Factors Influencing Consumer Preference and Buying Decisions for Residential Solar PV Systems: An Empirical Study of Households in Morbi and Rajkot, Gujarat

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Abstract*—Purpose: Residential solar photovoltaic (PV) systems offer households lower electricity bills, greater energy independence, and a cleaner energy source, yet many homeowners who are aware of these benefits have not installed a system. This study identifies the economic, social, informational, and trust-related factors that shape consumer preference and buying decisions for residential solar PV systems, and tests whether knowledge of the technology is related to purchase intention. Design/methodology/approach: A descriptive research design was used. Primary data were collected between January and February 2026 from 100 residential consumers in Morbi and Rajkot (Gujarat, India) through a structured online questionnaire administered using convenience sampling. Responses were analysed with frequency and percentage analysis, mean scores of five-point Likert statements, the Chi-square goodness-of-fit test, and the Chi-square test of independence at the 5% level of significance. Findings: Awareness of solar PV (97%) and of government schemes (96%) was very high, but only 45% of respondents had installed a system. Government subsidies influenced the purchase decision of 99% of respondents ($\chi^2 = 96.04$, $p < 0.001$), and every respondent agreed that solar PV reduces electricity bills (mean = 4.83). Quality and warranty (89%), subsidy (80%), and price (74%) were the factors most often ranked among the top three, while high initial cost (74%) and lack of awareness (61%) were the main barriers among non-adopters. Recommendations from friends and family (92% agreement) also shaped decisions significantly. Four of the five hypotheses were supported. Self-rated knowledge was not related to purchase intention ($\chi^2 = 5.73$, $p = 0.767$), because intention was high at every knowledge level. Practical implications: Solar companies should pair subsidy facilitation and easy EMI financing with clear warranty communication, referral-driven word-of-mouth marketing, and practical consumer education that helps interested households move from intention to installation. Originality/value: The study provides recent, region-specific evidence from the Saurashtra region of Gujarat, a major solar manufacturing cluster, on why awareness does not automatically translate into adoption.

***Index Terms*—Buying decision, Consumer preference, Government subsidy, Gujarat, Purchase intention, Residential solar PV, Rooftop solar**

I. INTRODUCTION

Rising electricity tariffs, growing concern about climate change, and the finite nature of fossil fuels have pushed households and governments to look for cleaner sources of power. Solar energy is the most abundant of these sources, and the cost of manufacturing solar panels has fallen sharply over the last decade, making it one of the cheapest forms of new electricity in many regions. Solar panels typically last around 25 years, which allows a household that installs a rooftop system to lock in decades of low-cost generation.

India, with abundant sunshine for most of the year, is well placed to benefit from this transition. The Government of India has promoted solar power through the National Solar Mission, its leadership of the International Solar Alliance, and household-level subsidy programmes for rooftop systems such as the PM Surya Ghar: Muft Bijli Yojana (MNRE, n.d.). Domestic manufacturing has also expanded quickly under the "Make in India" policy and Domestic Content Requirement (DCR) norms. Gujarat, and the

Morbi–Rajkot belt in particular, has emerged as an important centre of solar module manufacturing.

Despite these favourable conditions, residential adoption remains below its potential. Homeowners frequently acknowledge the financial and environmental benefits of solar PV, yet the step from interest to installation is held back by perceived risks, high upfront cost, limited technical knowledge, confusion among competing brands and technologies, and uncertainty about installers and after-sales service. Understanding which factors actually drive consumer preference is therefore important for solar companies designing their marketing strategies and for policymakers designing incentive schemes.

This study was carried out in association with Sunbond Energy Pvt. Ltd., a solar PV module manufacturer based in Morbi, Gujarat, that serves residential, commercial and utility-scale segments. It examines the factors that influence consumer preference and buying decisions for residential solar PV systems among households in Morbi and Rajkot.

A. Statement of the Research Problem

A significant gap exists between consumer awareness of solar PV and its actual adoption. The specific issues addressed in this study are:

- Many potential consumers remain hesitant to adopt residential solar PV systems despite their long-term benefits.
- Limited technical knowledge affects how consumers understand and evaluate solar PV systems.
- High initial installation cost influences the buying decision of residential customers.
- Multiple brands, technologies, and pricing options create confusion in the market.
- The extent to which government subsidies and incentives drive purchase decisions is not clearly understood.
- Trust in service providers, installation quality, and after-sales service varies among consumers.
- Solar companies find it difficult to identify the factors that matter most to consumers.

