



## UNDERSTANDING THE ECOLOGICAL ADOPTION OF SOLAR WATER HEATERS AMONG CUSTOMERS OF ISLAND ECONOMIES

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### **Abstract:**

*This paper explores the major factors impacting upon the ecological adoption of solar water heaters in Mauritius. The paper applies data reduction technique by using exploratory factor analysis on a sample of 228 respondents and condenses a set of 32 attributes into a list of 8 comprehensible factors impacting upon the sustained adoption of solar water heater in Mauritius. Multiple regression analysis was also conducted to investigate upon the most predictive factor influencing the adoption of solar water heaters in Mauritius. The empirical estimates of the regression analysis have also depicted that the most determining factor pertaining to the 'government incentives for solar water heaters' impacts upon the adoption of solar water heaters. These results can be related to sustainable adoption of green energy whereby targeted incentive mechanisms can be formulated with the aim to accelerate and cascade solar energy adoption in emerging economies. A novel conceptual model was also proposed in this paper, whereby, ecological stakeholders in the sustainable arena could use the model as a reference to pave the way to encourage adoption of solar water heating energy. This research represents a different way of understanding ecological customers by developing an expanding on an original scale development for the survey on the ecological adoption of solar water heaters.*

**Key words:** *Ecological, Adoption, Solar Water Heaters, Island Economies and Mauritius*

### **1. Introduction**

Environmental sustainability has been an important academic research topic and the environmental literature has depicted the growing consciousness of customers

to behave in an ecological manner around the globe (Nimse *et al.*, 2007; Sharma, 2009, Juwaheer *et al.* 2012; Pudaruth *et al.* 2015). Specific studies on the ecological adoption of social water heater are almost inexistent for an Island economy such as Mauritius. Mauritius is still in the early stages of executing sustainable strategies and ecological products within the context of the 'Maurice 'L'Ile Durable' programme on sustainability (Budget speech, 2008-09). There is still a lack of concern, education and purchase for green products among consumers of developing nations (Kumar and Ali, 2011), unlike developed countries have experienced an increase in the purchase of ecological products over the years as pointed out by various authors (Kangun *et al.*, 1991; Martin and Simintiras, 1995; Schlegelmilch *et al.*, 1996; Todd, 2004; Pudaruth *et al.* 2015). Likewise, there has been accelerating ecological concern among consumers towards environmental friendly products for solar water heaters since solar water heaters save money, energy and protect the environment (Sharma, 2009). Mauritius is one of the countries which benefits from sunlight almost all year around and this represent a crucial opportunity for companies and the government to promote the adoption of solar water in our small Island. Moreover, the uptake of solar water heaters has been influenced and promoted through government policies and incentive schemes in New Zealand (EECA, 2002; BERR, 2008; Masango, 2008). It has also been found that there is a widespread of green electricity as depicted by Plaza and Linares (2007), but, yet, Milton and Kaufman (2005) have stated that the low level of public awareness on solar water heaters have led to poor adoption of solar water heaters in Mexico. To the authors' best knowledge, no academic study has focused on the adoption solar water heaters in Mauritius. This paper presents a new crossroad to sharpen one's understanding towards the adoption of solar water heaters.

## **2. Literature Review and Hypothesis Development**

### **Perceived Seriousness of Environmental Problems and Consumer Effectiveness**

- **Perceived Seriousness of Environmental Problems**

Various researchers have highlighted that customers perceive environmental problems in the way that they are described in the media and these environmental problems can influence their attitudes towards the adoption of green products (Moser and Uzzell 2003; Cherian and Jacob 2012; Kim 2011; Kianpour *et al.* 2014; Majlath 2010). In a similar vein, Pahl *et al.* (2005) and Milfont (2007) have supported that the perceived seriousness of environmental problems has a positive impact on consumers' attitudes to propel ecological behaviours as suggested by Tan (2011). However, Ozaki (2011) has argued that despite the high level of awareness on the seriousness of environmental problems, they may not necessarily adopt ecological behavior due to switching costs.

