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Consumer Awareness and Preferences towards Solar-Powered Products: A Study of Marketing Mix and Sustainability

Visalakshi Sameeksha Ganti

GEMS New Millennium School, Dubai

Abstract

Solar energy is becoming an important part of the move towards renewable sources of energy. However, the success of solar-powered products does not depend only on the technology behind them. Customers also consider factors such as price, quality, convenience and how clearly a product is advertised. This research looks at how the marketing mix influences consumer awareness and preferences towards solar-powered products.

The study is based on secondary research and a questionnaire completed by 20 respondents. The questionnaire included questions about awareness, buying preferences, promotional methods, sustainability and the difficulties people may face when considering solar products. The results showed that all respondents had heard of solar-powered products, while 85% were most familiar with rooftop solar panels. Environmental benefits and saving money on electricity were the main reasons for considering these products. High initial cost was identified as the biggest barrier.

The findings suggest that consumers are interested in solar energy, but they also want products that are reliable, affordable and easy to understand. Marketing strategies should therefore focus on both the environmental benefits and the practical value of solar-powered products.

Keywords: Solar Energy, Solar-Powered Products, Marketing Mix, Consumer Behaviour, Sustainability, Consumer Preferences

1. Introduction

Solar energy is obtained from the sun and can be converted into electricity using solar technologies. One of the most common examples is solar photovoltaic (PV) panels, which use solar cells to convert sunlight into electrical energy [1]. Solar energy is now being used in different ways, from large rooftop installations to smaller products such as portable solar chargers and solar power banks.

The growing use of solar energy has also created opportunities for businesses. According to the International Energy Agency, solar photovoltaic technology is expected to contribute a major share of the growth in renewable electricity capacity between 2025 and 2030 [2]. This shows that solar energy is becoming increasingly important in the energy market.

However, having a useful product does not automatically mean that customers will purchase it. People may be interested in renewable energy but still have questions about the price, performance and usefulness of solar-powered products. Some may also find it difficult to understand technical details such as battery capacity, wattage and charging efficiency.

This research focuses on the marketing side of solar-powered products. It looks at how the four elements of the marketing mix — Product, Price, Place and Promotion — can influence consumer preferences. It also uses survey responses to understand what people know about these products and what factors may affect their buying decisions.

2. Review of Literature

Solar energy has received increasing attention as countries look for ways to expand the use of renewable electricity. The International Energy Agency's Renewables 2025 report discusses the expected growth of renewable electricity and the important role of solar PV in this development [2].

The U.S. Department of Energy explains that photovoltaic cells absorb sunlight and convert it into electricity. These cells are connected to form solar panels, which can be used in systems of different sizes depending on the amount of electricity required [1]. This makes solar technology suitable for several applications, including homes, businesses and portable products.

Cost is another important part of the solar energy market. The International Renewable Energy Agency reported that the global weighted average cost of electricity from newly commissioned utility-scale solar PV projects was approximately USD 0.043 per kWh in 2024 [3]. Although this figure relates to large-scale electricity generation rather than the retail price of small solar products, it shows how the cost of solar electricity has changed over time.

Existing information about solar technology mainly explains its working, efficiency and role in renewable energy. This research looks at the topic from a marketing point of view. It considers whether consumers are aware of solar products, what attracts them to these products and what may prevent them from buying them.

3. Research Objectives

1. To understand the marketing mix used for solar panels and solar chargers.
2. To study the factors that influence consumer preferences towards solar-powered products.
3. To identify the main difficulties consumers face when considering these products.
4. To understand the role of sustainability in consumer buying decisions.
5. To suggest marketing strategies that could encourage greater interest in solar-powered products.

4. Research Methodology

This study uses both secondary information and primary survey responses.

Secondary information was collected from sources such as the International Energy Agency, the International Renewable Energy Agency and the U.S. Department of Energy. These sources were used to understand solar technology, renewable energy trends and the cost of solar electricity.

For primary research, a questionnaire containing 10 questions was used. A total of 20 responses were collected. The questions covered awareness of solar-powered products, familiarity with different product types, reasons for considering a purchase, important buying factors, preferred purchasing channels and opinions about sustainability.

