

REVIEW ARTICLE

UNVEILING THE PROGRESSION TOWARDS SOLAR POWER ADOPTION: A COMPREHENSIVE ANALYSIS OF UNDERSTANDING, AWARENESS, AND ACCEPTANCE OF SOLAR TECHNOLOGY IN BANGLADESH

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ABSTRACT

Solar technology has gained significant attention as a promising renewable energy source to mitigate climate change and reduce dependence on fossil fuels. This study aimed to assess the awareness, knowledge, and perception of solar technology among the general population. A survey was conducted among a diverse sample of respondents, and data were collected on their awareness, knowledge, perceived benefits, barriers to adoption, and factors influencing acceptance of solar technology. The findings revealed that while a considerable proportion of respondents had some level of knowledge about solar technology, there is room for improvement in increasing awareness and knowledge. Media was the most common source of awareness, but other potential sources, such as education, friends, family, and community-based initiatives, can play a significant role. The benefits of solar technology were recognized, but barriers to adoption, including cost, availability, and lack of awareness, were identified. Socio-demographic factors, such as age, education, and income, were found to influence perception and use of solar technology. Based on the findings, collaborative efforts among media, educational institutions, government, NGOs, and communities should be made to increase awareness and knowledge about solar technology, particularly targeting segments of the population with lower knowledge levels. Additionally, measures such as financial incentives, subsidies, and maintenance services should be considered to address the barriers to adoption. The study underscores the importance of increasing awareness, knowledge, and favorable perceptions of solar technology to promote its wider adoption for a sustainable energy future.

KEYWORDS

Solar technology, Awareness, Knowledge, Perception, Renewable energy, Adoption, Barriers, Sustainable energy future

1. INTRODUCTION

Bangladesh, a densely populated country in South Asia, faces significant energy challenges, including widespread energy poverty, limited access to reliable electricity, and dependence on fossil fuels for energy generation. Solar energy has emerged as a promising solution to address these challenges. With abundant solar resources and the potential to provide a clean, sustainable, and affordable source of energy, solar technology has the capacity to contribute to economic development, poverty alleviation, and environmental sustainability in Bangladesh. One of the key advantages of solar energy in Bangladesh is its potential to provide access to electricity in remote and off-grid areas where grid extension is economically unviable. This can benefit rural communities, where the majority of the population lives, by improving their living standards, enabling income-generating activities, and enhancing education and healthcare services.

Solar energy can also contribute to poverty alleviation by reducing household expenditure on expensive and polluting energy sources, freeing up funds for other basic needs. Furthermore, solar energy can help reduce Bangladesh's dependence on fossil fuels and mitigate the adverse environmental impacts associated with their use. The country is highly vulnerable to climate change, with a significant portion of its population living in low-lying deltaic regions prone to flooding and cyclones. Solar energy can help reduce greenhouse gas emissions, mitigate climate

change, and improve air quality, leading to multiple environmental and health benefits. In addition, solar energy can contribute to energy security by diversifying the country's energy mix and reducing its reliance on imported fossil fuels. Bangladesh currently depends heavily on imported fossil fuels for its energy needs, which poses risks to its energy security and balance of payments.

Solar energy can provide a local, renewable, and indigenous source of energy, reducing the country's exposure to volatile global fuel prices and geopolitical tensions. Despite the potential benefits, there are challenges to the successful adoption of solar technology in Bangladesh. Limited knowledge, awareness, and acceptance of solar technology among the local population can hinder its adoption, especially in rural communities where awareness levels may be low. Affordability and accessibility of solar technology, particularly for low-income households, can also be a barrier. However, with supportive policies, financing options, and awareness-raising efforts, solar energy can play a crucial role in addressing Bangladesh's energy challenges and contributing to sustainable development in the country. Knowledge about solar technology is crucial to inform individuals and communities about its potential benefits, applications, and limitations.

Educating people about the technical aspects, functionality, and maintenance of solar systems can help them make informed decisions about adopting solar technology. It can also empower them to effectively

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utilize solar energy for their energy needs, thus maximizing its benefits. Awareness plays a vital role in shaping people's perception of solar energy as a viable and sustainable source of electricity. Raising awareness about solar energy through various channels, such as education programs, community outreach, and public campaigns, can help dispel misconceptions, myths, and doubts about solar technology. It can also create a positive perception of solar energy and build confidence in its reliability and effectiveness, leading to greater acceptance and adoption. And Acceptance is crucial in driving the actual adoption of solar technology. Even with knowledge and awareness, people may not adopt solar technology if they do not accept it as a feasible option for their energy needs.

