively under-studied.

Sustainable tourism has featured in Malaysia's national tourism agenda since the Eighth Malaysia Plan (2001-2005), with environmental considerations carrying particular weight through to the Eleventh Malaysia Plan. Government involvement has centred mainly on preserving and conserving destinations, reflected in national ecotourism policy. Tourism's economic benefits are substantial, but intensified tourism activity also strains the environment: it can threaten biodiversity and, over time, contribute to environmental degradation [13].

Sustainable tourism has often been framed as a corrective to the harms associated with conventional tourism development [14]. That framing still fits: it points toward balanced growth that meets today's needs without limiting what future generations can do, while limiting damage to the environment, the economy, and local cultures [15]. How to get there, though, is still debated within the industry [16].

That definition matters directly for the tourism sector, since environmental conservation is not separable from what operators are already asked to weigh. Tourism ranks as Malaysia's third-largest contributor to the economy [17], which raises the stakes: framing sustainable tourism as an extension of sustainable development, rather than a competing concern [18], makes its logic easier for stakeholders to accept and act on.

Tourism activity is inseparable from its surrounding environment, so raising awareness among tourists, residents, and tourism managers about sustainable practice matters. Marketing management shapes both the volume and type of visitors a destination attracts, which in turn affects whether that destination's growth stays economically viable.

C. Perceived Ease of Use

Davis [19] ties perceived ease of use to effort: how much exertion a person expects a given task to demand. Chen et al. [20] extend the technology acceptance model to online consumer contexts and show that navigation and interface design shape whether consumers engage with a platform at all, while Venkatesh and Davis [21] find that perceived ease of use is driven by both cognitive and social-influence processes within an extended TAM. In digital marketing specifically, Taiminen and Karjaluo [23] found that ease of use and resource simplicity strongly influence whether small and medium-sized enterprises adopt digital marketing channels. Learnability, controllability, clarity, comprehensibility, and adaptability all feed into this perception, which in turn strongly predicts whether users keep returning to a platform [22]. Taken together, this literature points to the following hypothesis:

Hypothesis 1: Perceived ease of use has a significant influence on the sustainable tourism industry in Malaysia.

D. Perceived Usefulness

Davis [19] defines perceived usefulness differently: it is the belief that using a given technology will improve job performance, that adopting an application will translate into better task outcomes. In a tourism context, San Martín and Herrero [24] similarly found that users' psychological readiness to adopt technology, including their perception of its usefulness, shapes online purchase and engagement intentions. Scherer et al. [25] argue that perceived usefulness and ease of use directly shape users' attitudes toward technology adoption, a view echoed by Teo et al. [26] in their work on computer technology adoption in Malaysian and Singaporean contexts. Ainin et al. [27] find the same pattern among Malaysian SMEs, where perceived usefulness and ease of use drive social media and digital marketing adoption. Fromm and Garton [28] add that marketing is heading toward intelligent, sustainable digital technologies, a shift millennials' familiarity with such tools is helping along. The hypothesis that follows draws on this body of work:

Hypothesis 2: Perceived usefulness has a significant influence on the sustainable tourism industry in Malaysia.

E. Perceived Cost

Shirisha [29] argues that digital marketing platforms are a cheaper way to reach a wide audience than traditional marketing channels. Gilmore et al. [30] add a caveat: resource and budget constraints still make it harder for smaller businesses to compete for advertising space and reach against larger firms working through traditional channels. Smithson et al. [31], meanwhile, find that firm size correlates with online visibility, since larger, better-resourced enterprises tend to build a stronger online presence than smaller ones — a pattern Seiler et al. [32] extend by noting that most sizable, forward-thinking companies run dedicated websites, giving them an edge smaller firms lack. Rising costs tied to website development, maintenance, and adopting newer digital marketing tools can therefore set smaller firms back, as Ayob [33] notes. These mixed findings motivate the third hypothesis:

Hypothesis 3: Perceived cost has a significant influence on the sustainable tourism industry in Malaysia.

F. Greater Return

Prior research on Malaysia's tourism industry links e-commerce and digital marketing adoption to measurable gains in business performance and revenue [51]. That gives businesses in the sector good reason to adopt digital marketing technologies where the returns are real. Rafique et al. [34] argue that, given the scale of investment already made in emerging economies such as Pakistan and Malaysia, it is time to properly assess how well users are actually receiving these technological advances. Navimipour and Soltani [35] make a related point: firms need empirical evidence on return on investment before they can commit to new technology with confidence. Given this split in the evidence, the fourth hypothesis follows: Hypothesis 4: A Greater return has a significant influence on the sustainable tourism industry in Malaysia.

