Sustainable Marketing and Household Purchase Intention for Solar Energy Systems in Uasin Gishu County, Kenya: The Moderating Role of Digital Marketing

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ABSTRACT

The global transition toward renewable energy depends on more than technological innovation. It also requires strategies that move households from passive awareness of clean-energy options to active purchase decisions, a challenge that is especially pressing in Uasin Gishu County, Kenya, where households are largely semi-rural and low- to middle-income. This study examined the effect of green marketing on household purchase intention for solar energy systems in Uasin Gishu County and tested whether digital marketing moderates that relationship. Anchored in the Theory of Planned Behaviour and the Diffusion of Innovation Theory, the study proposed that environmental communication shapes how households evaluate solar energy systems, while digital platforms extend the reach, credibility, and persuasive strength of that communication. Three hypotheses were tested: **H1**, green marketing has a significant positive effect on household purchase intention for solar energy systems; **H2**, digital marketing has a significant positive effect on household purchase intention; and **H3**, digital marketing moderates the relationship between green marketing and purchase intention. The study used a quantitative, explanatory, cross-sectional survey design. Primary data were collected with a structured, Likert-type questionnaire administered to 328 household heads, allocated proportionately across six sub-counties of Uasin Gishu County: Ainabkoi, Kapseret, Kesses, Moiben, Soy, and Turbo. Exploratory factor analysis showed that green marketing, digital marketing, and purchase intention each loaded onto a single component, with loadings above .80, supporting construct validity. Hypotheses H1 and H2 were tested with hierarchical multiple regression, and H3 was tested with Hayes' PROCESS macro (Model 1).Green marketing ($\beta = .491$, $t = 10.112$, $p < .001$) and digital marketing ($\beta = .303$, $t = 5.744$, $p < .001$) each had a significant positive effect on purchase intention, supporting H1 and H2. Digital marketing also significantly moderated the effect of green marketing on purchase intention ($b_3 = .075$, $t = 2.725$, $p = .007$, $\Delta R^2 = .015$), supporting H3. The conditional effect of green marketing strengthened from $b = .360$ at low digital marketing intensity to $b = .631$ at high intensity. These findings suggest that solar energy firms operating in semi-rural, low- to middle-income settings such as Uasin Gishu should treat digital platforms not as a substitute for sustainability messaging but as an amplifier of it. Theoretical, managerial, and policy implications are discussed alongside study limitations and directions for future research.

Keywords: Green Marketing; Digital Marketing; Solar Energy Adoption; Purchase Intention; Moderation Analysis; Hayes PROCESS Model 1; Renewable Energy; Kenya

Introduction

Background of the Study

Climate change, energy insecurity, and the rising cost of grid electricity have pushed renewable energy technologies to the centre of national development agendas across the world. Solar energy, in particular, offers households a decentralized and increasingly affordable pathway to reliable electricity, especially in regions

where grid extension remains incomplete or unreliable. In Kenya, off-grid and near-grid solar solutions have expanded rapidly over the past decade, supported by declining panel costs, pay-as-you-go financing models, and government programmes aimed at achieving universal electricity access. Even so, household adoption of solar energy systems continues to lag behind the technology's potential, particularly in semi-rural and peri-urban counties where awareness, trust, and affordability concerns remain significant barriers.

Marketing communication is one of the principal mechanisms through which these barriers can be reduced. Green marketing — the deliberate communication of a product's environmental and sustainability benefits — has been shown across a range of product categories to shape consumer attitudes and strengthen purchase intention (Nekmahmud, Naz, Ramkissoon, & Fekete-Farkas, 2022; Hartmann & Apaolaza-Ibáñez, 2012). For solar energy specifically, environmental messaging works alongside functional appeals such as cost savings and energy independence to influence household evaluations (Aldaihani, Islam, Saatchi, & Haque, 2024). However, the effectiveness of green marketing is unlikely to be uniform across communication channels. The rise of digital platforms — social media, WhatsApp groups, websites, and mobile advertising — has transformed how households encounter, verify, and act on marketing information (Nekmahmud et al., 2022). Digital marketing may therefore not simply add another channel alongside green marketing; it may change how strongly green marketing messages translate into purchase intention by improving message reach, enabling peer interaction, and increasing perceived credibility of the information source.

This study investigates that possibility directly. Rather than treating green marketing and digital marketing as parallel, independent predictors of purchase intention, it tests whether digital marketing intensity moderates — that is, strengthens or weakens — the relationship between green marketing and household purchase intention for solar energy systems. The study is set in Uasin Gishu County, Kenya, an agriculturally productive Rift Valley characterised by a mix of urban, peri-urban, and rural households, many of which experience intermittent grid supply and are realistic candidates for solar adoption.