II. REVIEW OF LITERATURE

Research on residential solar adoption has examined economic, environmental, social, psychological, and policy-related determinants. The literature reviewed for this study is organised below by theme.

A. Economic Factors and Financial Incentives

Financial considerations appear consistently as the strongest drivers of adoption. Petrovich (2021) found that installation cost, expected savings, and the availability of subsidies play a crucial role in household investment decisions. Alrawi et al. (2022), in a survey from Qatar, similarly reported that installation cost, expected savings, and incentives strongly shape adoption, alongside concerns about reliability and maintenance. Zander et al. (2019) showed that Australian households preferred upfront rebates and direct subsidies over other incentives because they reduce the initial investment. Islam and Meade (2013) demonstrated that installation cost, payback period, and government incentives affect not only whether households adopt PV but also when they adopt it, with high perceived cost delaying adoption. Glumac and Wissink (2018) found that homebuyers value energy cost savings and favourable financing more than environmental benefits.

B. Barriers and Uncertainty

Rai, Reeves and Margolis (2016) identified high upfront costs, information gaps about performance, perceived financial risk and regulatory hurdles as the key barriers to residential PV, and argued that incentives, streamlined permitting and financing options reduce them. Faiers and Neame (2006) observed that although consumers held positive attitudes toward domestic solar systems, high upfront cost, lack of clear information, and uncertainty about performance deterred potential buyers.

C. Environmental Values and Psychological Factors

Chen (2014) found that customer innovativeness, environmental values, and ecological lifestyles significantly increase the intention to install residential solar systems. Aggarwal, Syed and Garg (2019), studying Indian consumers, reported that environmental concern, perceived economic benefits, awareness of government policy, positive attitude and social influence all encourage rooftop solar purchase intention. García Alcaraz et al. (2025) showed that supportive government policies and environmental awareness improve attitudes toward solar energy, which in turn raise purchase intention. Batool, Zhao and Irfan (2024) linked environmental concern, perceived benefits, social influence and government support to the willingness to adopt renewable

technologies, particularly among lower-income households.

D. Social Influence and Information Sources

Liang et al. (2021) showed that social support, source credibility, and social influence positively affect solar PV purchase intention, with recommendations from family, friends, experts, and trusted installers increasing consumer confidence. Tanaka et al. (2017) found that in Japan, the purchase decision is shaped by family discussion, installer recommendations, and policy support rather than made individually. Kesari, Atulkar and Pandey (2021) identified social influence and product knowledge, together with environmental and economic considerations, as determinants of purchasing behaviour toward residential solar lighting systems in India.

E. Product Attributes, Demographics and Consumer Segments

Chen, Honda and Yang (2013) found that both technical attributes (power warranty, panel efficiency) and non-technical attributes (manufacturer reputation, aesthetics) influence preferences for residential solar panels. Siwiec and Pacana (2021) proposed a multi-criteria model in which customers evaluate PV panels on quality, efficiency, durability, price, warranty, and technical performance. Sommerfeld et al. (2017a) reported that income, home ownership and education are strong predictors of adoption, while Sommerfeld, Buys and Vine (2017b) showed that post-installation experience and interaction with installers shape how consumers perceive solar PV. Mamkhezri, Thacher and Chermak (2020) found considerable heterogeneity in willingness to pay for solar options, and Petrovich, Hille and Wüstenhagen (2019) segmented adopters into environmentally driven, economically motivated and aesthetics-conscious groups.