G. Efficiency

Kannan [6] builds the economic case for digital marketing channels that are both intelligent and sustainable across the national economy, positioning them as a support mechanism as firms fold digital marketing into their outreach. The environmental payoff runs alongside the economic one: these strategies can lift local community welfare and economic growth by improving productivity and resource allocation, and by deepening engagement with the real estate market [36], [37], while trimming marketing costs, opening new partnerships, and cutting the cost of site visits [38].

In Malaysia, Aziz and Idris [39] find that both end users and corporations remain reluctant to adopt e-tax systems and digital technologies, mainly because they are unsure about system reliability and hold unrealistic performance expectations. Koh et al. [40] examine digital banking technology acceptance in the Malaysian banking sector using the UTAUT framework and find performance expectancy and facilitating conditions to be the key drivers of adoption, though gaps remain in understanding the broader economic payoff of digital systems in Malaysia. Financial institutions and investment-oriented firms also need stronger security and privacy measures to keep their systems efficient, which helps them win and keep customers. The fifth and final hypothesis follows from this evidence:

Hypothesis 5: Efficiency has a significant influence on the sustainable tourism industry in Malaysia.

H. Conceptual Framework for the Digital Marketing Model

The model this study proposes ties digital marketing strategy directly to sustainable tourism practice for Malaysia's tourism industry. Concretely, that means managing resources responsibly across economic, social, and aesthetic needs, while protecting the cultural heritage, ecological processes, biodiversity, and tourism systems the industry ultimately depends on. It leans on digital platforms already in wide use social media, websites, mobile applications to carry Malaysia's eco-friendly destinations and cultural heritage to an international audience, and it folds in health and safety considerations alongside the digital innovation, aiming to support both domestic tourism promotion and the recovery of international arrivals.

The framework rests on six pillars: strengthening domestic tourism engagement; building strategic partnerships with key stakeholders; using digital platforms for targeted marketing; developing narratives that inform and engage different audiences; enabling safe travel through travel-bubble arrangements; and adapting continuously to shifts in the market and in technology. The accompanying marketing strategy draws on creativity, digital skill, and market-specific targeting, staying aligned with national policy and sustainable development goals. Taken together, these pillars are meant to support the industry's recovery, draw international visitors, and protect the destinations and heritage that make Malaysia's tourism sector distinctive.

III. METHODOLOGY

We took a quantitative approach to developing and validating the digital marketing model outlined above. Data collection combined face-to-face distribution with an online survey built in Google Forms and shared widely on social media; stratified sampling and a target of 261 responses were used to keep the dataset representative and the conclusions reliable. Three sections make up the closed-ended questionnaire, demographic data in Section A, the factors feeding into the proposed model in Section B, and the sustainable tourism sector itself in Section C with Sections B and C both scored on a 5-point Likert scale running from 1 (strongly disagree) to 5 (strongly agree). Five independent variables were measured against the dependent variable, sustainable tourism industry (STI): perceived ease of use (PEOU), perceived usefulness (PU), perceived cost (PC), greater return (GR), and efficiency (EF).

Several rounds of follow-up during data collection yielded 261 valid responses, comfortably above the minimum of 100 cases generally recommended for reliable statistical analysis. Every key variable achieved a Cronbach's alpha above 0.7 [41], [42], a sign of strong internal consistency among the constructs [44]. We carried out the analysis in SPSS, covering reliability and validity assessment, descriptive statistics, correlation analysis, and multiple regression.

IV. RESULTS AND DISCUSSION

A. Demographic Profile

TABLE 1. DEMOGRAPHIC PROFILE

Category	Item	Frequency	Percent (%)
Gender	Male	178	68.2
	Female	83	31.8
Age Group	17-22 years old	16	6.1
	23-28 years old	85	32.6
	29-34 years old	33	12.6
	34 years old and above	127	48.7
Education Level	SPM	62	23.8
	STPM/Diploma	46	17.6
	Degree	131	50.2
	Master	18	6.9
	Others	4	1.5
	UPSR	4	2.2
Work Experience	1-10 years	228	87.4
	11-20 years	28	10.7
	21-30 years	3	1.1
	31 years and above	2	0.8
State	Pahang	6	2.3
	Perak	15	5.7
	Terengganu	9	3.4
	Selangor	23	8.8
	Negeri Sembilan	14	5.4
	Johor	30	11.5
	Kelantan	2	0.8
	Kedah	4	1.5
	Pulau Pinang	1	0.4
	Melaka	136	52.1
	Sabah	2	0.8
	Sarawak	4	1.5
	Kuala Lumpur	15	5.7
Number of Employees	1-10 employees	168	64.4
	11-20 employees	52	19.9
	21-30 employees	11	4.2
	31-40 employees	8	3.1
	More than 40 employees	22	8.4
Stakeholder Type	Government Tourism Officer	18	6.9
	Marketing/Advertising Professional	130	49.8

