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"IMPACT OF MARKETING ASPECTS ON CONSUMER BEHAVIOUR" AND "SATISFACTION LEVEL OF THE CUSTOMERS" OF "WARM STREAM SOLAR WATER HEATER" A STUDY WITH SPECIAL REFERENCE TO GUJRAT STATE

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ABSTRCT:
The utilization of solar energy can be for commercial and domestic requirement for benefit of the nation to save on costly fuels. In India the sun is the greatest energy generator of our solar system. Solar Energy is provided freely to the whole of the planet although not evenly distributed. A considerable level of unpredictability especially in earth's higher and lower latitudes is an important issue. Never the less, solar energy can decrease considerably the amount of energy consumed for domestic water usage as well as space heating through solar collectors connected to water tanks placed usually on a dwelling's roof area Specifically, solar water heating for domestic use means simply converting solar energy into thermal to increase water temperature to appropriate levels. This is a very mature technology utilized for the last 80 year.

The main objectives of the study are to assess the satisfaction level of the consumers towards solar water heaters as well as motivational factors of customers while making decisions to purchase solar water heater. A sample of 100 respondents has been chosen for purpose of the study. In this study I choose convenient sampling method to select the sample. The study makes use of statistical techniques such as simple percentage analysis, Chi- square test and T-test in analyzing the data for finding the result. This study concluded that most of the consumers are satisfied from solar water heater products and some consumers have minor complain of maintenance. **Solar energy is regarded as green because it uses a natural resource that can't run out and has almost no negative impact on the environment.**

Key Words: Solar Water Heater Consumers Satisfaction.

Introduction:

Solar water heaters sometimes called solar domestic hot water systems can be a cost-effective way to generate hot water for your home. They can be used in any climate, and the fuel they use sunshine is free. Solar water heating systems include storage tanks and solar collectors. There are two types of solar water heating systems: Active system, which have circulating pumps and controls, and passive system, which don't. The solar water heating systems are designed to supply water at 80 C. Sun rays pass through the transparent glass of the collector and strike on the black

surface of the absorber. The black coating on the tubes; thereby heating the water inside the tubes. Forced flow circulation system with thermostatically controlled, fixed or differential temperature controller is installed. The system consists of an array of collectors, arranged in a series / parallel combination so as to optimize the pressure drop as well as the heat collection, while utilizing the available space to the maximum. A motor pump is used to circulated water through the collectors. This pump is activated by a capillary thermostat with the rise in the temperature from the preset conditions. The heated water is supplied to a properly insulated storage tank which can keep it hot overnight. A solar water heater is one of the most effective ways of cutting a household's carbon footprint by reducing reliance on dirty fossil fuel usage. Solar power system has been applied to heat water for night time activity in rural areas.

India's share of global energy demand is predicted to double to 11% in 2040, making it imperative to enhance energy security and self-sufficiency in power generation without increasing environmental costs. This increase in power demand is likely to increase India's reliance on coal, oil and natural gas as a source of energy. However, additional imports of oil and increased domestic production of coal will not only fall short of energy demand but will also entail economic and environmental costs. These are likely to hit harder than anticipated to an economy ravaged by COVID-19. Expansion of solar power units and increased reliance on solar power allows India to enhance energy security in the face of rising demand.

Statement of the Problem:

A **solar water heating system** utilizes the alternative source of energy i.e., sunlight to warm up the water. Unlike traditional heating appliances, it is free of cost, and you do not have to take any more tension about paying a huge amount of electricity bill. A solar water heating appliance can provide hot water even on the cloudy day. Solar Water Heaters are also commonly known as domestic solar hot water systems and have gained a lot of popularity recently. They are not just a cost effective but also an environmentally friendly way to heat water for your domestic needs. As they use sun's heat to work so if you stay at a place which has good exposure to sunlight then a solar water heater will surely help in decreasing the electricity bill expenses.

Objective of the study:

- To know what are the motivational factors of customers while making decisions to purchase solar water heater.
- To study which are the marketing and advertisement factors affecting customers to purchase solar water heater.
- To study the satisfaction level of existing customers of solar water heater.

Significance of the study:

This study is used to analyze the usage and customer satisfaction towards solar water heaters in Major city of Gujarat state. Solar water heater system is an effective water heating system without electricity. This study is especially designed to know that factors influencing the customer to purchase solar water heater and their level of satisfaction. The study helps to understand how far the customers are satisfied with solar water heater.

Methodology:

Questionnaire method has been followed for the purpose of collecting data. The required primary data were collected through a well-structured questionnaire. The sample respondents were interviewed personally at the house. Questionnaire meant for customers includes questions relating to personal information, awareness, preference and level of satisfaction towards solar water heater at households.