Table I. Summary of Key Studies Reviewed

Author(s) and Year	Context	Key Factors Identified
Faiers & Neame (2006)	United Kingdom	Attitudes, expected savings, upfront cost, information gaps
Islam & Meade (2013)	Canada	Cost, payback period, incentives, adoption timing
Chen (2014)	Taiwan	Innovativeness, environmental values, ecological lifestyle
Rai, Reeves & Margolis (2016)	United States	Upfront cost, information gaps, financial risk, policy
Sommerfeld et al. (2017a)	Australia	Income, home ownership, education
Tanaka et al. (2017)	Japan	Family discussion, installer advice, feed-in tariffs
Aggarwal, Syed & Garg (2019)	India	Environmental concern, economic benefit, policy awareness, social influence
Zander et al. (2019)	Australia	Rebates, feed-in tariffs, low-interest loans
Liang et al. (2021)	China	Social support, source credibility, social influence
Kesari, Atulkar & Pandey (2021)	India	Environmental awareness, cost savings, product knowledge
Alrawi et al. (2022)	Qatar	Cost, savings, incentives, reliability, maintenance
García Alcaraz et al. (2025)	Mexico	Government policy, environmental concern, attitude

Source: Compiled by the authors from the reviewed literature.

F. Research Gap

Most of the reviewed studies were conducted in developed economies such as the United States, Australia, Japan and the United Kingdom, where incentive structures, income levels and housing patterns differ considerably from India. The few Indian studies are either national in scope or focus on related products such as solar lighting. There is limited recent, region-specific evidence from the Saurashtra region of Gujarat, an important solar manufacturing cluster, on how subsidies, cost, social influence and knowledge jointly shape residential buying decisions, particularly since the introduction of expanded rooftop subsidy schemes. This study attempts to fill that gap.

III. OBJECTIVES OF THE STUDY

1) To identify the key factors influencing consumers' preference for residential solar PV systems.
2) To analyze the impact of economic factors such as installation cost, return on investment, electricity savings and government subsidies on buying decisions.

3) To examine the role of environmental awareness and sustainability concerns in shaping consumer attitudes toward solar energy adoption.
4) To assess the influence of brand reputation, product quality and after-sales service on consumer trust and purchase intention.
5) To identify the challenges and barriers faced by consumers when deciding to invest in residential solar PV systems.
6) To offer practical suggestions to solar companies and policymakers for improving awareness, service quality, and adoption.

IV. HYPOTHESES OF THE STUDY

The following null (H_0) and alternative (H_1) hypotheses were formulated based on the research problem, objectives and literature:

Table II. Hypotheses Of the Study

No.	Null Hypothesis (H_0)	Alternative Hypothesis (H_1)
H1	Government subsidies and incentives do not significantly influence consumers' purchase decisions.	Government subsidies and incentives significantly influence consumers' purchase decisions.
H2	Perceived reduction in electricity bills has no significant effect on consumers' buying decisions.	Perceived reduction in electricity bills has a significant effect on consumers' buying decisions.
H3	Initial installation cost does not significantly affect consumer preference for solar PV systems.	Initial installation cost significantly affects consumer preference for solar PV systems.
H4	Recommendations from friends and family do not significantly influence consumers' purchase decisions.	Recommendations from friends and family significantly influence consumers' purchase decisions.
H5	There is no significant relationship between consumer awareness/knowledge of solar PV systems and purchase intention.	There is a significant positive relationship between consumer awareness/knowledge and purchase intention.

V. RESEARCH METHODOLOGY

The study follows a descriptive research design aimed at describing the characteristics, perceptions and buying behaviour of residential consumers. The research plan is summarised in Table III.

Table III. Research Design

Element	Details
Research type	Descriptive research
Sampling method	Non-probability convenience sampling
Sampling element	Residential consumers – homeowners and potential buyers of solar PV systems
Population size	500
Sample size	100 respondents
Area of survey	Morbi and Rajkot cities, Gujarat
Period of data collection	January – February 2026
Source of data	Primary data (supported by secondary data from journals, company records, and government websites)
Data collection method	Survey method (online questionnaire)
Data collection tool	Structured questionnaire of 26 items: demographics, awareness, five-point Likert statements, multiple-choice and multiple-response items (Appendix)
Statistical tools	Frequency and percentage analysis; mean and standard deviation; Chi-square goodness-of-fit test (H1–H4); Chi-square test of independence, supported by Spearman's rank correlation (H5); $\alpha = 0.05$

Likert statements were scored from 5 (Strongly Agree) to 1 (Strongly Disagree), so a mean above 3 indicates overall agreement. For the goodness-of-fit tests on Likert items, the expected frequency under the null hypothesis assumes responses are spread equally across the five categories (no systematic opinion); for Yes/No items, the expected split is 50:50. For H5, the test of independence compares observed and expected frequencies in a cross-tabulation of knowledge level against purchase intention.