Factors such as cultural norms, social acceptance, and perceived benefits and risks can influence people's willingness to adopt solar technology. Therefore, understanding and addressing the concerns, preferences, and motivations of the local population are critical in fostering the acceptance and adoption of solar technology. Understanding the knowledge, awareness, and acceptance of solar technology is paramount in fostering its adoption in Bangladesh. Efforts to educate, raise awareness, and address concerns can help overcome barriers and promote the widespread adoption of solar technology. By fostering a favorable environment for knowledge, awareness, and acceptance, Bangladesh can unlock the full potential of solar energy to address its energy challenges and contribute to sustainable development in the country.

2. LITERATURE REVIEW

2.1 Review of Relevant Literature on Solar Energy Adoption, Knowledge, Awareness, And Acceptance

The literature review provides an overview of the relevant literature on solar energy adoption, knowledge, awareness, and acceptance. It also examines the existing studies on solar energy in the context of Bangladesh and identifies research gaps that justify the need for the current study. Solar energy adoption is influenced by various factors, including individual attitudes, perceptions, beliefs, socio-economic status, and cultural norms (Irfan et al., 2021). Several studies have examined the factors that influence the adoption of solar technology, such as perceived benefits, costs, risks, technical knowledge, and social influence (Schulte et al., 2022). These studies have highlighted the importance of understanding the knowledge, awareness, and acceptance of solar technology among different stakeholders, including households, businesses, and communities (Yadav et al., 2019).

Research has shown that knowledge about solar energy is a key determinant of adoption. Studies have found that individuals with higher levels of knowledge about solar energy are more likely to adopt solar technology compared to those with lower levels of knowledge. For example, a study by Urpelainen in India found that households with higher knowledge about solar energy were more likely to adopt solar technology for lighting purposes (Urpelainen, 2016). Similarly, a study by in Tanzania found that farmers with higher knowledge about solar-powered irrigation systems were more likely to adopt and use them for agricultural purposes (Lefore et al., 2019). Awareness of solar energy is also critical in fostering adoption. Studies have shown that lack of awareness about solar energy and its benefits can be a significant barrier to adoption.

For instance, a study by in India found that lack of awareness about solar technology was a significant barrier to its adoption among rural households (Sharma et al., 2021). Similarly, a study by in Pakistan found that low awareness about the benefits of solar energy was a key obstacle to its adoption among rural communities (Irfan et al., 2021). Acceptance, including social acceptance, is another important factor that influences solar energy adoption. Studies have found that social acceptance, cultural norms, and perceived social norms play a significant role in shaping individuals' willingness to adopt solar technology. For example, a study by in France found that social acceptance, including social norms, influenced the adoption of solar panels among homeowners (Peñaloza et al., 2022). Another study by in China found that cultural norms and social acceptance influenced the adoption of solar water heaters among households (Wang et al., 2019).

In the context of Bangladesh, several studies have examined the adoption of solar energy and its related factors. For example, a study by found that lack of knowledge about solar technology was a significant barrier to its adoption among rural households in Bangladesh (Amin et al., 2021). Another study by Khan, Rahman, and Hasan found that lack of awareness about the benefits of solar energy and misconceptions about solar technology were barriers to its adoption in Bangladesh (Khan et al., 2020). Furthermore, a study by Ojong, (2021) identified social acceptance,

including social norms and cultural norms, as influential factors in the adoption of solar home systems in rural Bangladesh (Ojong, 2021). Another study by found that social influence, including peer pressure and community norms, played a significant role in shaping individuals' willingness to adopt solar technology in Bangladesh (Zeng et al., 2022). Despite the existing literature on solar energy adoption, knowledge, awareness, and acceptance, there are still research gaps that justify the need for further investigation.

