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ROLE OF ATTITUDE AND VALUE ON BEHAVIORAL INTENTION OF YOUTH TOWARDS ADOPTION OF SOLAR PANELS

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Abstract:

Energy plays a very important role in the process of attaining economic growth and development. But the price to be paid for this development is very huge as more than 70 % of energy needs in our economy is met from fossil fuel which is adversely affecting our environment. Despite huge solar potential in our country we are unable to tap it. The total solar potential for India is estimated as 750 GW (MNRE) but the current solar power installed capacity is just 3 GW. This clearly brings out the fact that to protect our planet without compromising the development goals we need to rigorously consider the tapping of solar potential. This would help us to fight the problems like Global warming and climate change. The present article is an attempt to investigate the measure to optimize solar power in future. This could not happen without bringing a change in the attitude and behavior of the people. To bring a change in the attitude and behavior of consumers we need to emphasize on creation of habits through values. The cross- sectional data from 165 students' samples using structured questionnaire in Jaipur city is used in this study. The reason for selecting students as respondents for the study is that today youth have more awareness about environment, global warming, and the importance of green products. It also evidenced that the consumer's positive attitude along with the behavior towards environment, awareness of the eco-friendly products and value of the (solar panels) is satisfactory then the consumers have positive behavioral intention to adopt the solar panels. The results of the study could help us to develop effective marketing strategies for solar panels in future.

Keywords: Economic Growth, Solar Energy, Attitude,Intentio

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Introduction

Energy plays a very important role in the process of achieving the goals of economic growth and development. All the nations worldwide are relying on energy sources for the development of their economies. There are many sources of energy but among all electricity is more important. Consumption of electric power is also considered to be an effective indicator of growth and development by the economies these days as it is positively related to the progress of a nation. The per capita consumption of electricity for the year 2019-20 in India has been 1,181 KWh (Energy Statistics 2018). India ranks third in the world next to China (6,015 TWh) and US (4,327 TWH) and generates 1,423 TWh. The increase in the consumption and generation of power since independence highlights the fact that India is developing. The opportunity cost for this development is very huge as more than 70 % of energy needs in our economy is met from coal and oil which is adversely affecting our environment. Despite huge solar potential in our country we are unable to tap it. The total global solar Photovoltaic installed capacity is about 629 GW and India in fourth position after China, USA and Japan contributed only 35,739 MW. The total solar potential for India is estimated as 750 GW (MNRE) but the current solar power installed capacity is just 3 GW. This highlights the fact that to protect our planet without compromising the development goals we need to rigorously consider the tapping of solar potential. This would help us to fight the battle against emission of greenhouse gases and take the economy towards the path of growth and development. The present article is an attempt to investigate the measure to maximize the use of solar power in future. This could not happen without bringing a change in the attitude and behavior of the people. To bring a change in the attitude and behavior of consumers we need to emphasize on creation of habits through values. The process of performing habitual action along with moral habits in human life would definitely go a long way not only in creating conscious consumption behavior among the consumers but also would help us to overcome the environmental issues in a better way. In the view of Aristotle virtues (traits) through habits could develop a moral character.There is always a logical relationship between habits and moral character only when people have the understanding of the cause of problem and how an individual through their strong will power can change their consumption patterns and contribute to overcome the environmental issues. But institutional factor are also equally responsible for exhibiting this relationship between habits and moral character through strong will power and social norms.

It is being observed that a person pursues virtues in everyday life and thesevirtues become a part of life over a period of time and if it is a good habit, it not only contributes to the riches of the individuals but to the planet as a whole. The behavior of an individual should be influenced in such a way that it is not concerned with only individual's growth but to the growth of entire planet. Green Energy is a concept which is at a very infant stage in a country like India. But there is a need to gain adequate knowledge about the factors that contribute to the behavior of

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consumers towards green energy alternatives. Among the various alternatives for renewable energy sources, India is considered to have huge potential of solar power and therefore in this article the researcher tries to investigate the factors that influence the consumption behavior of individuals towards adoption of solar energy technologies in day to day life and tries to bring the relationship between Values, Attitude of consumer and his intension through the Theory of Reasoned Behavior. The focus of the present article is to find out the factors that influence the behavior of the consumers towards decision making in context of adoption of solar panels among households.