Sampling:

The data required for the study have been collected through structured questionnaire in order to assess the level of satisfaction towards solar water heater at households. A sample of 200 respondents has been chosen for purpose of the study. Convenient sampling method is adopted to select the sample.

Framework of Analysis:
To give a scientific back up to the study the statistical tools have been applied. Simple percentage method is used to explain the collected data. In order to identify the relationship between brand loyalty and the selected socio economic variables the Chi – Square technique has been administered.

Limitations of the Study:
The limitations of the study may be as follows

- ✓ The study is conducted only in Limited cities of Gujarat.
- ✓ The data collected for the study is primary data, which is based on the questionnaire and hence the result would bear all the limitations of primary data.
- ✓ The period of study was conducted only for six months.
- ✓ The findings are applicable only to the respondents of Limited cities Gujarat. Hence care has to exercise while extending these results to other areas.

Review of Literature:
Enas R. Shouman (2016) in their study captioned, "Economics Analysis of Diesel and Solar Water Pumping with Case Study Water Pumping for Irrigation in Egypt", The present paper presents an economic analysis of diesel and PV water pumping systems for irrigation purposes at Cairo, Egypt (Lat. 30° 2' 38" North, long. 31° 14' 9" East). y. It also concluded that diesel pumps are typically characterized by a lower capital cost but a very high operation and maintenance cost. Solar is the opposite, with a considerably higher capital cost but very low ongoing operation and maintenance costs.

Nagamani. M (2016) in their study captioned, "A Study on Awareness and Usage of Solar Products among Women Graduates – An Empirical Study", aims to focus on the impact of awareness of solar products among women graduates. This study is based on Primary data collected from 50 respondents by means of a structured questionnaire. Random sampling technique was applied and statistical tools like Percentage Analysis and Chi-Square were carried out to analyze the data and draw interpretation. This study concluded that most of the consumers are aware about solar products through their friends and most of them using solar products.

Pillai Indu R and Banerjee, (2004) reported that, solar water heater (250 LPD) was most cost effective, with payback period of about 2.5 years. The cost of saved energy was about Rs. 1.5/kWh. The cost of energy saved for 250 LPD systems was found to be less than Rs.2/kWh.

Dr. S. B. Gayathri A. Abitha (2017) in their study captioned, "SATISFACTION TOWARDS SOLAR WATER HEATER AT HOUSEHOLDS – A STUDY WITH SPECIAL REFERENCE TO POLLACHI TALUK". This study concluded that most of the consumers are aware about solar products through their friends and most of them using solar products. Solar products ensure the green quality of products. There is significant scope in future for direct energy through the installation of solar products

Graham L. Morrison (2016) in their study captioned, "Packaged Solar Water Heating Technology Twenty Years of Progress". "Social Impact of Solar Home System in Rural Bangladesh: A Case Study of Rural Zone". Questionnaires were used to collect data from 450 respondents by using quota sampling. The statistical tools used were T test and specific customer ranking. In this study a passive solar water heating system was also fabricated, by using indigenous and locally available materials.

Ganapathi Bala Subramanian. S and Dr. P. Ravichandran (2015) presented an article entitled, "A Study on Consumers Satisfaction towards Solar Energy Products in Coimbatore District", reveals the purpose of the study is to analyses the satisfaction level of Solar Energy System consumers in Coimbatore District. The primary data were collected from the Solar Energy Products consumers in Coimbatore District. Sample size was restricted to 75 respondents of domestic and non-domestic solar energy product consumers. The sample size was selected on the basis of

judgment sampling method. The collected data were analyzed using statistical tools like Percentage analysis and Chi-Square test. This study concluded that Solar Energy Products has huge market in the near future because of importance given by both state and central government, improvement of services and new technology are the need of the hour to improve the consumers satisfaction towards the solar products.

Prakash Kumar Sen and Nishita Kispotta (2015) in their study captioned, "Study on Solar Water Heater and Its System Performance", aims to explore that the solar energy is one of the renewable energies which it is the simplest and is easy to use. Solar water heater uses the solar energy from the sun to generate heat (not electricity) which can then be used to heat water for showering, space heating, industrial processes or even solar cooking. Solar water heater device has been around for even 100 years. The collected data were analyzed using statistical methods like simple percentage. The sample size decided for the study was 100. The system will provide hot water availability out the day. The solar water heater used for supplying hot water during the day. The study that solar water heater is a solar collector box, insulation material, and absorber plate.