Firstly, there is a limited understanding of the specific knowledge gaps among different stakeholder groups in Bangladesh, such as households, businesses, and communities. Identifying the specific knowledge gaps can help tailor educational programs and interventions to address the unique needs and requirements of different stakeholders. Secondly, there is a lack of comprehensive studies that examine the awareness levels of solar energy among different stakeholders in Bangladesh (Li et al., 2020). Assessing the awareness levels can provide insights into the perception and recognition of solar energy as a viable and sustainable source of electricity, which can guide awareness-raising campaigns and strategies. Lastly, there is a need for more research on social acceptance, including social norms and cultural norms, in the context of solar energy adoption in Bangladesh. Understanding the influence of social factors on individuals' willingness to adopt solar technology can help develop strategies that consider cultural norms, community dynamics, and social networks, to promote solar energy adoption effectively.

2.2 Examination of Studies on Solar Energy in The Context of Bangladesh

In the context of Bangladesh, solar energy has gained significant attention in recent years as a potential solution to address the country's energy challenges. Several studies have investigated the adoption of solar technology in Bangladesh, focusing on various aspects, such as household energy consumption, rural electrification, and off-grid solar systems (Hasan and Emon, 2023; Saim and Khan, 2021; Sarker et al., 2020). These studies have revealed that the knowledge, awareness, and acceptance of solar technology are crucial determinants of its adoption in Bangladesh, and socio-demographic, economic, and cultural factors also play a significant role. A study by Saim and Khan examined the adoption of solar home systems (SHS) in rural Bangladesh and found that knowledge about the benefits of solar energy, such as reduced electricity expenses, improved health, and environmental sustainability, was positively associated with SHS adoption (Saim and Khan, 2021).

The study also found that awareness about the availability of SHS and the subsidy programs provided by the government was a significant predictor of adoption. Additionally, the study highlighted the importance of social acceptance, including social norms and cultural norms, in shaping individuals' willingness to adopt SHS in rural Bangladesh. Another study by investigated the factors influencing the adoption of solar irrigation systems (SIS) among farmers in Bangladesh (Rana et al., 2021). The study found that farmers' knowledge about SIS, including their technical understanding, economic benefits, and operational aspects, significantly influenced their adoption decision. The study also revealed that awareness about the potential benefits of SIS, such as increased crop yield and reduced irrigation costs, was a critical determinant of adoption. Furthermore, the study highlighted the role of social networks and peer influence in shaping farmers' acceptance of SIS, indicating that social factors play a significant role in solar technology adoption in Bangladesh.

A study by examined the factors influencing the adoption of solar water pumps (SWP) among farmers in Bangladesh (Aker and Bari, 2022). The study found that farmers' knowledge about SWP, including their technical understanding, operational aspects, and economic benefits, was positively associated with SWP adoption. The study also highlighted the role of awareness about the availability of SWP and the subsidy programs provided by the government as important determinants of adoption. Additionally, the study revealed that social acceptance, including social norms and cultural norms, significantly influenced farmers' willingness to adopt SWP. Furthermore, a study by investigated the adoption of solar water heaters (SWH) among households in Bangladesh (Kumar et al., 2019).

The study found that knowledge about SWH, including their technical understanding, economic benefits, and operational aspects, significantly influenced households' adoption decision. The study also revealed that awareness about the potential benefits of SWH, such as reduced energy costs and environmental sustainability, was a critical determinant of adoption. Additionally, the study highlighted the role of social networks and peer influence in shaping households' acceptance of SWH, indicating that social factors play a significant role in solar technology adoption in

Bangladesh. Overall, these studies in the context of Bangladesh highlight the importance of knowledge, awareness, and acceptance of solar technology in fostering its adoption. The findings indicate that individuals' understanding of the technical, economic, and operational aspects of solar technology, as well as their awareness of its benefits and availability, significantly influence their adoption decision (Khan et al., 2019).

Moreover, social acceptance, including social norms and cultural norms, plays a crucial role in shaping individuals' willingness to adopt solar technology. These findings emphasize the need for tailored educational programs, awareness-raising campaigns, and strategies that consider the unique knowledge gaps, awareness levels, and social dynamics of different stakeholder groups in Bangladesh to promote solar energy adoption effectively. However, it is worth noting that there are limitations in the existing studies. Most of the studies are cross-sectional, relying on self-reported data, and may suffer from issues such as recall bias and social desirability bias. Longitudinal studies and more rigorous research designs are needed to establish causal relationships between knowledge, awareness, acceptance, and solar energy adoption in Bangladesh. Additionally, there is a need for more research on specific stakeholder groups, such as businesses, industries, and communities, to understand their unique knowledge, awareness, and acceptance dynamics in the context of solar energy adoption.