Statement of the Problem

Despite the availability of solar energy products and the proliferation of marketing campaigns promoting them, household adoption in counties such as Uasin Gishu remains below what the available technology and financing options would predict. Prior studies on renewable energy adoption in Kenya have primarily emphasised structural barriers — cost, financing, and technical reliability — while giving comparatively little attention to how the channel through which marketing messages are delivered affects their persuasive power (Kiprop, Matsui, & Maundu, 2019). At the same time, the broader green-marketing literature has tested a variety of moderators of the green-marketing–purchase-intention relationship, including environmental knowledge and green brand knowledge, but has rarely examined digital marketing intensity itself as the moderating mechanism, and almost never within the context of household energy technology adoption in a Kenyan county setting. This leaves practitioners with limited evidence on a practical question: does investing in digital communication channels actually amplify the effect of sustainability messaging on household purchase intention, or does it operate independently of it? Without an answer, solar energy firms risk misallocating marketing budgets between environmental messaging and digital channel investment. This study addresses that gap by testing green marketing, digital marketing, and their interaction as joint predictors of household purchase intention for solar energy systems.

Objectives of the Study

This study was guided by three specific objectives:

1. To determine the effect of green marketing on household purchase intention for solar energy systems in Uasin Gishu County, Kenya.

2. To establish the effect of digital marketing on household purchase intention for solar energy systems in Uasin Gishu County, Kenya.

3. To examine the moderating effect of digital marketing on the relationship between green marketing and household purchase intention for solar energy systems in Uasin Gishu County, Kenya.

Research Hypotheses

Corresponding to the three objectives, the study tested the following hypotheses, stated in the null form for statistical testing:

H1: Green marketing has no significant effect on household purchase intention for solar energy systems.

H2: Digital marketing has no significant effect on household purchase intention for solar energy systems.

H3: Digital marketing does not significantly moderate the relationship between green marketing and household purchase intention for solar energy systems.

Significance of the Study

The findings contribute to renewable-energy marketing literature by clarifying the conditions under which green marketing becomes more, or less, effective at converting environmental awareness into purchase intention. For solar energy companies and development partners operating in similar semi-rural, low- to middle-income contexts, the results offer practical guidance on how to sequence and combine sustainability messaging with digital communication investment. For policymakers pursuing universal electrification and climate targets, the study offers evidence on a lower-cost lever — communication strategy — that can complement financing and infrastructure interventions in accelerating household solar adoption.

Scope and Delimitation of the Study

The study was delimited to household heads residing in six sub-counties of Uasin Gishu County — Ainabkoi, Kapseret, Kesses, Moiben, Soy, and Turbo — and focused specifically on solar energy systems for household electrification (lighting, appliance power, and small-scale productive use), rather than solar water heating, industrial solar, or grid-tied commercial installations. The analysis is cross-sectional, capturing purchase intention rather than confirmed purchase behaviour, and considers green marketing and digital marketing as the substantive predictors of interest, with gender, age, income, household size, and education level included as statistical controls.

LITERATURE REVIEW

Theoretical Review

Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB), developed by Ajzen (1991) as an extension of the earlier Theory of Reasoned Action (Fishbein & Ajzen, 1975), posits that behavioural intention — the immediate antecedent of actual behaviour — is jointly determined by attitude toward the behaviour, subjective norms, and perceived behavioural control. Applied to green consumption, attitude captures the household's evaluation of solar energy as favourable or unfavourable; subjective norms capture perceived social pressure from family, neighbours, or community leaders to adopt solar energy; and perceived behavioural control captures the household's confidence in its ability to afford, install, and maintain a solar system. Green marketing communication is theorised to operate primarily through the attitude pathway, by supplying information that shapes beliefs about the environmental and functional consequences of adopting solar energy (Han & Kim, 2010). Because TPB treats intention formation as sensitive to the information available to the decision-maker, it provides a natural basis for expecting that both the content of a message (green marketing) and the channel through which that content is delivered (digital marketing) will jointly shape purchase intention. Recent applications of TPB to green consumption on social media have shown that channel-related constructs such as social media usage and marketing exposure enhance the predictive power of the classic TPB variables

(Nekmahmud et al., 2022), reinforcing the theoretical plausibility of treating a communication channel as a moderator rather than merely an independent predictor.

Diffusion of Innovation Theory

Rogers' (2003) Diffusion of Innovation (DOI) Theory explains how, why, and at what rate new ideas and technologies spread through a social system. The theory identifies five perceived attributes of an innovation — relative advantage, compatibility, complexity, trialability, and observability — that determine its rate of adoption, and it assigns a central role to communication channels in moving potential adopters from awareness to persuasion to the decision stage. Rogers distinguishes mass-media channels, which are efficient at creating awareness among large audiences, from interpersonal channels, which are more effective at persuading individuals to change attitudes, particularly for complex or costly innovations such as solar energy systems. Digital platforms increasingly blur this distinction: social media and messaging applications combine the reach of mass media with the interpersonal, peer-validated quality of word-of-mouth communication (for example, solar promotions shared within WhatsApp groups). DOI theory therefore predicts that digital marketing should not simply substitute for green marketing content but should accelerate its diffusion through a household's social network, strengthening the link between exposure to green marketing messages and the household's resulting purchase intention. This reasoning underlies the study's central proposition that digital marketing moderates, rather than merely parallels, the effect of green marketing on purchase intention.