In view of the above, we posited the following research hypothesis:

*H<sub>1a</sub>: Perceived seriousness of environmental problems can have a positive impact on the adoption of solar water heaters.*

- **Perceived Consumer Effectiveness**

The ecological literature have demonstrated that perceived consumer effectiveness is an important consideration for encouraging socially responsible and ecological behavior among consumers (Webb *et al.*, 2008; Gupta and Ogden, 2009; Gleim *et al.* 2013; Kang *et al.* 2013). Other pertinent environmental studies have highlighted that perceived consumer effectiveness can encourage customers to engage in green consumerism and green purchase behavior (Kim and Choi, 2005; Vermeir and Verbeke, 2006; Verhoef, 2005, Lee, 2008).

The following research hypothesis is derived from the preceding evidence:

*H<sub>1b</sub>: Perceived consumer effectiveness can have a positive impact on the adoption of solar water heaters.*

### **Perceived Risks and Adoption of Ecological Products**

- **Perceived Risks**

In a study conducted by Durif *et al.* (2012), green products such as solar water heaters may have functional problems and also they may not last longer than electric heaters and gas heaters. In a similar vein, Datta (2011) and Ozaki (2011) have highlighted that consumers lack confidence in the quality of green power since consumers do not possess enough information on eco-friendly raw materials that have been used in producing green products. Price is considered as another factor accounting for the reluctance of consumers towards the adoption of green products (Zaiem, 2005). However, Hopkins (2009) and Tanner and Wolfiging Kast (2003) have pointed out that customers do not perceive price as a hindrance factor for the non-adoption of green products as outlined by Gerpott and Mahmudova (2010). Durif *et al.* (2012) have also suggested that temporal risks can arise when consumers spend a lot of time in the search of ecological products such as solar water heaters since the search of ecological products demands more effort and travelling time than conventional products (Nicholls and Lee 2006, Hopkins, 2009, Adams and Raisborough 2010).

In view of the above, we posited the following research hypothesis:

*H<sub>2</sub>: Perceived risks can act as a barrier towards the ecological adoption of solar water heaters.*

### **The Role of Government and Adoption of Ecological Products**

- **The Role of government on the ecological adoption of products**

Numerous green marketing studies have depicted that government policies can influence the adoption of ecological products (Sinnappan and Rahman 2011; Chen and Chai 2010; Kianpour *et al.* 2014). Likewise, Rezai *et al.* (2013) have pointed out that the government can exert a significant role towards the adoption of green products through public campaigns, enforcement of laws and provision of environmental education to the general public. In contrast, Rahbar and Wahid (2010) and Tsen *et al.* (2006) have argued that consumers have outlined that the state is solely responsibility to protect the environment. However, Qader and Zainuddin (2011) have affirmed that

government policies do not posit a huge impact on consumers' adoption for eco-friendly products.

Hence, the following hypothesis of the study is listed below:

*H<sub>3</sub>: The policies of the government can influence on the adoption of solar water heaters.*

### **Environmental Attitudes, Environmental Knowledge and Ecological Behaviour**

- **Environmental Attitudes**

Several studies on environmental management have demonstrated that green attitudes can propel positive purchase intention and encourage ecological behaviours (Walsh *et al.* 2009; Mostafa, 2007; Cornelissen *et al.* 2008; Beckford *et al.* 2010; Krarup and Russell, 2005; Hartmann and Ibanez, 2006; Datta, 2011). However, others studies on green marketing have depicted that there is no significant relationship between environmental attitudes and adoption of green products such as solar water heaters even though consumers are eco-conscious (Clevel *et al.*, 2005; Tarkiainen and Sundqvist, 2005; Arvola *et al.* 2008; Pickett-Baker and Ozaki, 2008; Smith and Paladino, 2010; Dagher and Itan, 2012;). According to Lee (2008), green environmental attitude is not considered as a significant variable in predicting green behaviors.

- **Environmental Knowledge**

Many studies have depicted that environmental knowledge can influence the adoption of green products (Flamm, 2009; Mostafa, 2007; Thogersen, 2006; Fraj-Andrés *et al.* 2007; Pickett-Baker and Ozaki, 2008; Kaufmann *et al.* 2012; Tilikidou, 2007; Gram-Hanssen, 2010). However, a few other studies have also reported a negative relationship between environmental knowledge and adoption of ecological products (Bang *et al.* 2000; Wolsink, 2007; Chan and Lau, 2000; Rashid, 2009; Ramayah and Rahbar, 2013). Tadajewski *et al.* (2006) and Booi-Chen (2011) gave a similar explanation that environmental knowledge does not lead to green ecological behaviours.