Treatment of the data. Two follow-up questions were applied only to part of the sample: reasons for installation (Q19, adopters only) and barriers to installation (Q20, non-adopters only). A few

respondents answered the follow-up that did not apply to them; these answers were excluded so that each percentage is based on the correct group. Purchase intention (Q21) was answered by 71 respondents: all 55 non-adopters and 16 adopters (who may be considering an additional or upgraded system). The remaining 29 respondents, all adopters, did not answer it. Three respondents selected two adjacent intention options ("very likely" and "likely") and were counted once as "very likely"; the effect of this choice on H5 is reported in Section VII.

VI. DATA ANALYSIS AND INTERPRETATION

A. Demographic Profile of Respondents

Table IV. Demographic Profile of Respondents (N = 100)

Variable	Category	Frequency	Percentage
Age (years)	Below 25	23	23%
	25–35	48	48%
	36–45	17	17%
	46–55	12	12%
	Above 55	0	0%
Gender	Male	82	82%
	Female	18	18%
Education	School level	1	1%
	Graduate	72	72%
	Postgraduate	25	25%
	Other (diploma, CA)	2	2%
Monthly household income (₹)	Below 25,000	10	10%
	25,000 – 50,000	18	18%
	50,001 – 1,00,000	43	43%
	Above 1,00,000	29	29%
Occupation	Service (private/government)	52	52%
	Business	31	31%
	Student	13	13%
	Other (farmers, advocates)	4	4%

Source: Primary data.

The sample is dominated by young and middle-aged respondents, with 71% under 36 years of age. Most respondents are male (82%) and well educated, with 97% holding a graduate or postgraduate degree. Seventy-two per cent belong to households earning more than ₹50,000 a month, and 83% are salaried or self-employed, indicating a sample with the financial capacity to consider a solar investment.

B. Awareness and Sources of Information

Table V. Awareness and Knowledge of Solar Pv Systems (N = 100)

Item	Response	Percentage
Aware of solar PV systems (Q7)	Yes / No	97% / 3%
Aware of government schemes supporting solar (Q16)	Yes / No	96% / 4%
Source of first information (Q8)*	Friends/family	73%
	Internet / social media	57%
	Government programmes	30%
	Other	3%
Self-rated knowledge of solar PV (Q9)	Excellent	17%
	Good	32%
	Moderate	40%
	Poor	11%

Multiple responses allowed; percentages do not total 100. Source: Primary data.

Awareness of solar PV (97%) and of government schemes (96%) is almost universal. Friends and family (73%) are the most common first source of information, ahead of the internet and social media (57%), which shows the importance of personal networks. However, only 49% rate their knowledge as good or excellent, while 51% rate it as moderate or poor. Consumers therefore know that solar exists and is subsidised but are less confident about the technical details.

C. Consumer Perceptions of Solar PV

Table VI. Responses To Likert-Scale Statements (N = 100)

Statement	SA	A	N	D	SD	Mean	SD (σ)
Installing solar PV helps reduce electricity bills (Q11)	83	17	0	0	0	4.83	0.38
Solar energy is a reliable source of power (Q10)	73	25	2	0	0	4.71	0.50
Solar systems are environmentally friendly (Q12)	59	39	2	0	0	4.57	0.54
Recommendations from friends/family influence my decision (Q23)	31	61	7	1	0	4.22	0.61

Brand reputation affects my decision (Q22)	39	45	14	0	2	4.19	0.83
Initial installation cost of solar PV is affordable (Q14)	11	60	27	1	1	3.79	0.69
Financial support/EMI options would encourage me to buy (Q17)	21	40	33	5	1	3.75	0.88
Online reviews and ratings play an important role (Q24)	21	35	42	1	1	3.74	0.84
Maintenance of solar systems is easy (Q13)	17	42	39	1	1	3.73	0.79
I prefer locally available brands over international ones (Q25)	17	47	29	4	3	3.71	0.90

SA = Strongly Agree (5), A = Agree (4), N = Neutral (3), D = Disagree (2), SD = Strongly Disagree (1). Figures are numbers of respondents. Source: Primary data; mean and σ computed by the authors.