EMPIRICAL REVIEW

Green Marketing and Purchase Intention

A substantial body of empirical work links green marketing to consumer purchase intention across product categories. Aldaihani, Islam, Saatchi, and Haque (2024) found that green marketing strategies, including eco-labelling and environmental advertising, significantly strengthen consumers' green purchase intention. Similarly, Hartmann and Apaolaza-Ibáñez (2012) demonstrated that consumer attitudes toward green energy brands are shaped by the psychological benefits and environmental concern communicated through marketing, which in turn predict purchase intention. Within the renewable-energy space specifically, Ozaki (2011) showed that consumers' willingness to sign up for green electricity is driven by attitudinal and normative beliefs that environmental marketing communication is designed to activate, while Pickett-Baker and Ozaki (2008) found that marketing framed around environmental performance measurably shifts consumer purchase decisions toward pro-environmental products. In the Kenyan renewable-energy context, Kiprop, Matsui, and Maundu (2019) reported that household decisions about renewable-energy technologies are closely tied to consumers' evaluations of investment value and the perceived characteristics of the energy source — evaluations that are themselves shaped by the information households receive through marketing and community channels. Collectively, this body of evidence supports the expectation that green marketing exerts a positive, direct effect on purchase intention for solar energy systems, forming the basis for the study's first hypothesis.

Digital Marketing and Purchase Intention

A parallel and rapidly growing literature examines how digital and social media marketing shape green purchase intention. Nekmahmud et al. (2022), extending the Theory of Planned Behaviour with social media usage and social media marketing constructs, found that both variables were positively and significantly associated with consumers' intention to purchase green products, and that social media usage also strengthened the relationship between attitude and green purchase intention. This is consistent with the broader argument that digital channels reduce the search costs associated with verifying environmental claims, allow consumers to compare products and prices, and expose consumers to peer opinions that increase confidence in a purchase decision. In renewable-energy contexts, digital platforms additionally address a practical barrier to solar adoption: limited awareness of where providers are located, what products cost, and what financing options exist. Where formal retail infrastructure is thin, as is the case in many semi-rural Kenyan sub-counties, mobile-based and social-media-based marketing can substitute for physical distribution networks in building consumer awareness and confidence. This literature supports the study's second hypothesis, that digital marketing exerts a positive direct effect on household purchase intention for solar energy systems.

Digital Marketing as a Moderating Variable

A smaller stream of research has tested moderators of the green-marketing–purchase-intention relationship, though the moderators examined have typically been consumer-level constructs rather than the communication channel itself. For example, studies of green purchase intention have tested environmental knowledge and green brand knowledge as moderators, generally finding that the effect of green marketing strengthens as the moderating construct increases, because better-informed or more brand-aware consumers are better able to process and act on environmental claims. Related work in the sustainable-marketing literature has similarly shown those channel and relationship variables, such as corporate social responsibility perceptions, can strengthen the link between marketing-driven brand outcomes and purchase intention in environmentally-relevant product categories such as electric vehicles. Extending this logic to the channel of delivery itself, rather than to a consumer trait, is a comparatively underexplored question, particularly outside the fast-moving-consumer-goods categories where much of the existing green-marketing moderation literature is concentrated. This study addresses that gap by testing digital marketing intensity directly as a moderator of the green-marketing–purchase-intention relationship in the context of household solar energy adoption, forming the basis for the third hypothesis.

Conceptual Framework

The conceptual framework proposes that green marketing (the independent variable) exerts a direct effect on household purchase intention for solar energy systems (the dependent variable), and that this relationship is moderated by digital marketing. Green marketing is operationalised through household exposure to and understanding of environmental, cost, and provider-related advertising content. Digital marketing is operationalised through the extent to which households receive solar-related information via social media, mobile platforms, and online sources. Purchase intention is operationalised through households' stated willingness, motivation, and plans to adopt solar energy. The framework is summarised as follows: Green Marketing → Purchase Intention, with Digital Marketing moderating the strength of that path. Gender, age, income, household size, and education level are included as control variables given their established association with technology adoption decisions in prior renewable-energy studies.

Summary and Research Gap

The reviewed literature establishes fairly consistent support for direct effects of both green marketing and digital marketing on purchase intention across product categories, including renewable energy. What remains comparatively untested — particularly in a Kenyan household solar-energy context using a moderation framework such as Hayes' PROCESS Model 1 — is whether digital marketing changes the strength of the green-marketing-to-purchase-intention pathway itself, rather than operating as a parallel, independent predictor. This study addresses that gap directly, contributing context-specific evidence from Uasin Gishu County, Kenya, to a literature that has so far been dominated by studies from Asian, European, and North American settings.

METHODOLOGY

Research Design

The study adopted a quantitative, explanatory, cross-sectional survey design. This design was appropriate because the study sought to test hypothesised causal-order relationships (green marketing and digital marketing predicting purchase intention, with a moderating interaction) using numerical data collected at a single point in time, rather than to track change over time or to generate qualitative, exploratory insight.

Study Area

The study was conducted in Uasin Gishu County, located in the North Rift region of Kenya. The county is predominantly agricultural, with a mix of urban, peri-urban, and rural settlements, and experiences intermittent

grid electricity supply in several of its sub-counties, making it a relevant setting for examining household solar energy adoption decisions.