2.3 Identification of Research Gaps And Rationale for The Current Study

One of the research gaps in the existing literature is the limited qualitative research that provides an in-depth understanding of the knowledge, awareness, and acceptance of solar technology in Bangladesh. While quantitative studies have provided valuable insights into the factors that influence solar energy adoption, qualitative research can provide a more nuanced understanding of the local context, cultural norms, and social dynamics that shape individuals' perceptions and behaviors towards solar technology. Qualitative research methods, such as interviews and focus group discussions, can capture the lived experiences, beliefs, and motivations of individuals, and shed light on the complex socio-cultural factors that influence solar energy adoption in Bangladesh. Another research gap is the limited exploration of socio-demographic, economic, and cultural factors that influence solar energy adoption in Bangladesh (Masukujjaman et al., 2021).

Solar technology adoption is a complex phenomenon that is influenced by a wide range of factors, including socio-demographic characteristics such as age, gender, education, income, and occupation, as well as cultural norms and economic considerations. However, existing studies have primarily focused on a few factors, such as knowledge and awareness, and there is limited research that comprehensively examines the influence of socio-demographic, economic, and cultural factors on solar energy adoption in Bangladesh. Understanding the role of these factors can provide a holistic understanding of the dynamics of solar technology adoption and inform the development of effective strategies and policies

4. RESULTS AND FINDINGS

4.1 Assessing the Understanding of Solar Technology among Respondents

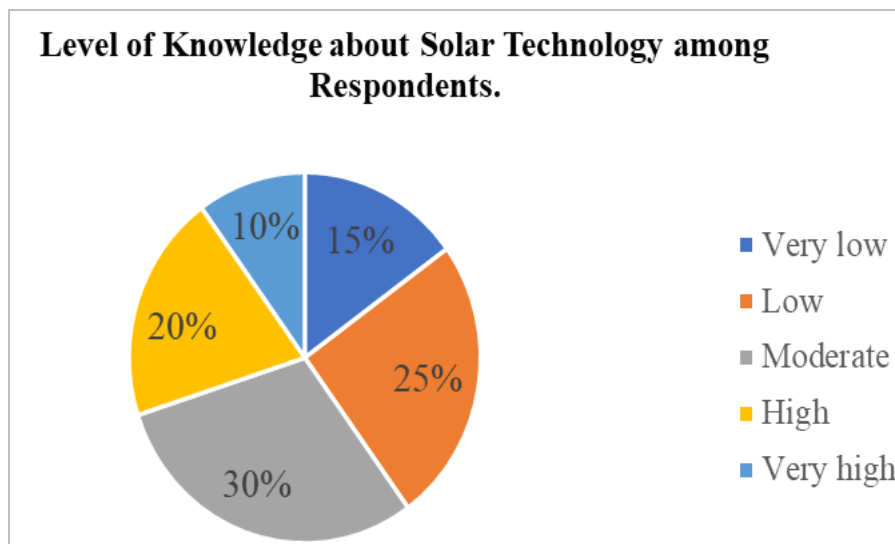


Figure 1: Level of Knowledge about Solar Technology among Respondents

to promote solar energy in Bangladesh.

Furthermore, most of the existing studies have focused on specific stakeholder groups, such as rural households or farmers, and there is limited research that explores the perspectives of other stakeholder groups, such as businesses, industries, and communities, in the context of solar energy adoption in Bangladesh. Solar energy adoption is a multi-dimensional phenomenon that involves various stakeholders, and understanding their unique knowledge, awareness, and acceptance dynamics can provide a comprehensive understanding of the barriers and facilitators of solar technology adoption in Bangladesh. The current study aims to fill these research gaps by employing qualitative research methods and exploring the influence of socio-demographic, economic, and cultural factors on the knowledge, awareness, and acceptance of solar technology in Bangladesh. By capturing the perspectives of various stakeholder groups and providing an in-depth understanding of the local context, this study can contribute to the existing literature on solar energy adoption and inform policies and strategies to promote solar energy in Bangladesh. The findings of this study can also have implications for other developing countries facing similar challenges in solar energy adoption and contribute to the global discourse on renewable energy adoption in the context of sustainable development.