The entire article is divided into eight sections. The first part of this article presents the introduction of energy sector in India and the significance of studying the factors influencing consumer behavior towards adoption of solar panels in residential sector. The second section presents the literature review to highlight the institutional, motivational, contextual, behavioral, and environmental issues related to consumer behavior. Third section of this article presents the research objective and rationale behind the investigation. Fifth section presents the methodology and model adopted by the researcher in the study. Sixth section highlights the data analysis along and the findings. Final section of the article presents the limitation of the study and future research directions.

Review of Literature

Majority of the researches carried out in advanced nation have focused on only improving the supply of solar energy systems i.e. improving the efficiency , durability etc. but now it is felt that unless people start adopting the green / solar energy technologies any research in the areas of technology would not be successful in overcoming the environmental issues. Now the focus has to be shifted to recognize the behavior of consumers related to solar energy (Sharma&Bhattarchaya, 2018).Solar photovoltaic (PV) is unusual in that it allows homes to create and use power with low maintenance costs, even at low capacity ratings(Aarakit et al., 2021).Pro-environmental behavior research shows that intrinsic benefits are also major determinants of recycled behavior. The favorable assessment of the product features, such as power efficiency, durability, price and environmental impacts, has influenced customer purchases of the costly electric product(Waris & Ahmed et al., 2020).

Behavior- Intention Gap: There is always a gap existing between consumer's preferences for green energy and actual willingness to purchase referred to as attitude- behavior gap (Peattie, 2001). Understanding the behavior of consumers towards an innovative technology enables us to know the strength and weaknesses of the technology and also provides us an opportunity to make the innovation more attractive and acceptable (Rundle-Thiele, Paladino, & Apostol Jr, 2008). Any new technology or new information is not always easy to accept by the people and this

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result in the intention- behavior gap. It is argued that implementation intention mediates the relationship between intention and behavior (Carrington, Neville, & Whitwell, 2010).

Institutional Factors: Studies carried out in developed countries reveal the fact that consumers today are more conscious towards the environment as compared to those in the past. But it is also seen that only strong will power alone could not help us to influence the behavior of consumer towards adoption of green energy options. The relationship between social norms and consumer behavior in the adoption of solar energy equipment (Connolly & Prothero, 2008). Researchers from many regions of the world emphasized the necessity of renewable energy (RE) education at all levels, from school to university. Many researchers at school are observing at learners understanding of renewable energy sources (Assali et al., 2019).According to the study strong institutional factors can bring a significant change in the behavior of the consumers towards the adoption of green energy sources.

Motivation: Intention generally indicates the readiness of an individual to adopt or accept a product that he has preferred on the basis of his own evaluation after considering the factors like experience, institutional pressure, belief about the product or technology which is better explained through Theory of Reasoned Action (Fishbein & Ajzen, 1977). According to TRA the attitude of consumer is greatly influenced by the motivation he gets for accepting the new technology and his own behavior preferences.

Contextual Factors: Contextual factors like Feasibility of the technology, financial Support, Cost – Benefit and Political Commitment play a vital role to minimize the intention- behavior gap (Carrington et al., 2010).Information regarding energy cost savings and awareness about the technology have a greater impact on the consumer's adoption probability (Islam, 2014). Values, Knowledge, Social Norms have been very relevant to explain the adoption or rejection of renewable energy sources (Carlisle, Kane, Solan, Bowman, & Joe, 2015) whether or not an individual would accept a new technology depends on the level of knowledge about the technology, Knowledge about the new technology influences the intention of consumer towards it (Park & Ohm, 2015).

Environment Attitude: People concerned about the environment tend to conserve energy. There is a strong relationship between the environmental concern of individual attitudes and pattern of energy consumption.(Sapci, Onur & Considine, Timothy, 2014). Creation of awareness among the consumers about the environmental issues and generate concern for the same would create a sense of responsibility and influence the decision making of the consumers towards adoption of green energy technologies (Kim & Choi,2005 Schelly, 2010).Therefore, environmental responsibility information should be promoted to encourage people to choose products that are kind to the environment and embrace sustainable lifestyles.(Shukla et al., 2019).