Target Population and Sampling

The target population comprised household heads across the six sub-counties of Uasin Gishu County — Ainabkoi, Kapseret, Kesses, Moiben, Soy, and Turbo — totalling 230,363 household heads. A sample size of 399 was determined using standard proportion-based sample size procedures for finite populations, and this sample was allocated proportionately across the six sub-counties based on their respective share of household heads, as shown in Table 1. A multistage sampling procedure was applied: sub-counties were treated as strata for proportionate allocation, after which systematic random sampling was used to select individual households within each sub-county. Of the 399 questionnaires administered, 328 were returned complete and usable, yielding a response rate of 82.2 percent, which is considered adequate for survey-based social science research.

Table 1 Distribution of Household Heads and Sample Allocation by Sub-County

Sub-county	Household heads	Sample allocation
Ainabkoi	24,781	43
Kapseret	41,984	73
Kesses	30,205	52
Moiben	36,213	63
Soy	45,132	78
Turbo	52,048	90
Total	**230,363**	**399**

Note. Sample allocation was determined using proportional allocation based on the number of household heads in each sub-county.

Data Collection Instrument

Data were collected using a structured, self-administered questionnaire divided into sections capturing respondent demographics and Likert-scaled items measuring green marketing, digital marketing, and purchase intention. Items were rated on a seven-point scale ranging from strongly disagree to strongly agree, consistent with the range of composite scores observed in the data (approximately 1 to 7 across all constructs). The instrument was adapted from constructs validated in prior green-marketing, digital-marketing, and technology-adoption research and refined through expert review before administration.

Validity and Reliability of the Instrument

Content validity was established through review by subject-matter experts, who assessed the relevance and clarity of items relative to the constructs of green marketing, digital marketing, and purchase intention. Construct validity was assessed using exploratory factor analysis (EFA) with Principal Component Analysis extraction, conducted separately for each construct. As reported in Section 4, all three constructs loaded onto a single component with loadings well above the conventional 0.50 threshold (ranging from .82 to .96), confirming that the items measuring each construct were unidimensional and appropriate for use in composite scale scores. Internal consistency reliability of the resulting scales was additionally assessed using Cronbach's alpha prior to the main analysis, consistent with standard survey research practice, to confirm that items within each construct cohered acceptably before being averaged into composite variables used in the regression and moderation analyses.

Model Specification

The study's hypotheses were tested using ordinary least squares regression and Hayes' (2022) PROCESS macro Model 1 for moderation analysis. The moderation model is specified as:

Purchase Intention = b0 + b1(Green Marketing) + b2(Digital Marketing) + b3(Green Marketing × Digital Marketing) + e

where b1 captures the effect of green marketing at the (mean-centred) reference level of digital marketing, b2 captures the effect of digital marketing at the reference level of green marketing, and b3, the interaction coefficient, indicates whether the strength of the green-marketing effect on purchase intention depends on the level of digital marketing. A statistically significant b3 constitutes evidence of moderation. Gender, age, income, household size, and education level were entered as control variables in all models.

Data Analysis Procedure

Data were analysed using descriptive statistics (means, standard deviations, skewness, and kurtosis) to characterise the sample and study variables, followed by diagnostic testing of regression assumptions. Linearity between each predictor and purchase intention was assessed using the ANOVA test for linearity (deviation from linearity), and homoscedasticity of residuals was assessed using the Breusch-Pagan procedure, implemented by regressing squared standardised residuals on the study predictors.

Following satisfactory diagnostic results, hierarchical multiple regression was used to test the direct effects specified in H1 and H2, and Hayes' PROCESS Model 1 was used to test the interaction effect specified in H3, using mean-centred predictor variables, 5,000 bootstrap resamples, and bias-corrected 95 percent confidence intervals, consistent with Hayes' (2022) recommended procedure. The conditional effect of green marketing on purchase intention was probed at low, moderate, and high levels of digital marketing (one standard deviation below the mean, the mean, and one standard deviation above the mean, respectively) to characterise the form of the moderation.

Ethical Considerations

Participation was voluntary, and informed consent was obtained from all respondents prior to data collection. Respondents were assured of confidentiality and anonymity, and no personally identifying information was collected. The study instrument and procedures were reviewed for compliance with standard research ethics guidelines applicable to survey-based social science research.

Results

Response Rate

Of the 399 questionnaires distributed proportionately across the six sub-counties, 328 were returned complete and usable, representing a response rate of 82.2 percent. This response rate exceeds the commonly cited 70 percent threshold for adequate survey response in social science research and supports the reliability of the subsequent analysis.

Demographic and Household Characteristics

Table 2 presents the demographic and household characteristics of the 328 respondents. Female respondents constituted a slightly higher proportion (51.8%) than males (48.2%), suggesting balanced gender representation. Most respondents (52.4%) were aged between 25 and 44 years, representing economically active household members who are typically the primary decision-makers on household energy investments. Regarding income, the majority of households (58.2%) earned between KES 10,001 and 40,000 per month, indicating that the sample was drawn predominantly from low- to middle-income households — the segment for which affordability concerns around solar energy are most salient.