Category	Item	Frequency	Percent (%)
	NGO/Community Representative	11	4.2
	Tourism Business Owner/Operator	82	31.4
	Tourist/Visitor	42	20.1
Tourism Sector	Accommodation (Hotel, Resort, Homestay)	73	28.0
	Attractions & Activities	79	30.3
	Tourism Board/Government Agency	22	8.4
	Travel & Tour Services	87	33.3

Of the 261 respondents summarised in Table 1, men outnumbered women by roughly two to one (68.2% vs. 31.8%). Close to half were 34 or older (48.7%), and another third fell in the 23-28 bracket (32.6%) a spread that put most participants well into their working years within the tourism industry. Degree holders made up half the sample (50.2%), with SPM (23.8%) and STPM/Diploma (17.6%) qualifications behind them, pointing to a generally solid educational base; work experience skewed heavily toward the 1-10-year range (87.4%). Melaka supplied over half the respondents (52.1%), with Johor (11.5%) and Selangor (8.8%) contributing the next-largest shares. Small enterprises with 1-10 employees dominated by organisation size (64.4%). Marketing and advertising professionals formed the single largest stakeholder group (49.8%), ahead of tourism business owners and operators (31.4%), and respondents' sector involvement spread fairly evenly across travel and tour services (33.3%), attractions and activities (30.3%), and accommodation (28.0%) a reasonable cross-section of the tourism industry.

B. Descriptive Statistical Analysis

TABLE 2. DESCRIPTIVE STATISTICS

Variables	N	Mean	Std. Deviation
Perceived Usefulness	261	4.317	0.697
Perceived Ease of Use	261	4.326	0.676
Perceived Cost	261	4.324	0.731
Greater Return	261	4.368	0.698
Efficiency	261	4.508	0.679
Sustainable Tourism Industry	261	4.323	0.658
Valid N (listwise)	261		

Every variable in Table 2 recorded a mean above 4.00, which points to generally positive perceptions across the constructs examined. Efficiency came out highest ($M = 4.508$, $SD = 0.679$), ahead of Greater Return ($M = 4.368$, $SD = 0.698$), Perceived Ease of Use ($M = 4.326$, $SD = 0.676$), Perceived Cost ($M = 4.324$, $SD = 0.731$), Sustainable Tourism Industry ($M = 4.323$, $SD = 0.658$), and Perceived Usefulness ($M = 4.317$, $SD = 0.697$), in that order. Standard deviations stayed under 1.0 throughout, reflecting fairly low variation in how respondents answered.

C. Pearson Correlation Analysis

TABLE 3. CORRELATION ANALYSIS

	1	2	3	4	5	6
1. Perceived Usefulness	1					
2. Perceived Ease of Use	.859**	1				
3. Perceived Cost	.671**	.710**	1			
4. Greater Return	.709**	.740**	.682**	1		

	1	2	3	4	5	6
5. Efficiency	.709**	.734**	.716**	.787**	1	
6. Sustainable Tourism Industry	.630**	.679**	.628**	.686**	.808**	1

** Correlation is significant at the 0.01 level (2-tailed).

Table 3 shows all variables correlating positively and significantly with each other at the 0.01 level, evidence of strong relationships running through the constructs [46]. Efficiency and Sustainable Tourism Industry produced the strongest pairing ($r = 0.808$, $p < 0.01$), with Greater Return and Efficiency close behind ($r = 0.787$, $p < 0.01$). Perceived Usefulness and Perceived Ease of Use also correlated strongly ($r = 0.859$, $p < 0.01$) — a pairing that shows up often in regional technology-adoption research [47]. Across all five predictors, higher levels track with stronger sustainable tourism industry development [48].

D. Multiple Regression Analysis

TABLE 4. MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.819a	0.670	0.664	0.38145

a. Predictors: (Constant), MinEF, MinPU, MinPC, MinGR, MinPEOU

TABLE 5. ANOVA

Model		Sum Squares	Df	Mean Square	F	Sig.
1	Regression	75.445	5	15.089	103.703	<.001
	Residual	37.103	255	0.146		
	Total	112.547	260			

a. Dependent Variable: MinSTI b. Predictors: (Constant), MinEF, MinPU, MinPC, MinGR, MinPEOU