All ten statements have a mean above the neutral value of 3, but they fall into two clear tiers. The strongest agreement relates to the core benefits of solar PV: bill reduction (4.83, with 100% agreement), reliability (4.71), and environmental friendliness (4.57). Social influence (4.22) and brand reputation (4.19) form a second tier of strong influence. Agreement is noticeably weaker, with large neutral shares of 27% to 42%, on affordability, financing, online reviews, ease of maintenance, and local-brand preference. Consumers are convinced of the benefits but are less certain about cost, upkeep, and which brand or seller to trust.

D. Government Support and Financing

Ninety-nine per cent of respondents stated that government subsidies or incentives influence their decision to buy a solar system (Q15), and 96% were aware of at least one government scheme. Sixty-one per cent agreed that financial support or EMI options would encourage them to purchase, while one-third remained neutral. Subsidies are thus an almost universal decision factor, and financing acts as an additional lever for a large part of the market.

E. Adoption Status, Reasons and Barriers

Forty-five per cent of respondents had installed a solar PV system at their residence, and 55% had not (Q18). Adopters were asked for their main reasons for installation (Fig. 2) and non-adopters for the barriers preventing installation (Fig. 3); both were multiple-response questions.

Reducing electricity bills was the leading reason for installation (93.3% of adopters), followed by government subsidy (64.4%) and long-term investment (60.0%). Environmental concern was cited by only one-third of adopters (33.3%). Among the 54 non-adopters who answered the barrier question, high initial cost (74.1%) and lack of awareness (61.1%) were the dominant barriers, followed by space constraints (44.4%). Lack of trust in the technology (7.4%) and uncertainty about the benefits (5.6%) were minor concerns. The barriers are therefore practical (cost, information, roof space) rather than attitudinal.

F. Future Purchase Intention

Table VII. Intention To Install Solar Pv Within Two Years (N = 71)

Response	Count	Percentage	Cumulative %
Very likely	42	59.2%	59.2%
Likely	21	29.6%	88.7%
Not sure	7	9.9%	98.6%
Unlikely	0	0.0%	98.6%
Never	1	1.4%	100.0%
Total	71	100.0%	

Q21 was answered by all 55 non-adopters and 16 adopters. Percentages may not sum exactly because of rounding. Source: Primary data.

When asked how likely they were to consider installing a solar PV system within the next two years, 59.2% of the 71 respondents answered "very likely", 29.6% "likely", 9.9% "not sure", 0% "unlikely" and 1.4% "never". Overall, 88.7% are likely or very likely to consider installing a system. The figure is almost identical among non-adopters alone: 49 of the 55 (89.1%) said they were likely or very likely to install, which represents a large pool of interested but not yet converted households.

G. Most Important Factors in the Purchase Decision

When asked to choose the three most important factors (Q26), 89% of respondents selected quality and warranty, 80% subsidy or incentives, and 74% price. Brand image (30%) and environmental concern (21%) were chosen far less often. Consumers therefore weigh product reliability and financial value most heavily when choosing a system, which matters for a product expected to perform for 25 years or more.

VII. TESTING OF HYPOTHESES

Hypotheses H1 to H4 were tested with the Chi-square goodness-of-fit test, $\chi^2 = \Sigma (O - E)^2 / E$, where O is the observed frequency, and E is the expected frequency under the null hypothesis. H5 concerns the relationship between two variables and was tested with the Chi-square test of independence, where E for each cell = (row total × column total) / total. All tests use the 5% level of significance. The results are summarised in Table VIII.

Table VIII. Results Of Chi-Square Tests

Hyp.	Questionnaire item and expected distribution	χ^2 value	df	Critical value	p-value	Decision
H1	Q15 – Subsidy influences decision (Yes 99, No 1); E = 50: 50	96.04	1	3.841	< 0.001	H_0 rejected
H2	Q11 – Solar reduces electricity bills (83, 17, 0, 0, 0); E = 20 per category	258.90	4	9.488	< 0.001	H_0 rejected
H3	Q26 – Price ranked in top three (Yes 74, No 26); E = 60: 40*	8.17	1	3.841	0.004	H_0 rejected
H4	Q23 – Friends/family influence (31, 61, 7, 1, 0); E = 20 per category	136.60	4	9.488	< 0.001	H_0 rejected
H5	Q9 (knowledge) × Q21 (intention) – test of independence (n = 71) **	5.73	9	16.919	0.767	H_0 not rejected

Respondents chose 3 of 5 factors, so under the null hypothesis each factor has a 3/5 (60%) chance of being selected. *4 × 4 table (Table IX); the "Unlikely" category had no responses and was excluded. Expected counts were below 5 in 11 of 16 cells. Source: Computed by the authors.