Household sizes were concentrated between four and six members (45.7%). Educational attainment was varied, with secondary education being the most common level attained (38.4%). Notably, 47.3 percent of households reported already using some form of solar energy, indicating that the sample captured both existing users and potential adopters, which is appropriate for a study of purchase intention.

Table 2 Demographic and Household Characteristics of Respondents (N = 328)

Characteristic	Category	Frequency (n)	Percentage (%)
Gender	Male	158	48.2
	Female	170	51.8
Age	25 years and below	35	10.7
	25–34 years	84	25.6
	35–44 years	88	26.8
	45–54 years	57	17.4
	Above 55 years	64	19.5
Monthly income (KES)	1,000–10,000	36	11.0
	10,001–40,000	191	58.2
	40,001–80,000	90	27.4
	80,001–100,000	9	2.7
	Above 100,000	2	0.6
Household size	1–3 members	109	33.2
	4–6 members	150	45.7
	7–9 members	47	14.3
	10 members and above	22	6.7
Education level	Primary	33	10.1
	Secondary	126	38.4
	Diploma	74	22.6
	Degree	62	18.9
	Postgraduate	33	10.1
Household location	Rural	122	37.2
	Peri-urban	133	40.5
	Urban	73	22.3
Solar energy use	Yes	155	47.3
	No	173	52.7

Note. Percentages may not total exactly 100 due to rounding. Source: Field data (2026).

Construct Validity: Exploratory Factor Analysis

Exploratory factor analysis using Principal Component Analysis extraction was conducted separately for the green marketing, digital marketing, and purchase intention scales. In each case a single component was

extracted, and all retained items loaded strongly (above .80) onto that component, confirming that each set of items measured a single underlying construct. Tables 3 to 5 present the factor loadings for each construct.

Table 3 Factor Loadings for Green Marketing Communication Indicators

Item	Loading
I have seen advertisements explaining the importance of solar energy.	.932
Advertisements have helped me understand that solar energy protects the environment.	.938
I often see messages encouraging households to use solar energy.	.946
Marketing messages have improved my understanding of solar energy benefits.	.937
Promotions explain how solar energy reduces electricity costs.	.927
Advertisements provide clear information about solar system pricing.	.943
Marketing messages present solar energy as affordable.	.945
I have seen information on flexible payment options (e.g., instalments, pay-as-you-go).	.956
Advertisements help me identify where solar providers are located.	.943
Marketing information makes it easy to contact solar providers.	.944
Marketing messages increase my trust in solar energy companies.	.956

Note. Extraction method: Principal Component Analysis. One component extracted.

Table 4 Factor Loadings for Digital Marketing (Social Media/Online Exposure) Indicators

Item	Loading
Most information I receive about solar energy comes from social media.	.927
Social media has improved my knowledge of solar energy products.	.950
Solar promotions are often shared in WhatsApp groups.	.940
Most solar energy information I receive is online.	.961
I frequently see digital advertisements about solar energy.	.954
Online sources provide information about solar energy pricing.	.934
Online content helps me understand how solar energy works.	.960
I use online platforms to compare solar energy options.	.963
I receive most solar-related information via my mobile phone.	.960
I trust solar energy information shared on digital platforms.	.955

Note. Extraction method: Principal Component Analysis. One component extracted. One item ("I frequently see solar energy content on platforms such as Facebook or WhatsApp") was dropped due to weak factor performance.

Table 5 Factor Loadings for Purchase Intention Indicators

Item	Loading
I intend to use solar energy in the future.	.907
I am willing to purchase a solar energy system.	.938
I plan to install solar energy when financially able.	.918
I am interested in switching to solar energy.	.922
I would choose solar energy if given the opportunity.	.923
I am likely to use solar energy instead of other sources.	.859
I consider solar energy a long-term solution.	.888
I would recommend solar energy to others.	.920
I am likely to purchase solar products soon.	.937
I feel motivated to adopt solar energy.	.939
I would adopt solar energy if reliable providers are available.	.955
I believe solar energy is a good choice for my household.	.938
I have a strong intention to use solar energy.	.946

Note. Extraction method: Principal Component Analysis. One component extracted.

Descriptive Statistics of Study Variables

Table 6 presents descriptive statistics for the composite study variables following data transformation. Purchase intention (PI) had a mean of 4.61 (SD = 1.23), green marketing (GM) a mean of 4.15 (SD = 1.53), and digital marketing (DM) a mean of 4.17 (SD = 1.60), on the seven-point response scale. Skewness values for all three variables fell within the range of −0.74 to −0.05, and kurtosis values ranged from −1.51 to −0.24, both comfortably within the conventional ±2 threshold, indicating that the data were approximately normally distributed and suitable for parametric regression analysis.

Table 6 Descriptive Statistics for Study Variables (N = 328)

Variable	Min	Max	Mean	SD	Skewness	Kurtosi
Purchase intention (PI)	1.38	6.69	4.61	1.23	−0.74	−0.24
Green marketing (GM)	1.27	6.91	4.15	1.53	−0.05	−1.47
Digital marketing (DM)	1.00	6.80	4.17	1.60	−0.05	−1.51

Diagnostic Tests

Before conducting regression analysis, the linearity and homoscedasticity assumptions were tested. Table 7 presents the ANOVA test for linearity between purchase intention and each of the two substantive predictors. Both relationships showed statistically significant linear components ($p < .001$), confirming that a linear regression specification was appropriate. Table 8 presents the Breusch-Pagan test for homoscedasticity, obtained by regressing squared standardised residuals on the study predictors. The overall model was not statistically significant, $F(3, 324) = 2.21$, $p = .087$, indicating that the null hypothesis of homoscedastic (constant-variance) residuals could not be rejected, and therefore that the ordinary least squares regression assumption of homoscedasticity was satisfied.