TABLE 6. COEFFICIENTS

Model	B	Std. Error	Beta	t	Sig.
(Constant)	0.584	0.170		3.429	<.001
MinPU	-0.034	0.069	-0.036	-0.492	0.623
MinPEOU	0.175	0.076	0.180	2.295	0.023
MinPC	0.028	0.051	0.031	0.553	0.581
MinGR	0.057	0.061	0.061	0.948	0.344
MinEF	0.611	0.064	0.631	9.575	<.001

a. Dependent Variable: MinSTI

Table 6's regression model returned an R value of 0.819 a strong relationship between the five predictors and the sustainable tourism industry [49]. At $R^2 = 0.670$, the model accounts for 67.0% of the variance, ahead of the explanatory power typically reported in recent tourism digital marketing studies [50]. The ANOVA confirms the model holds up statistically ($F = 103.703$, $p < 0.001$) and is fit for prediction [43]. Efficiency emerged as the strongest predictor ($\beta = 0.631$, $p < 0.001$); Perceived Ease of Use followed ($\beta = 0.180$, $p = 0.023$), consistent with recent literature that identifies digital service efficiency and user-friendly technology as key drivers of a more sustainable tourism experience [51]. We note, though, that Perceived Usefulness and Perceived Ease of Use were strongly intercorrelated ($r = 0.859$, Table 3) a level at which multicollinearity between predictors can suppress the apparent regression effect of one or both variables, which may partly explain why Perceived Usefulness did not reach significance despite its strong bivariate correlation with the dependent variable. Variance Inflation Factor (VIF) and tolerance statistics should still be examined and reported to formally confirm the absence of problematic multicollinearity in the final regression model.

V. DISCUSSION

What shapes the effectiveness of a digital marketing model for Malaysia's sustainable tourism industry was this study's central question. With the regression model statistically significant and explaining 67.0% of the variance in sustainable tourism practices, the variables tested clearly carry real explanatory weight in the

Malaysian context. Adoption here looks driven more by operational practicality and system performance than by abstract perceptions of the technology itself which fits an industry under pressure to digitalise while staying competitive.

Perceived Ease of Use had a significant effect on the sustainable tourism industry, supporting the Technology Acceptance Model's core claim that technologies seen as easy to use get accepted more readily. This matches earlier work emphasising that user-friendly systems remain essential for digital technology adoption [22], [23], [43]. In the Malaysian tourism context, that likely reflects the industry's make-up: SMEs, homestay operators, and community-based tourism businesses that often lack in-house technical expertise, and so favour digital marketing systems that keep operational complexity low and can run without heavy technical support. Perceived Usefulness, by contrast, had no significant effect a result that runs against traditional TAM findings. It suggests digital marketing tools are now seen as a baseline operational necessity rather than a strategic advantage, so stakeholders weigh implementation ease more heavily than the functional benefits a platform promises.

Perceived Cost and Greater Return were likewise not significant. For cost, this points to financial barriers mattering less than before: affordable digital platforms, social media tools, and cloud-based systems are now widely available, and digital marketing spend increasingly reads as a routine operating cost rather than a burden. For greater return, the null result suggests tourism stakeholders may weigh long-term sustainability, destination resilience, and community well-being more heavily than short-term financial gain consistent with a sector where environmental preservation and customer trust matter as much as immediate returns.

Efficiency, however, was the strongest predictor: tourism stakeholders clearly value digital systems that improve operational performance, ease communication, strengthen customer engagement, and reduce dependence on scarce resources. This matches earlier work on the role of operational efficiency in digital transformation and sustainable business practice [6], [52]. It points to sustainable tourism development in Malaysia being shaped less by return on investment and more by the need for leaner, faster, more adaptive digital operations. Taken together, these results identify the determinants that matter for digital marketing effectiveness in sustainable tourism, extend TAM into a new empirical context, and give tourism stakeholders a basis for building digital marketing strategies that are efficient, accessible, and geared toward sustainability.

VI. CONCLUSION

What shapes the development of a digital marketing model for Malaysia's sustainable tourism industry has been this study's focus throughout. Two determinants came out significant efficiency and perceived ease of use pointing to stakeholders who weight digital marketing systems by how practical, user-friendly, and operationally efficient they are. Perceived usefulness, perceived cost, and greater return did not reach significance, suggesting these stakeholders care more about operational effectiveness and long-term sustainability than about immediate financial or technological payoff.

The study adds to theory by clarifying how digital marketing adoption plays out in a sustainable tourism setting, particularly in an emerging market like Malaysia. For tourism operators, agencies, and policymakers, the findings point toward digital marketing strategies that are accessible, efficient, and built around sustainability objectives. Prioritising operational efficiency and ease of implementation could strengthen tourism competitiveness and customer engagement and support the sector's move toward more sustainable practice.

Some limitations are worth flagging. The study drew only on selected tourism stakeholders in Malaysia and relied on a cross-sectional, quantitative design. Extending it to other tourism sectors, geographical settings, or countries would test how well the findings generalise; adding qualitative approaches or further variables technological readiness, innovation capability, digital trust, environmental awareness would build a fuller picture of sustainable tourism and digital marketing adoption.

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