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Summary of the Literature Review

The above stated literatures have found that personal and contextual factors like knowledge, Social and institutional norms etc. influencethe intention of an individual to adopt or reject a technology. There are good number of studies that have studied the intention- behavior gap through contextual factors e.g. Haukkala (2015), Jung, Moula, Fang, Hamdy, and Lahdelma (2016)etc. If the logic for this gap could be investigated it would not only help us to protect the environment but also devise effective marketing strategies so as to maximize the production and use of solar energy technology.

1. **Research Objective**: The prime objective of the study is to empirically investigate the gap between the attitude and behavior of the consumers in the adoption of solar panels in residential sector between age group 18-23. The study also aims to investigate the influence of reasons for adoption of solar panels on the attitude of the consumers. The present study highlights the behavior of youth especially in the context of Indian economy and helps to understand the adoption behavior of youth towards solar panels.
2. **Rationale of the Study**: Youth are considered to have unique ability to think, ability to device creative solutions and have great potential to bring about a positive change in the world. In the present research the author tries to empirically investigate the linkexisting between the attitude and behavior in the adoption of solar panel in residential sector among the respondents of age group 18-23 years as they are the future consumers and at the same time can influence the buying behavior of elders in their family to a greater extent. The present study is an attempt to determine the factors that influence the behavior of youths between the age group less than 25 years who can bring great change in the economy through their behavior as people above 30 or more are more rigid and are less interested in changing their consumption pattern. It is strange to observe that huge potential of solar energy and huge financial support for adoption of solar panels is not attracting the present consumers towards the adoption positively.
3. **Methodology**: In order to investigate the factors which are responsible for this insignificant adoption of solar panels in the residential sector an investigation has been carried out among 164 respondents who are in the age group 18-23 years so as to find out the effective reasons for adoption or rejection of solar panels in their life. Figure 1 shows the conceptual model used by the researcher in the present study.

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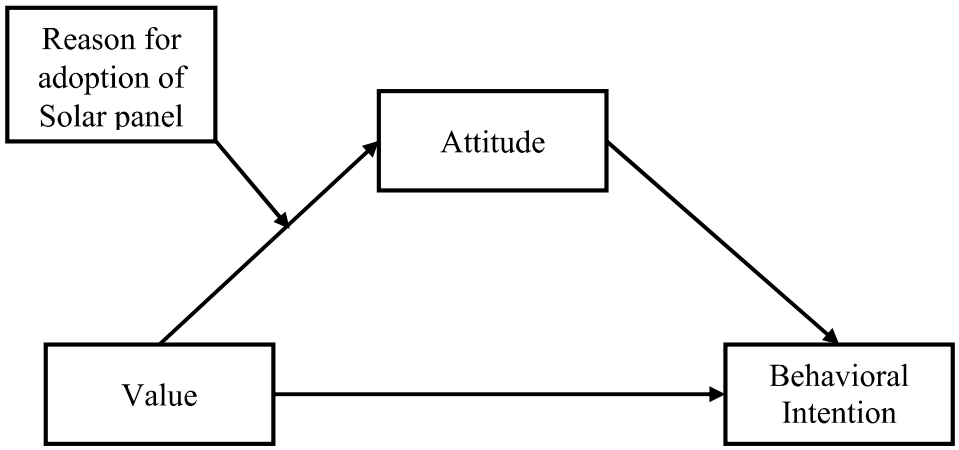

Figure-1 Conceptual Model

5.1 Hypotheses

H_1. Value positively related to behavioral intention
H_2. Attitude mediates the relationship between value and behavioral intention.
H_3. Reason for solar moderates the relationship between value and attitude.
H_4. Reason for solar will moderate the strength of the mediated relationships between value and behavioralintention via attitude such that the mediated relationship will be stronger under high reason for adoption of solar panel than low reason for adoption of solar panel.