H1 (Government subsidies): The calculated χ^2 (96.04) far exceeds the critical value (3.841). The null hypothesis is rejected: government subsidies and incentives significantly influence consumers' purchase decisions.

H2 (Reduction in electricity bills): With $\chi^2 = 258.90$ against a critical value of 9.488, the null hypothesis is rejected. The perceived reduction in electricity bills has a significant effect on buying decisions, which is consistent with 93.3% of adopters naming it as a main reason for installation.

H3 (Initial installation cost): Price was ranked among the top three factors by 74% of respondents, significantly more than the 60% expected by chance ($\chi^2 = 8.17$, $p = 0.004$). The null hypothesis is rejected: installation cost significantly affects consumer preference. This is supported by high initial cost being the leading barrier among non-adopters (74.1%).

H4 (Friends and family recommendations): The calculated χ^2 (136.60) exceeds the critical value (9.488), and 92% of respondents agreed with the statement. The null hypothesis is rejected: recommendations from friends and family significantly influence purchase decisions.

Table IX. Knowledge Level and Purchase Intention (N = 71)

Knowledge level (Q9)	Very likely	Likely	Not sure	Never	Total
Excellent	9	2	2	0	13
Good	14	6	3	1	24
Moderate	14	10	2	0	26
Poor	5	3	0	0	8
Total	42	21	7	1	71

Source: Primary data.

H5 (Awareness/knowledge and purchase intention): A Chi-square test of independence was applied to the cross-tabulation of self-rated knowledge (Q9) and intention to install within two years (Q21), shown in Table IX. The calculated χ^2 (5.73, df = 9) is well below the critical value of 16.919 ($p = 0.767$), so the null hypothesis is not rejected: there is no significant relationship between knowledge of solar PV and purchase intention. Because many expected counts were below 5, the result was checked in three ways, all of which led to the same conclusion: a Monte Carlo permutation test of the same table (20,000 replications, $p = 0.81$); Spearman's rank correlation between knowledge and intention ($\rho = 0.02$, $p = 0.88$); and recoding the three double responses as "likely" instead of "very likely" ($\chi^2 = 4.60$, $p = 0.868$). Intention is high at every knowledge level: all 8 respondents with poor knowledge said they were likely or very likely to install. Consumers' willingness to consider solar therefore does not depend on how much they know about the technology, which is consistent with the

finding that the main barriers are practical (cost, roof space) rather than attitudinal.

VIII. FINDINGS AND DISCUSSION

- Economic benefits dominate the decision. Electricity bill reduction received unanimous agreement and was a main motive for 93.3% of adopters, far ahead of environmental concern (33.3%). This supports Glumac and Wissink (2018) and Petrovich (2021), who found that financial returns outweigh environmental motives for most households.
- Subsidies are a near-universal trigger. Ninety-nine per cent said subsidies influence their decision, and subsidies were the second most important factor overall (80%). This agrees with Zander et al. (2019) and Aggarwal et al. (2019) and suggests that household subsidy schemes have been a key driver of adoption in the region.
- Upfront cost is the main barrier. Even with subsidies, 74.1% of non-adopters cited high initial cost, and only 11% strongly agreed that solar PV is affordable. This echoes the barriers identified by Rai et al. (2016) and Faiers and Neame (2006). The 61% who would be encouraged by EMI options show that financing can address part of this barrier.
- An awareness–knowledge gap exists, but it does not suppress intention. Awareness is very high (97%), yet 51% rate their knowledge as only moderate or poor, 61.1% of non-adopters cite lack of awareness as a barrier, and 39% are unsure whether maintenance is easy. However, knowledge was not related to purchase intention (H5), and intention was high at every knowledge level. Unlike Aggarwal et al. (2019), who found policy awareness to raise intention, this study suggests that in a market where awareness is already near-universal, interest is no longer the constraint. Closing the knowledge gap is therefore more likely to help convert existing intention into informed, confident installation than to create new interest.
- Quality and warranty drive brand choice. Quality and warranty were the most frequently chosen factor (89%), and 84% agreed that brand reputation matters. Consumers making a 25-year investment look for reliability assurance, consistent with Chen, Honda and Yang (2013) and Siwiec and Pacana (2021).
- Word-of-mouth is powerful. Friends and family were both the leading source of information (73%) and a significant influence on decisions (92% agreement), supporting Liang et al. (2021) and Tanaka et al. (2017). Online reviews had a more moderate effect, with 42% neutral.
- Consumers show a moderate preference for local brands. Sixty-four per cent prefer locally available brands, which favours domestic manufacturers that can offer nearby service support.
- Trust in the technology is high. Ninety-eight per cent consider solar a reliable source of power and only 7.4% of non-adopters distrust the technology, so the main obstacles are financial and practical rather than scepticism about solar itself.