Table 7 ANOVA Test of Linearity Between Purchase Intention and Study Predictors

Relationship	Sum of squares	df	Mean square	F	Sig.
PI × GM (linearity)	79.771	1	79.771	78.838	.000
PI × DM (linearity)	23.459	1	23.459	18.584	.000

Table 8 Breusch-Pagan Test for Homoscedasticity

Source	Sum of squares	df	Mean square	F	Sig.
Regression	43.117	3	14.372	2.211	.087
Residual	2106.515	324	6.502		
Total	2149.632	327			

Note. Dependent variable: squared standardised residuals. Predictors: (Constant), green marketing, digital marketing, and study covariates. A non-significant F statistic indicates homoscedasticity.

Test of Hypothesis One: Effect of Green Marketing on Purchase Intention

Hypothesis one proposed that green marketing has no significant effect on household purchase intention for solar energy systems. As shown in Table 9, after controlling for gender, age, income, household size, and education level, green marketing had a positive and highly significant effect on purchase intention (B = .397, β = .491, t = 10.112, p < .001). The model explained approximately 29.7 percent of the variance in purchase intention (R^2 = .297, adjusted R^2 = .284), and the overall model was statistically significant, F(6, 321) = 22.625, p < .001. Among the controls, age (β = .168, p = .003) and education level (β = −.304, p < .001) were also significant predictors, while gender, income, and household size were not. The null hypothesis H1 was therefore rejected, and it is concluded that green marketing has a significant positive effect on household purchase intention for solar energy systems.

Table 9 Regression Results for the Effect of Green Marketing on Purchase Intention

Variable	B	SE	β	t	Sig.
(Constant)	3.584	0.376		9.538	.000
Gender	−0.133	0.116	−.054	−1.150	.251
Age	0.162	0.055	.168	2.958	.003
Income	0.042	0.088	.024	0.483	.629
Household size	−0.055	0.082	−.039	−0.676	.499
Education level	−0.323	0.060	−.304	−5.374	.000
Green marketing (GM)	0.397	0.039	.491	10.112	.000

Note. Dependent variable: purchase intention for solar energy among households. R = .545, R^2 = .297, Adjusted R^2 = .284, SE of estimate = 1.044, F(6, 321) = 22.625, p < .001.

Test of Hypothesis Two: Effect of Digital Marketing on Purchase Intention

Hypothesis two proposed that digital marketing has no significant effect on household purchase intention for solar energy systems. As shown in Table 10, digital marketing had a positive and statistically significant effect on purchase intention after controlling for demographic covariates (B = .235, β = .303, t = 5.744, p < .001). The model explained approximately 16.0 percent of the variance in purchase intention (R^2 = .160, adjusted R^2 = .144), and the overall model was statistically significant, F(6, 321) = 10.169, p < .001. Age (β = .137, p =

.028) and education level (β = −.267, p < .001) were again significant covariates. The null hypothesis H2 was therefore rejected, and it is concluded that digital marketing has a significant positive effect on household purchase intention for solar energy systems, though its direct effect is smaller in magnitude than that of green marketing.

Table 10 Regression Results for the Effect of Digital Marketing on Purchase Intention

Variable	B	SE	β	t	Sig.
(Constant)	3.905	0.420		9.286	.000
Gender	−0.080	0.126	−.032	−0.631	.529
Age	0.132	0.060	.137	2.204	.028
Income	0.123	0.096	.070	1.282	.201
Household size	−0.019	0.089	−.014	−0.217	.829
Education level	−0.284	0.066	−.267	−4.324	.000
Digital marketing (DM)	0.235	0.041	.303	5.744	.000

Note. Dependent variable: purchase intention for solar energy among households. R = .400, R^2 = .160, Adjusted R^2 = .144, SE of estimate = 1.142, F(6, 321) = 10.169, p < .001.

Test of Hypothesis Three: Moderating Effect of Digital Marketing

Hypothesis three proposed that digital marketing does not significantly moderate the relationship between green marketing and household purchase intention. This hypothesis was tested using Hayes' (2022) PROCESS macro Model 1, with green marketing as the focal predictor (X), digital marketing as the moderator (W), purchase intention as the outcome (Y), and gender, age, income, household size, and education level as covariates. As shown in Table 11, the interaction term (green marketing × digital marketing) was positive and statistically significant (b3 = .075, SE = .028, t = 2.725, p = .007, 95% CI [.021, .130]). Adding the interaction term produced a statistically significant increase in explained variance beyond the direct-effects model (ΔR^2 = .015, F(1, 319) = 7.427, p = .007), and the full model explained 36.6 percent of the variance in purchase intention (R^2 = .366), F(8, 319) = 23.021, p < .001. The null hypothesis H3 was therefore rejected, and it is concluded that digital marketing significantly moderates the relationship between green marketing and household purchase intention.