Methodology

Researcher collected the cross-sectional data from students' samples using structured questionnaire in Jaipur city. The reason for selecting students as respondents for the study is that today youth have more awareness about environment, global warming and the importance of green products. The responses collectedusing convenience sampling. Previous researchers proved that this type of research the students samples are ideal and results of convenient sampling does not affect the generalizability (Cheah & Phau, 2011; DelVecchio, 2000). 164 usable responses were retained after removing incomplete responses. Of respondents, 44 % female and 56% male, the average age is 20.

Measures

Value (Egoistic, Altruistic and Biospheric) is measured using 12-item scale adopted from Stern, Dietz, and Kalof (1993) and Stern, Dietz, and Guagnano (1995). Reason for adoption of solar panel (10 item) scale is derived from Nyrud, Roos, and Sande (2008) and Schwarz and Ernst

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(2008). Attitude six-item scale is measured using Azjen (1980), and four- item behavioralintention scale is adopted from Fishbein and Ajzen (1977) and Westaby, Probst, and Lee (2010). All the variables in the study were measured using five point Likert scale (5 - strongly agree 1- strongly disagree).

Data Analysis and Findings

The descriptive statistics, normality and reliability of the study variables were analyzed usingIBM SPSS, version 24. The moderated mediation model hypotheses were tested in process macro 3.2 with 5000 Bootstrap Samples (Hayes, 2017). Table 1 provides the summary statistics of latent constructs. The results showed that inter-correlations among the variables are statistically significant. All the variables in the study used established measurement scale. Therefore, the psychometric properties of measurement scales were not explicitly reported in the result section.

Table-1 Summary of descriptive statistics

Constructs	Mean	SD	(1)	(2)	(3)
(1) Value	4.162	0.641			
(2) Reason for adoption of solar panels	3.583	0.462	.446**		
(3) Attitude	3.724	0.454	.476**	.610**	
(4) Behavioral Intention	4.028	0.597	.581**	.653**	.595**

Note: **. Correlation is significant at the 0.01 level (2-tailed), SD-Standard Deviation

The results, as shown in Table 2 and Figure 2, indicate that the direct relationships between Attitude (Mediator) and value (B=0.708, p<0.01), reason for adoption of solar panel (B=0.93, p<0.01) were statistically significant. The interaction effect of value and reason for adoption of solar panel on attitude (B=-0.161, p<0.01) is also statistically significant. Another direction relationship between behavioral intention (outcome variable) and value (B=0.358, p<0.01), attitude (B=0.543, p<0.01) is statistically significant.

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Table-2 Moderated mediation analysis with Reason for adoption of solar panels as a moderator between Value and BehavioralIntention

Prediction of Attitude (Mediator)						
	B	SE	t-values	P value	LLCI	ULCI
Value	0.708	0.096	7.369	0.000	0.518	0.897
RASP	0.933	0.094	9.961	0.000	0.748	1.118
Value * RASP	-0.161	0.026	-6.135	0.000	-0.213	-0.109
Model Summary: R square=0.534, f value=61.05, p<0.01						
Prediction of Intention (Dependent Variable)						
	B	SE	t-values	P value	LLCI	ULCI
Value	0.358	0.061	5.884	0.000	0.238	0.478
Attitude	0.543	0.086	6.317	0.000	0.373	0.713
Model Summary: R square=0.469, f value=71.02, p<0.01						

Note: RSAP-Reason for adoption of solar panels, B-un standardized Beta coefficient, SE=standard error, t-t statistics, p-probability value, LLCI-lower limit confidence interval, ULCI-Upper limit confidence interval