IX. SUGGESTIONS AND MANAGERIAL IMPLICATIONS

- Facilitate subsidies end-to-end. Solar companies and dealers should explain subsidy eligibility clearly and handle the application and documentation for customers, because subsidies influence almost every buyer.
- Offer easy financing. Partnerships with banks and NBFCs for low-interest loans and EMI plans can reduce the upfront-cost barrier, which is the single largest reason for non-adoption.
- Make quality and warranty visible. Marketing should highlight certifications, product and performance warranties, and expected generation, since quality and warranty are the top-ranked factors.
- Build referral programmes. Given the strength of word-of-mouth, companies should encourage satisfied customers to refer others through referral incentives, testimonials, and site visits to existing installations.
- Use education to convert, not to persuade. Since interest is already high at every knowledge level, workshops in housing societies, webinars, short social-media explainers and brochures in Gujarati should focus on the practical steps that turn intention into installation: system sizing, payback,

maintenance, roof-space requirements and the subsidy process.

- Strengthen after-sales service. Professional installation, quick complaint resolution and periodic maintenance visits can address uncertainty about upkeep and build long-term trust.
- Policy support. Policymakers can simplify subsidy disbursement, promote awareness campaigns about technical aspects, and encourage financing schemes to reach middle-income households.

X. LIMITATIONS AND SCOPE FOR FUTURE RESEARCH

- The sample of 100 respondents from two cities, selected by convenience sampling, limits how far the findings can be generalised to Gujarat or India as a whole.
- The sample is skewed toward male (82%), young and well-educated respondents, so the views of women, older and less-educated households may be under-represented.
- The data are self-reported and may be affected by social desirability bias, especially on environmental questions. Knowledge was self-rated rather than objectively measured.
- The goodness-of-fit tests for H1–H4 compare responses against an equal spread across categories; with strongly one-sided responses, rejection of the null hypothesis is expected, so these tests confirm the direction of opinion rather than measure the size of each factor's effect.
- The H5 test is based on the 71 respondents who answered the intention question, and many cells had expected counts below 5. Although a permutation test and a rank correlation gave the same result, the finding should be treated as indicative.
- Future research could use larger random samples, test the reliability of the scale (Cronbach's alpha), apply techniques such as factor analysis, regression or structural equation modelling, compare adopters and non-adopters directly, include rural and semi-urban households, and examine post-installation satisfaction.

XI. CONCLUSION

This study examined the factors influencing consumer preference and buying decisions for residential solar PV systems among households in Morbi and Rajkot. Consumers are highly aware of solar energy and trust its reliability and environmental benefits, but their buying decisions are driven mainly by economics: electricity bill savings, government subsidies and price. Quality and warranty assurance, brand reputation and recommendations from friends and family further shape which system they choose. The main obstacles for non-adopters are high initial cost and a lack of detailed knowledge rather than distrust of the technology.

Four of the five hypotheses were supported: subsidies, bill reduction, installation cost and personal recommendations each have a significant influence on the decision. The fifth was not supported: knowledge of solar PV showed no significant relationship with purchase intention, because intention to install was high across all knowledge levels. The buying decision is therefore not based on a single factor but on a combination of cost, trust, information and service quality. Solar companies that combine subsidy facilitation, accessible financing, transparent warranties, practical consumer education and referral-led marketing are best placed to convert the region's high interest into actual installations and to support India's transition to clean energy.

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