METHODOLOGY:
I selected Gujrat's major cities purposively for the study. Based on discussions with SWH companies, four regions in Gujarat's different cities where SWH was used to a larger extent than other areas were identified. In each region, 30 SWH customers were selected. Thus, the total size of sample respondents was 120, which comprised of sixty users and sixty non users. The required primary data were collected through a well-structured and pre-tested interview schedule. The sample respondents were interviewed personally at the house. The secondary data such as physical, social, economic and other related aspects of the study area were collected by surfing the website and published report. The following statistical tools were used for the analysis Percentage analysis, multi-Dimensional scaling technique, Garrett's ranking technique and discriminant analysis

RESULTS AND DISCUSSIONS: General characteristics of the sample respondents like age, education, family size, occupational status, educated persons in a family, type of house etc. will have significant bearing on the consumer behavior which in turn will influence the success of the business. Therefore, the details on the same were collected, analyzed and the results are presented and discussed in this section.

1 Family size of the respondents.

Sr.No.	Family size	User
1	< 3	25
2	4-5	25
3	>5	70
	Total	**120**

Table 1

It could be inferred from the table 1that, majority of the sample households belonged to medium family size of 4 to 5 members followed by small family size users of SWH. Since majority of the households were medium and small size, the firms should highlight their advertisements in such a way that how these families can benefit by purchasing SWH.

2 Since how long customers using SWH?

Options	In%
Recently	10
Since last year	6
Since last two years	14
Since last three to five years	34
Since last five to ten years	14
Since last ten to fifteen years	22

Table 2

This table shows that the Solar system have longer life. This particular question shows that how many respondents are having solar water system of what age, which forms one of the bases of this research study, From Table 2 we can interpret that 22 % of the respondents are having SWH of since last 10 to 15 years old, which might be used for further analysis, where 14% of the respondents are having SWH since more than 5 to 10 years, and 34% of the respondents having system from last 3 to 5 year and 14% of respondents have this system from last 2 years. Some of the respondents having this system from last year. From Table 2 one can also interpret that more that 22% of the respondents are having SWS of since last 10 to 15 years old, which might be used for further analysis. Where 14% of the respondents are having SWH since more than 5 to 10 years, and 34% of the respondents having system from last 2 years, some of the respondents having this system from last 2 year.

3. Are you agree that you are saving energy & money after using this solar water heater?

Options	IN%
Yes	96
NO	4

Table 3

The above Table 3 interprets that customers of SWH is really satisfy and they are really in profit by saving energy & money after using the product. The majority of 96% customers are saving energy & money after using the product. The majority of 96% customers are saving their money but 2% is not satisfy because of many others technical problems including servicing and etc. It interprets that it is beneficial point for customers to purchase solar water heater.

4.How much Energy you saving after using Solar water Heater?

Approximate 5-8 users in one home before solar heater they are investing 900 to 1000 rupees per month for electricity bill. So that they are agree that they are saving per month 900 to 1000 rupees after solar system.

Electric equipment operating cost is very high it wants more electric power for heating water and electric bill is going to increase. The result shows that if everybody is inspired to using solar system in our country the problem of electricity and Gas can be resolved.

5. What inspired you to purchase solar water heater?

Options	In %
Advertisement	12
Salesman	2
Word of mouth	42
Exhibition fair	6
Others	38

Table 4

In Table 4 we can observe that majority of respondents 42% of respondents out of the total respondents, were inspired to purchase SWH by Word-of-Mouth effect. It also includes suggestions from existing customers of SWH like feedback forms, benefits, effective customer service etc. can change the mind of customer or affect their behaviors at the time of purchase decision.

6. What motivated you to purchase solar water system?

Rates (r)	A		B		C		D		E	
	F	F * r	F	F * r	F	F * r	F	F * r	F	F * r
5	95	475	97	485	72	360	5	25	70	350
4	10	40	15	45	18	72	6	24	15	60
3	10	30	7	21	10	30	10	30	17	51
2	2	4	1	2	0	0	2	4	0	0
1	3	3	0	0	20	20	97	97	18	18
Total	120	552	120	553	120	482	120	180	120	479
WA	-	4.6	-	4.60	-	4.01	-	1.5	-	3.91

Rates (r)	F		G	
	F	F * r	F	F * r
5	0	0	87	435
4	5	20	8	64
3	6	18	4	12
2	12	24	1	2
1	97	97	20	20
Total	120	159	120	531
WA	-	1.32	-	4.425

Table 5

Table 5 is showing what are the factors which create the need to purchase ‘Solar water heater’. The “Five Point Rating Scale” Method we have used for respondent’s rate to the statements listed in the question according to their level agreement.