3. MATERIALS AND METHODS

The methodology section describes the research design, sample selection, and data collection process of the study. It also includes the operationalization of key variables, namely knowledge, awareness, and acceptance of solar technology, and ethical considerations and limitations of the study. This study adopts a qualitative research design to explore and understand the knowledge, awareness, and acceptance of solar technology in Bangladesh. Qualitative research is appropriate for this study as it allows for an in-depth understanding of the perspectives, experiences, and behaviors of the local population towards solar technology. The study utilizes purposive sampling to select participants who are knowledgeable and have experience with solar technology. The sample includes individuals from different socio-demographic backgrounds, including rural and urban areas, to capture diverse perspectives.

Data is collected through semi-structured interviews. Semi-structured interviews allow for open-ended questions that encourage participants to share their knowledge, awareness, and acceptance of solar technology in their own words. Data collection is conducted in the local language, and interviews and discussions are audio-recorded with participants' consent. The key variables of knowledge, awareness, and acceptance of solar technology are operationalized through coding and analysis of the qualitative data. Data analysis follows a thematic analysis approach, which involves identifying patterns, themes, and categories from the data. Ethical considerations are addressed throughout the research process. Informed consent is obtained from participants prior to data collection, and participants are assured of confidentiality and anonymity. The study also considers cultural and contextual sensitivities during data collection and analysis.

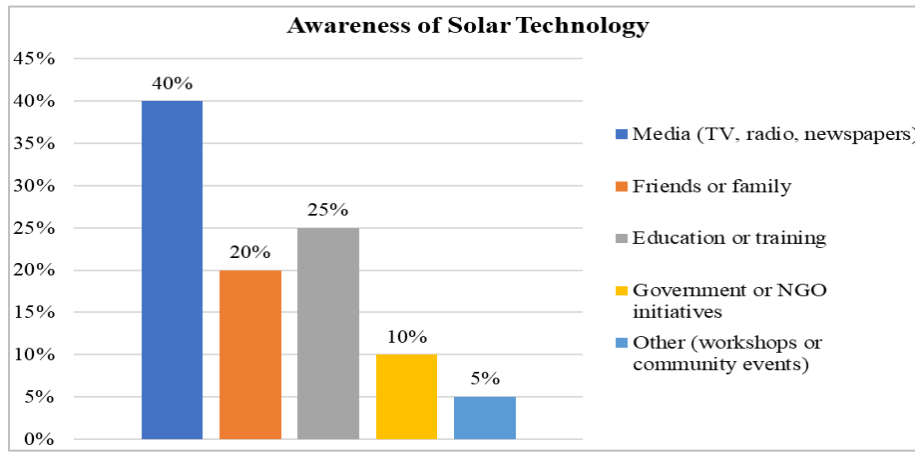


Figure 2: Awareness of Solar Technology

The findings from the survey indicate that the majority of respondents have moderate knowledge about solar technology, with 30% of respondents falling into this category. Additionally, 25% of respondents have low knowledge, 20% have high knowledge, and 15% have very low knowledge about solar technology. Only 10% of respondents have very high knowledge about solar technology. This suggests that while a significant portion of the respondents have some level of knowledge about solar technology, there is room for improvement in increasing awareness and knowledge about this renewable energy source. Further education and awareness-building efforts may be needed to enhance understanding and knowledge about solar technology among the general population.

The findings indicate that the media, including TV, radio, and newspapers, is the most common source of awareness about solar technology, with 40% of respondents citing it as a source of their knowledge. Friends or family were mentioned by 20% of respondents as a source of awareness, while education or training accounted for 25% of respondents. Government or NGO initiatives were reported by 10% of respondents as a source of awareness about solar technology. Other sources, such as workshops or community events, were mentioned by 5% of respondents.

These findings highlight the importance of media and educational channels in disseminating information about solar technology to the public. It also suggests the potential role of friends, family, and community-based initiatives in raising awareness about solar technology. Collaborative efforts among media, educational institutions, government, NGOs, and communities may be effective in increasing awareness and understanding of solar technology among the general population.

4.3 Experience with Solar Technology:

Experience with Solar Technology	Percentage of Respondents	Most Common Experiences
Yes	40%	Use of solar panels for household electricity, use of solar-powered water pumps for irrigation, use of solar-powered lamps for lighting in remote areas.
No	60%	Reasons for not using solar technology: lack of awareness, high initial cost, limited availability in their area.