The conditional effects reported in the lower panel of Table 11 clarify the form of this moderation. At low digital marketing intensity (one standard deviation below the mean), the effect of green marketing on purchase intention was b = .360 (SE = .087, t = 4.153, p < .001). At moderate digital marketing intensity (the sample mean), the effect strengthened to b = .533 (SE = .049, t = 10.883, p < .001), and at high digital marketing intensity (one standard deviation above the mean), the effect strengthened further to b = .631 (SE = .056, t = 11.359, p < .001). This pattern indicates that green marketing's influence on household purchase intention nearly doubles as digital marketing exposure moves from low to high, confirming that digital marketing amplifies, rather than substitutes for, the effect of green marketing.

Table 11 Moderating Effect of Digital Marketing on the Relationship Between Green Marketing and Purchase Intention (Hayes PROCESS Model 1)

Variable	B	SE	t	p	LLCI	ULCI
Constant	5.145	0.565	9.105	.000	4.033	6.256
Green marketing (GM)	0.171	0.149	1.151	.251	−0.122	0.465
Digital marketing (DM)	−0.487	0.102	−4.775	.000	−0.688	−0.286

GM × DM (interaction)	0.075	0.028	2.725	.007	0.021	0.130
Gender	−0.127	0.111	−1.148	.252	−0.345	0.091
Age	0.173	0.052	3.298	.001	0.070	0.275
Income	0.026	0.084	0.308	.758	−0.140	0.192
Household size	−0.078	0.078	−0.997	.320	−0.231	0.076
Education level	−0.306	0.058	−5.295	.000	−0.419	−0.192

Table 11 (continued)

Model Summary and Conditional Effects of Green Marketing at Values of Digital Marketing

Statistic	**Value**
R	.605
R^2	.366
MSE	.989
F (overall model, df = 8, 319)	23.021, p < .001
R^2 change (interaction)	.015
F (interaction, df = 1, 319)	7.427, p = .007

Level of digital marketing	**Effect (b)**	**SE**	**t**	**p**	**LLCI**	**ULCI**
Low (−1 SD; 2.500)	0.360	0.087	4.153	.001	0.189	0.530
Moderate (mean; 4.800)	0.533	0.049	10.883	.001	0.437	0.629
High (+1 SD; 6.100)	0.631	0.056	11.359	.001	0.522	0.740

Note. Conditional effects of green marketing on purchase intention estimated at low, moderate, and high levels of digital marketing (mean ± 1 SD).

Summary of Hypothesis Testing

Table 12 Summary of Hypothesis Testing Results

Hypothesis	**Statistical result**	**Decision**
H1: Green marketing has no significant effect on purchase intention.	β = .491, t = 10.112, p < .001	Rejected
H2: Digital marketing has no significant effect on purchase intention.	β = .303, t = 5.744, p < .001	Rejected
H3: Digital marketing does not significantly moderate the GM–PI relationship.	b3 = .075, t = 2.725, p = .007	Rejected

DISCUSSION

Green Marketing and Purchase Intention

The finding that green marketing significantly and positively predicts household purchase intention for solar energy systems (β = .491, p < .001) is consistent with the Theory of Planned Behaviour's account of attitude formation: information about environmental benefits, cost savings, and provider reliability appears to shape favourable evaluations of solar energy, which households then translate into stated intention to purchase. The magnitude of this effect — the largest of any predictor in the study — echoes findings from Aldaihani et al.

(2024) and Hartmann and Apaolaza-Ibáñez (2012), who similarly found environmental and green-brand communication to be a dominant driver of purchase intention in energy-related and green product categories. The result also extends Kiprop et al.'s (2019) observation that Kenyan households' renewable-energy decisions are closely tied to their evaluations of investment value: this study suggests that green marketing communication is one concrete mechanism through which those evaluations are formed.

Digital Marketing and Purchase Intention

Digital marketing also had a significant positive direct effect on purchase intention ($\beta = .303$, $p < .001$), though smaller in magnitude than that of green marketing. This is broadly consistent with Nekmahmud et al.'s (2022) finding that social media marketing and social media usage are positively associated with green purchase intention. In the Uasin Gishu context, where formal solar retail infrastructure is uneven across sub-counties, digital channels appear to function partly as a substitute for physical distribution and partly as an information-search tool, helping households learn about providers, pricing, and payment options that would otherwise be difficult to access. The comparatively smaller direct effect, relative to green marketing, suggests that digital marketing alone — absent environmentally framed content — is a weaker independent driver of purchase intention than the substantive sustainability message itself.