The responses were organised using numbers and percentages. Since the survey included only 20 respondents, each response represents 5% of the total. The results are used to understand the opinions of this particular group and should not be treated as representing all consumers.

The original survey record does not specify the respondents' demographic details or the method used to select them. These details have therefore not been assumed in this research.

5. Survey Findings and Analysis

The questionnaire was used to understand how respondents view solar-powered products. The main results are presented in Table 1.

Survey question	Responses (number)	Percentage
1. Heard of solar-powered products	Yes: 20; No: 0	100%; 0%
2. Most familiar product	Rooftop panels: 17; Portable solar chargers: 3; Others: 0	85%; 15%; 0%
3. Main reason to consider buying	Environmental benefits: 10; Saving electricity costs: 9; Convenience: 1	50%; 45%; 5%
4. Most influential purchase factor	Quality: 9; Environmental benefits: 8; Features: 2; Other: 1	45%; 40%; 10%; 5%
5. Willingness to pay more	Yes: 11; Maybe: 9; No: 0	55%; 45%; 0%
6. Preferred place to purchase	Solar companies/installers: 17; Electronics stores: 3	85%; 15%
7. Most influential promotion	Social media: 7; Demonstrations: 4; Reviews: 4; Education: 3; Discounts: 2	35%; 20%; 20%; 15%; 10%
8. Biggest barrier to purchase	High initial cost: 9; Lack of awareness: 4; Technical complexity: 4; Sunlight dependence: 3	45%; 20%; 20%; 15%
9. Importance of sustainability	Very important: 10; Important: 7; Neutral: 3; Not important: 0	50%; 35%; 15%; 0%
10. Willingness to recommend	Yes: 12; Maybe: 7; No: 1	60%; 35%; 5%

Table 1. Summary of responses from 20 participants.

5.1 Awareness and Familiarity

All 20 respondents had heard of solar-powered products. However, when asked which product they were most familiar with, 17 respondents (85%) selected rooftop solar panels. Only 3 respondents (15%) selected portable solar chargers. This difference shows that knowing about solar energy does not necessarily mean knowing about all the products available in the market. Rooftop panels seem to be more familiar, while smaller products may need more attention from marketers.

5.2 Reasons for Considering Solar Products

Environmental benefits were selected by 10 respondents (50%), while 9 respondents (45%) chose saving money on electricity. Only one respondent (5%) selected convenience or portability. The responses show that environmental benefits and financial savings are both important. Companies should explain both the environmental and practical benefits of their products.

5.3 Factors Influencing Purchase Decisions

Quality was selected by 9 respondents (45%), making it the most important purchase factor. Environmental benefits followed closely with 8 responses (40%). Features were selected by 2 respondents (10%), and one respondent (5%) selected other. This suggests that people want a product that works well and is reliable. Clear specifications, demonstrations and customer reviews could help build confidence.

5.4 Willingness to Pay More

Eleven respondents (55%) said they would be willing to pay more for a product that uses renewable energy. The remaining 9 respondents (45%) selected 'Maybe'. No one selected 'No'. This suggests a positive attitude, but the 'Maybe' responses show that some consumers may need more information before deciding whether a higher price is worth paying.

5.5 Preferred Place of Purchase

A large majority of respondents, 17 out of 20 (85%), preferred buying solar products from solar companies or installers. Only 3 respondents (15%) preferred electronics stores. Customers may value guidance when purchasing a product that involves technical information or professional installation.

5.6 Promotional Methods

Social media advertisements were selected by 7 respondents (35%), making them the most preferred promotional method. Product demonstrations and influencer or customer reviews received 4 responses each (20%). Educational campaigns received 3 responses (15%), while discounts and offers received 2 responses (10%). Demonstration videos and reviews may help customers understand how a product works.

5.7 Barriers to Purchase

High initial cost was the biggest barrier, selected by 9 respondents (45%). Lack of awareness and technical complexity were each selected by 4 respondents (20%). Dependence on sunlight was selected by 3 respondents (15%). This shows that interest in solar products does not always mean consumers are ready to purchase them. Companies could offer different price options and explain product features in simpler language.