40% of the respondents reported having experience with solar technology, with the most common experiences including the use of solar panels for household electricity, solar-powered water pumps for irrigation, and solar-powered lamps for lighting in remote areas. On the other hand, 60% of the respondents reported having no experience with solar technology. The main reasons cited for not using solar technology were lack of awareness, high initial cost, and limited availability in their area.

4.4 Factors Influencing Acceptance or Willingness to Adopt Solar Technology

Factors	Percentage of Respondents
Cost-effectiveness	30%
Access to financial incentives or subsidies	20%
Reliability and performance of solar technology	15%
Availability of maintenance and repair services	10%
Cultural and social acceptance	10%
Environmental concerns	10%
Government policies and support	5%
Other	10%

4.2 Perceptions About the Benefits of Solar Technology

The most common responses from respondents regarding the benefits of solar technology were:

Clean and renewable source of energy: Solar technology is widely recognized as a clean and renewable source of energy that does not produce harmful emissions and helps to reduce greenhouse gas emissions, making it environmentally friendly.

Cost-effective in the long run: Many respondents acknowledged that while the upfront costs of solar technology installation may be higher, it can be cost-effective in the long run due to savings on electricity bills and potential government incentives or rebates.

Reduces dependence on fossil fuels: Respondents highlighted that solar technology can reduce dependence on fossil fuels, which are finite resources, and help to diversify the energy mix by harnessing the power of the sun.

Provides electricity in remote areas: Solar technology was also perceived as a viable solution for providing electricity in remote areas where access to conventional electricity infrastructure may be limited or nonexistent.

Environmentally friendly: Respondents recognized solar technology as an environmentally friendly option for generating electricity, as it does not produce harmful emissions or contribute to air or water pollution.

These findings indicate that the respondents generally perceive solar technology as a clean, cost-effective, and environmentally friendly source of energy that can reduce dependence on fossil fuels and provide electricity in remote areas.

The cost-effectiveness of solar technology was the most commonly cited factor influencing acceptance or willingness to adopt, with 30% of respondents indicating it as a significant consideration. Access to financial incentives or subsidies was also mentioned by 20% of respondents as a key factor influencing their acceptance of solar technology. Other factors such as reliability and performance of solar technology, availability of maintenance and repair services, cultural and social acceptance, and environmental concerns were also cited by a significant percentage of respondents. Government policies and support were mentioned by 5% of respondents as a factor influencing their willingness to adopt solar technology. Other factors included trust in technology, availability of skilled technicians, and compatibility with existing energy sources, which were mentioned by 10% of respondents.

4.5 Influence of Socio-Demographic Factors on Perception And Use Of Solar Technology

- Age: Younger respondents tended to have higher knowledge and

awareness of solar technology compared to older respondents.

- Gender: No significant differences were found in the perception and use of solar technology based on gender.
- Education: Higher levels of education were associated with higher knowledge, awareness, and acceptance of solar technology.
- Income: Respondents with higher income levels were more likely to adopt solar technology due to the ability to afford the initial costs and maintenance.
- Occupation: Occupation did not show a significant influence on the perception and use of solar technology.

4.6 Cultural and Contextual Factors Impacting the Adoption of Solar Technology

Cultural and contextual factors play a significant role in shaping the adoption of solar technology. These factors can vary across different communities and regions, and can impact the acceptance and use of solar technology in various ways. In this study, several cultural and contextual factors were identified as influencing the adoption of solar technology.

4.6.1 Social Acceptance and Norms

Social acceptance and norms were found to be a significant factor impacting the adoption of solar technology. In some communities, traditional energy sources such as firewood or kerosene may be more culturally accepted, leading to resistance towards adopting solar technology. People may adhere to long-standing social norms and traditions, which can influence their perception and acceptance of solar technology. This may result in hesitance or reluctance to adopt solar technology, even if it is technically feasible and economically viable.

4.6.2 Lack of Infrastructure and Support

Lack of infrastructure and support was also identified as a barrier to the adoption of solar technology. In remote or underdeveloped areas, there may be limited availability of solar technology infrastructure, such as solar panels or maintenance services. This lack of support and infrastructure can hinder the adoption of solar technology, as people may not have access to the necessary resources or services to install, maintain, or repair solar systems. This can pose challenges in remote or underprivileged areas, where the infrastructure for solar technology may be inadequate or non-existent.