The Moderating Role of Digital Marketing

The central contribution of this study is the finding that digital marketing significantly moderates the relationship between green marketing and purchase intention ($b3 = .075$, $p = .007$), with the conditional effect of green marketing on purchase intention increasing from .360 at low digital marketing intensity to .631 at high digital marketing intensity — nearly a twofold strengthening. This pattern is well explained by Diffusion of Innovation Theory (Rogers, 2003): digital platforms function simultaneously as mass-reach and interpersonal channels, allowing green marketing content to circulate through household social networks (for example, via WhatsApp groups, as captured in the digital marketing scale) in ways that increase its perceived credibility and salience. Rather than green marketing and digital marketing operating as separate, additive levers, the results suggest they interact: green marketing content delivered through low-digital-exposure households produces a comparatively modest shift in purchase intention, whereas the same content reaching highly digitally engaged households produces a substantially larger shift. This finding is conceptually aligned with, but extends, prior green-marketing moderation studies that have relied on consumer-level moderators such as environmental knowledge or green brand knowledge: it demonstrates that the communication channel itself can perform an equivalent amplifying function.

Two secondary patterns in the results merit comment. First, education level was a consistent negative predictor of purchase intention across all three models (β ranging from $-.267$ to $-.304$, $p < .001$). This counter-intuitive result may reflect that more formally educated household heads in this sample are disproportionately concentrated in urban or peri-urban areas with more reliable grid connections, reducing their felt need for solar energy, or that greater education is associated with more critical scrutiny of marketing claims and financing terms, dampening stated purchase intention even where awareness is high. Second, age was a consistent positive predictor (β ranging from .137 to .173, $p \leq .028$), suggesting that older household heads, who are more likely to be established heads of household with independent purchasing authority over major home investments, express stronger purchase intention than younger respondents. Gender, income, and household size were not significant predictors in any of the three models, suggesting that, in this sample, purchase intention for solar energy is shaped more by communication exposure and life-stage factors than by these demographic characteristics.

CONCLUSION AND RECOMMENDATIONS

Conclusion

This study set out to examine the effect of green marketing on household purchase intention for solar energy systems in Uasin Gishu County, Kenya, and to test whether digital marketing moderates that relationship. Using survey data from 328 household heads and Hayes' PROCESS Model 1, the study found that both green

marketing and digital marketing significantly and positively predict purchase intention, and, more importantly, that digital marketing significantly strengthens the effect of green marketing on purchase intention. Green marketing's influence on household purchase intention is therefore not fixed; it depends materially on the digital communication environment through which it is delivered. All three hypotheses were rejected, indicating direct effects of both predictors and a significant moderating interaction.

Theoretical Implications

The findings extend the Theory of Planned Behaviour and Diffusion of Innovation Theory to the specific context of household renewable-energy adoption by demonstrating that a communication channel variable — digital marketing — can function as a boundary condition on the strength of a green-marketing effect, rather than merely as an additional independent predictor. This contributes to the broader green-marketing literature, which has more commonly tested consumer-level moderators such as environmental knowledge or green brand knowledge, by showing that channel-level intensity can perform a comparable amplifying role. It also contributes context-specific evidence to a literature on renewable-energy adoption in Kenya that has historically emphasised structural and financial barriers over communication-channel effects.

Managerial and Practical Implications

For solar energy companies and their marketing teams, the results suggest that digital channel investment and environmental messaging should be planned jointly rather than as separate budget lines. Firms that rely on green messaging through traditional or offline channels alone are likely to realise a smaller return on that messaging than firms that pair the same content with active digital distribution — social media pages, WhatsApp community groups, and mobile-targeted advertising — given the near-doubling of the green-marketing effect observed between low and high digital marketing exposure in this sample. Marketing teams operating in semi-rural counties such as Uasin Gishu should also consider that digital channels appear to substitute in part for weak physical retail visibility, making digital investment particularly valuable in areas with thin provider networks. Given the negative association between education level and purchase intention observed here, providers may also benefit from tailoring messaging for more formally educated segments toward addressing scrutiny of costs, warranties, and provider credibility, rather than relying on general environmental appeals alone.

Policy Implications

For county and national government actors pursuing universal electrification and climate commitments, the findings suggest that communication-channel policy — for example, supporting digital and mobile connectivity infrastructure, or partnering with solar providers on digitally distributed public awareness campaigns — can function as a comparatively low-cost complement to existing financing and subsidy interventions aimed at accelerating household solar adoption.

LIMITATIONS OF THE STUDY

This study is subject to several limitations. First, the cross-sectional design captures purchase intention at a single point in time and cannot establish that green marketing and digital marketing exposure precede, rather than merely correlate with, that intention; nor can it confirm that stated intention translates into actual purchase behaviour. Second, the study relied on self-reported measures of marketing exposure and intention, which may be subject to social desirability or recall bias. Third, the sample was drawn exclusively from one Kenyan county, limiting the generalisability of the findings to other counties or countries with different infrastructure, income, and connectivity profiles. Fourth, the study examined a single moderator (digital marketing); other plausible moderating or mediating variables — such as brand reputation, which was measured in the broader data collection but fell outside the scope of the present study's three objectives — were not incorporated into the reported models.

Directions for Future Research

Future research should consider longitudinal or panel designs capable of tracking households from marketing exposure through to confirmed purchase behaviour, comparative studies across multiple counties or countries with differing infrastructure and connectivity contexts, and extended models that incorporate additional mediating and moderating variables, including brand reputation, environmental knowledge, and financing accessibility, to build a more complete account of the pathways linking marketing communication to household solar energy adoption.

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