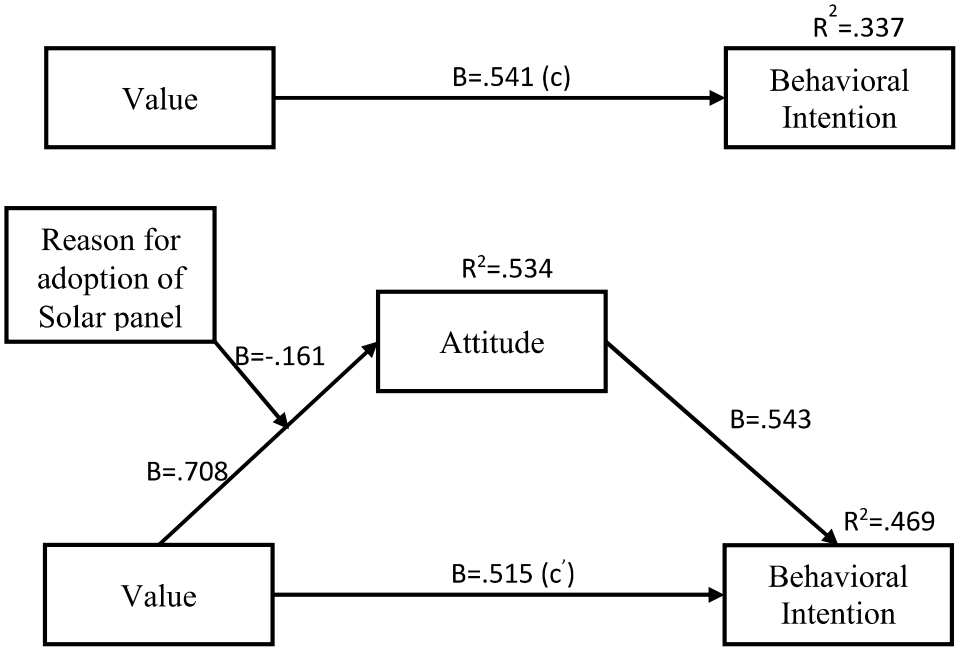

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Figure 2 Moderated Mediational Model

To test the moderated mediational model, we followed the systematic procedures suggested by (Hayes, 2017)using process macro (model 7). First, we need to test the Hypothesis 1 "value positively related to behavioral intention" (B=.541, P<0.01, R^2=.337) is statistically significant. Second, the simple mediation Hypothesis-2 "Attitude mediates the relationship between value and behavioral intention" is accepted (B=0.358, P<0.01). Similarly, the study showed the moderating effect of reason for adoption of solar panel (B=0.416 at P<0.05 with 0.109 Change in R^2) between Value and attitude. Hence, hypothesis 3 "Reason for solar moderates the relationship between Value and Attitude" is accepted. Finally, the study proved the partial moderated mediation effect (B=-0.0874, LCL=-0.2373, UCL=-0.0339) between value and behavioral intention. Results confirms the hypothesis 4 Reason for solar will moderate the strength of the mediated relationships between value and behavioral intention via attitude such that the mediated relationship will be stronger under high reason for adoption of solar panels than low reason for adoption of solar panels. The conditional indirect (Table 3) shows that the moderation effect is holding true at low level and mean level of reason for adoption of solar panels.

Table-3 Direct Effect, Conditional Indirect Effect and index of moderated mediation

Direct Effect	Effect	Boot SE	BootLLCI	BootULCI
	0.358	0.061	0.238	0.478
Conditional Indirect effect				
RASP (low)	0.096	0.036	0.057	0.199
RASP (Mean)	0.070	0.029	0.033	0.145
RASP (High)	0.035	0.031	-0.008	0.112
Index of Moderated Mediation				
Reason for solar	-0.0874	0.0531	-0.2373	-0.0339

Note: RASP-Reason for adoption of solar panels

Discussion

This study set out with the aim of assessing the importance of attitude and reason for adoption of solar panels between value and behavioral intention.The most obvious finding to emerge from the analysis is that value and attitude are the good predictors of behavioral intention. It is interesting to note that in all four hypotheses of this study supported. It also evidenced that the consumer positive attitude towards environment and awareness of the eco-friendly products and value of the (solar panels) is satisfactory then the consumers have positive behavioral intention to

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adopt the solar panels. In current scenario, India is the youngest country in the world. The young minds are more conscious about the environment and willing to pay more for the green products. Government and policy maker could create more awareness about the green products through digital campaign and other modes of marketing efforts.

Limitations and future research

The moderated mediation model is tested using cross-sectional design, the experimental research deign would be appropriate. The study conducted in only Jaipur city, therefore the study lacks generalization of model for overall Indian context. Since the moderated mediation model shows partial effect, few other important predictors like habit, trust can be include in the model to gain better prediction of the overall model.

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