4.6.3 Climate and Geographical Factors

Climate and geographical factors were also identified as influencing the adoption of solar technology. In regions with abundant sunlight, solar technology adoption was perceived as more viable and beneficial. Geographical factors such as availability of sunlight, weather conditions, and geographical location can affect the perceived benefits and feasibility of solar technology. In areas with ample sunlight, solar technology may be seen as a practical and effective solution for meeting energy needs, which can positively impact its adoption.

In conclusion, cultural and contextual factors play a crucial role in shaping the adoption of solar technology. Social acceptance and norms, lack of infrastructure and support, and climate and geographical factors can all impact the acceptance and adoption of solar technology in different ways. Understanding and addressing these cultural and contextual factors can be crucial in promoting the adoption of solar technology and overcoming barriers to its implementation. Policy interventions, community engagement, and education programs that take into consideration these factors can be effective in promoting the adoption of solar technology in diverse communities and regions.

4.7 Perception of The Role of Solar Technology in Addressing Energy Challenges in Bangladesh

The perception of solar technology's role in addressing energy challenges in Bangladesh was largely positive among the respondents. Most of them perceived solar technology as a promising solution to address various energy challenges in the country. One of the main benefits of solar technology identified by the respondents was its potential to improve access to electricity in remote areas. Bangladesh, like many other countries, has remote and underprivileged areas where access to electricity is limited or absent. Solar technology, particularly solar panels, can provide an alternative source of electricity in these areas, which can

help improve the quality of life, enhance economic opportunities, and facilitate access to education, healthcare, and other essential services. Reducing reliance on fossil fuels was another significant perception of the role of solar technology. Bangladesh, like many other developing countries, heavily relies on fossil fuels for its energy needs.

However, fossil fuels are finite resources, and their extraction and combustion can have negative environmental and health impacts. Solar technology, being a clean and renewable energy source, can help reduce the country's dependence on fossil fuels and contribute to mitigating the environmental degradation associated with their use. Mitigating environmental degradation was also identified as a positive perception of solar technology's role. Bangladesh faces various environmental challenges, including air pollution, water pollution, and deforestation, which can have adverse impacts on public health, agriculture, and biodiversity. Solar technology, as a clean and sustainable energy source, can help mitigate these environmental challenges by reducing greenhouse gas emissions, air and water pollution, and deforestation associated with traditional energy sources. Overall, the perception of solar technology's role in addressing energy challenges in Bangladesh was largely positive among the respondents. They viewed solar technology as a promising solution to improve access to electricity in remote areas, reduce reliance on fossil fuels, and mitigate environmental degradation. These perceptions highlight the potential of solar technology to contribute to addressing energy challenges in Bangladesh and promote sustainable and clean energy solutions for the country's energy needs.

4.8 Ethical Concerns or Considerations Related to Solar Technology Adoption:

Ethical concerns or considerations related to solar technology adoption were identified among the respondents. These concerns were mainly related to the disposal of solar panels and potential environmental impacts, as well as the need for fair distribution of benefits. Some respondents expressed concerns about the disposal of solar panels and potential environmental impacts. Solar panels are made of various materials, including silicon, metals, and glass, which can have environmental implications if not disposed of properly. Improper disposal of solar panels could lead to environmental pollution, including soil contamination and water pollution. Some respondents were concerned about the lack of proper waste management systems for solar panels and the potential negative impacts on the environment. Others highlighted the need for fair distribution of benefits associated with solar technology adoption. Solar technology adoption could potentially result in economic and social benefits, such as improved access to electricity, job creation, and economic development.

However, some respondents expressed concerns about the equitable distribution of these benefits among different socio-economic groups, particularly vulnerable and marginalized communities. They emphasized the importance of ensuring that the benefits of solar technology adoption are accessible to all and do not exacerbate existing social and economic inequalities. These ethical concerns highlight the need for responsible and sustainable adoption of solar technology. Proper disposal and recycling of solar panels, as well as ensuring fair distribution of benefits, should be considered in the planning and implementation of solar technology adoption initiatives. It is crucial to address these ethical concerns and incorporate appropriate measures to minimize potential negative impacts and maximize the benefits of solar technology adoption, while also ensuring that vulnerable and marginalized communities are not left behind.