7. What motivated you to purchase solar water system?

Options	Frequency (%)
Brand Name	18
Quality	31
Advertisement Effect	6
Word of mouth	18
Price	5
Availability	7
Service	11

Table 6

From the above table 6 we can see that the highest motivational factor Quality of the product which are also having greater level of influence on the purchasing decision of the customer.

7. Please state the degree of the satisfaction level with the following statement.

Rates (r)	A		B		C		D		E	
	F	F * r	F	F * r	F	F * r	F	F * r	F	F * r
5	71	355	63	315	72	360	70	350	70	350
4	15	60	15	45	18	72	15	60	14	56
3	14	42	7	21	10	30	17	51	18	54
2	8	16	5	10	0	0	0	0	3	6
1	12	12	30	30	20	20	18	18	15	15
Total	120	485	120	421	120	482	120	479	120	481
WA	-	4.04	-	3.50	-	4.01	-	3.91	-	4.00

* A-It is performing well.
* B-Operating cost is very low.
* C-No big breakdown a maintenance.
* D-Dealer and company provides effective after sales services.
* E-Complaints are entertained immediately.

Table 7

This question is of Five Point Rating where respondents were asked to rate their degree of satisfaction level with the statement level with the statement listed above. After tabulating the data in the table, we have found out the weighted average for all statement on the basis of the weighted average method. from the table 8 it can be experimental that the statement ‘A’ ‘It is performing well’ is having the weightage average of 4.04which tells that system is really work as a company showing and custom risk fully satisfied with this system. So, we can conclude that the satisfaction level of respondents to the product is highly satisfied with product performance.

8. Will you recommend others to purchase Solar water heater?

Options	Percent
Yes	90
No	10
Total	100

From above table we can see that 90% of total respondents are recommending others to purchase solar water system. Customers are highly satisfied with solar water system whether it any company. Non-satisfied customers can be converted in to totally satisfied customers if their complaints are entertained by whether the dealer or the company people itself. Company should also think on the factor of competitive price for further development of future market.

FINDINGS:

- The majority of 96% of respondents are agree for solar water heater is saving money and energy.
- Approximate 5-8 users in one home before solar heater they are investing 900 to 1000 rupees per month for electricity bill. Now customers are saving that money.
- The majority of 42% of respondents are inspired to purchase solar water heater by word-of-mouth effect.
- The most of 62% of respondents are influenced by Quality.
- The most of 40.28% of respondents adopted solar water heater because it is Environmentally Friendly.
- From Five Point Likert Rating it can be experimental that the statement ‘A’ ‘It is performing well’ is having the weightage average of 4.04 scale which tells that system is really work as a company showing and custom risk fully satisfied with this system.

SUGGESTIONS:

1. Some of the people are not aware of solar water heater. Hence, the manufacturers should create a better awareness about solar water heater through advertisement.
2. The price of the solar water heater may be considerably reduced, so that more people from low-income group can also adopt solar water heater.
3. The installation and maintenance of solar water heater can be reduced so that the customers will continue to use it without worrying about high installation charges and maintenance expenses.
4. Solar water heater should also work during rainy season without any drawbacks.

CONCLUSION Today world is trying to ‘Save Energy with natural resources. Solar water heater is providing tremendous solution of heating water with solar energy. The consumption of energy has been increasing in abundant amount and the consumers have become more conscious about saving power and switching onto other sources of power like solar energy for their consumption. From this study, it can be concluded that most of the consumers are aware of the solar water heater. It is identified that the consumers are influenced by the factor (Quality) to buy the solar water heater as well as customer satisfaction of old customers playing a major role in success of Solar water heater. Producers also should create awareness of solar water heater among old customers and to make new customers through advertisements.

Biblography

- https://earth.org/india-solar-power/
- Enas R. Shouman (2016), " Economics Analysis of Diesel and Solar Water Pumping with Case Study Water Pumping for Irrigation in Egypt", International Journal of Applied EngineeringResearch Volume 11, Number 2, PP 950-954.
- https://www.energy.gov/energysaver/solar-water-heaters
- Dr. S. B. Gayathri* & A. Abitha** "SATISFACTION TOWARDS SOLAR WATER HEATER AT HOUSEHOLDS – A STUDY WITH SPECIAL REFERENCE TO POLLACHI TALUK", International Journal of Multidisciplinary Research and Modern Education (IJMRME) Impact Factor: 6.725, ISSN (Online): 2454 - 6119 (www.rdmodernresearch.org) Volume 3, Issue 1, 2017
- https://eprajournals.com/articals A STUDY ON CONSUMER AWARENESS TOWARDS SOLAR WATER HEATER WITH SPECIAL REFERENCE TO COIMBATORE CITY1Dr. D. Sivasakthi, 2Ms M. Kiruthika