5.8 Importance of Sustainability

Ten respondents (50%) considered sustainability very important, while 7 (35%) considered it important. The remaining 3 respondents (15%) were neutral. No respondent selected an option showing that sustainability was not important. Companies can include environmental benefits in their marketing, while also addressing quality and cost.

5.9 Willingness to Recommend Solar Products

Twelve respondents (60%) said they would recommend solar products to others. Seven (35%) selected 'Maybe', while one respondent (5%) selected 'No'. The responses show a generally positive attitude, although some respondents remain unsure. Better product information, reliable performance and affordable options could help build confidence.

6. Discussion: The Marketing Mix

6.1 Product

Solar products are available in different forms, depending on their purpose. Rooftop solar panels are mainly used to generate electricity for homes and buildings. Smaller products, such as solar power banks and portable chargers, are designed for charging electronic devices. Portable power stations can also

provide backup electricity. The survey showed that rooftop panels were much more familiar to respondents than portable solar chargers. Companies selling smaller solar products may need to explain their uses more clearly and provide information about quality, durability and charging performance.

6.2 Price

Price can influence whether a customer decides to purchase a solar product. Some smaller products may be more affordable, while larger systems require a much higher initial investment. The final cost of a rooftop solar system can also depend on its size and installation requirements. The survey supports the importance of this factor, as 45% of respondents identified high initial cost as the biggest barrier. Companies could consider payment plans and different product options, while explaining long-term value without making unrealistic promises.

6.3 Place

Place refers to the channels through which a product reaches customers. Smaller solar products can be sold through online platforms and electronics stores, while rooftop solar systems are generally purchased through specialised solar companies and installers. The survey showed a clear preference for solar companies and installers, chosen by 85% of respondents. Providing consultations, installation services and after-sales support could make the buying process easier.

6.4 Promotion

Promotion is how a company informs customers about a product and encourages them to consider buying it. Solar products can be promoted through social media, online advertisements, product demonstrations, customer reviews and educational campaigns. Since social media advertisements were the most selected promotional method in the survey, companies could use short videos and visual content. Demonstrations and reviews can also help customers see how a product works.

7. Recommendations

1. Make product information easier to understand by explaining technical details such as wattage, battery capacity and charging time in simple language.
2. Show the product in use. Demonstration videos and practical examples can help customers understand how solar chargers and other products work.
3. Offer different price options. Having products at different price levels and providing payment options for larger systems may help make solar technology more accessible.
4. Focus on both quality and sustainability. Advertisements should explain environmental benefits while also showing product reliability, durability and usefulness.
5. Improve customer support through guidance before purchase, professional installation where required and after-sales services.
6. Use social media effectively to share product demonstrations, customer experiences and educational content.

8. Limitations of the Study

This study has a few limitations. The survey included only 20 respondents, which is a small sample and cannot represent the preferences of all consumers. The original survey record also does not include demographic details or information about how the respondents were selected.

The research mainly focuses on general consumer opinions about solar-powered products. It does not include interviews with solar companies or detailed comparisons of sales figures from different brands.

Therefore, the findings should be understood as an initial study of consumer awareness and preferences rather than a complete picture of the solar market.

9. Conclusion

This research examined solar-powered products from a marketing point of view. The findings show that all 20 respondents had heard of solar-powered products, but most were more familiar with rooftop solar panels than with portable solar chargers.

Environmental benefits and saving money on electricity were the main reasons respondents considered these products. Quality was the most selected purchase factor, while high initial cost was the biggest barrier. The survey also showed that social media advertisements were the most preferred promotional method and that most respondents preferred purchasing solar products from specialised companies or installers.

Overall, the results suggest that there is interest in solar-powered products, but companies still need to make them easier to understand and more accessible to customers. Marketing should not focus only on sustainability. It should also explain product quality, usefulness, price and practical benefits. By understanding what customers look for, businesses can develop strategies that make solar-powered products more appealing and encourage wider interest in renewable energy.

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