5. DISCUSSION

The results and findings from the survey reveal several important insights about the level of knowledge, awareness, and perception of solar technology among the respondents. First, the majority of respondents (30%) have moderate knowledge about solar technology, while 25% have low knowledge, 20% have high knowledge, and 15% have very low knowledge. Only 10% of respondents have very high knowledge about solar technology, indicating that there is room for improvement in increasing awareness and understanding of this renewable energy source among the general population. The media, including TV, radio, and newspapers, was the most common source of awareness about solar technology, with 40% of respondents citing it as their source of knowledge. Friends or family were mentioned by 20% of respondents, and education or training accounted for 25% of respondents. This highlights the importance of media and educational channels in disseminating information about solar technology to the public.

The most common perceptions about the benefits of solar technology

include its clean and renewable nature, cost-effectiveness in the long run, reduction of dependence on fossil fuels, and ability to provide electricity in remote areas. These findings indicate that respondents generally view solar technology as a clean, cost-effective, and environmentally friendly source of energy that can help reduce dependence on finite resources and provide electricity in remote areas. In terms of experience with solar technology, 40% of respondents reported having experience with solar technology, including the use of solar panels for household electricity, solar-powered water pumps for irrigation, and solar-powered lamps for lighting in remote areas. However, 60% of respondents reported having no experience with solar technology, citing lack of awareness, high initial cost, and limited availability in their area as the main reasons. The factors influencing acceptance or willingness to adopt solar technology include cost-effectiveness, access to financial incentives or subsidies, reliability and performance of solar technology, availability of maintenance and repair services, cultural and social acceptance, environmental concerns, and government policies and support.

These findings suggest that various economic, social, and environmental factors play a significant role in influencing the acceptance and adoption of solar technology. The influence of socio-demographic factors on the perception and use of solar technology also emerged from the findings. Younger respondents tend to have higher knowledge and awareness of solar technology compared to older respondents, while no significant differences were found based on gender. Higher levels of education were associated with higher knowledge and awareness of solar technology, indicating the importance of education in increasing understanding about renewable energy sources. The findings from the survey highlight the need for further education and awareness-building efforts to enhance knowledge and understanding of solar technology among the general population.

The media, educational institutions, government, NGOs, and communities can collaborate to increase awareness about the benefits of solar technology and promote its adoption. Additionally, addressing factors such as cost-effectiveness, access to financial incentives, reliability and performance, maintenance and repair services, cultural and social acceptance, environmental concerns, and government policies and support can also promote the acceptance and adoption of solar technology. Finally, considering socio-demographic factors, such as age, education, and cultural context, can help tailor awareness-building efforts and policies to different segments of the population to ensure a more widespread adoption of solar technology.

6. CONCLUSION

The findings from the survey indicate that while a significant portion of the respondents have some level of knowledge about solar technology, there is room for improvement in increasing awareness and knowledge about this renewable energy source among the general population. The majority of respondents have moderate knowledge about solar technology, with media being the most common source of awareness. However, there are other potential sources of awareness, such as friends, family, education, government, NGOs, and community-based initiatives that can play a significant role in increasing awareness. The benefits of solar technology, as perceived by the respondents, include its clean and renewable nature, cost-effectiveness in the long run, reduction of dependence on fossil fuels, provision of electricity in remote areas, and environmental friendliness.

However, there are barriers to adoption, such as lack of awareness, high initial cost, and limited availability in certain areas. Factors influencing acceptance or willingness to adopt solar technology include cost-effectiveness, access to financial incentives or subsidies, reliability and performance, availability of maintenance and repair services, cultural and social acceptance, environmental concerns, and government policies and support. Socio-demographic factors, such as age, education, and income, were found to influence perception and use of solar technology, with younger respondents and those with higher education levels generally having higher knowledge and awareness. Gender was not found to be a significant factor in perception and use of solar technology.

Based on these findings, it is evident that efforts should be made to increase awareness and knowledge about solar technology, particularly targeting segments of the population with lower knowledge levels. Collaborative efforts among media, educational institutions, government, NGOs, and communities can be effective in disseminating information and raising awareness. Additionally, measures such as financial incentives, subsidies, and maintenance services should be considered to address the barriers to adoption. Overall, increased awareness, knowledge, and favorable perceptions of solar technology can contribute to its wider

adoption, leading to a more sustainable and environmentally friendly energy future.

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