We therefore posited a similar effect in the following hypotheses:

*H<sub>4a</sub>: There is a significant relationship between environmental attitudes and ecological adoption of solar water heaters among customers.*

*H<sub>4b</sub>: Environmental knowledge can impact upon adoption of solar water heaters among customers.*

### **Religion, Reference Groups and Adoption of Ecological Products**

- **Religion**

According to Rashid (2009) and Baqer (2012), religion can influence consumer attitudes and behaviour towards the purchase of green products. In fact, religion is the divine belief that people have towards God and this belief influences consumers' lifestyle and decisions (Djupe and Gwiasda, 2010; Hirschman *et al.* 2011; Minton and Kahle, 2013; Kalamas *et al.* 2014). The holy books encourage the protection of the environment (Ozdemir 2003 cited by Baqer 2012) and consumers are influenced by

the holy verses, hence, religion positively impact on green purchases in *The United States of America, Kuwait and Turkey* and same has been supported by other studies (Hunt and Penwell, 2008; Sarre, 1995; Baqer, 2012). However, there has been very little academic research conducted on religion and ecological behavior of customers (Engelland, 2014; Minton and Kahle, 2013).

Hence, the following hypothesis of the study is listed below:

*H<sub>5a</sub>: Religion has a significant impact on the sustained adoption of solar water heaters in Mauritius.*

- **Reference Group**

Reference groups have been considered as a useful tool for predicting behavioral purchasing patterns (Hawkins *et al.* 2007; Kotler and Keller, 2006). Numerous studies on ecological consumption have depicted a positive relationship between the influence of reference group and the intention to adopt green products (Mourali *et al.* 2005; Wiser. 2007; Gerpott and Mahmudova, 2010; Ek and Soderholm, 2008). In addition, White and Dahl (2006) have found a strong correlation between reference group and adoption of green products. Similarly, Wong and Mo (2013) have also proposed that reference group has significantly contributed towards green behavioral patterns as highlighted by Serralvo *et al.* (2010) in the survey conducted in Brazil.

*H<sub>5b</sub>: Reference groups can significantly impact on the sustained adoption of solar water heaters.*

## **Green Advertising, Eco-labeling and Adoption of Ecological Products**

- **Green Advertising**

Several research studies have demonstrated that customers who are aware of ecological problems place greater emphasis on green advertising campaigns and ecological products (Haytko and Matulich, 2008; Kianpour *et al.* 2014). Conversely, the study of D'Souza and Taghian (2005) and Do Paco and Reis (2012) have depicted that consumers who are aware of ecological issues do not perceive green advertising as credible. Furthermore, Chang (2008) and Tu *et al.* (2013) have proposed that green advertising messages can influence customers' views and judgments about products as suggested by several researchers (Qader and Zainuddin, 2011; Zhu, 2012, Nyborg *et al.* 2006).

- **Eco labeling**

Numerous studies have demonstrated that consumers who possess better knowledge on the benefits of eco labeling and energy star are more likely to adopt green products (Leire and Thidell, 2005; Loureiro and Lotade, 2005; Rashid, 2009; Young *et al.* 2010; Rahbar and Wahid, 2011). Conversely, other studies have depicted that only a few customers have positive attitudes concerning eco labeling and the majority of customers still have many problems to fully understand environmental jargons associated with eco labeled products (Leire and Thidell, 2005; Nitalla, 2014) and in turn, they do not understand how these eco certified products can solve environmental issues. However, research findings have further revealed that eco-

labeled products do not necessarily encourage green purchase as very often consumers perceive eco label claims as being over-exaggerating and incredible (Grundey, 2009; Nitalla, 2014).

All of the above lead us to conjecture that:

*H<sub>6a</sub>: Green advertising has a significant impact on the sustained adoption of solar water heaters.*

*H<sub>6b</sub>: Eco labeling has a significant impact on the sustained adoption of solar water heaters among customers.*

### **Cost of Electricity and Consumer Decision Processes for Green Products**

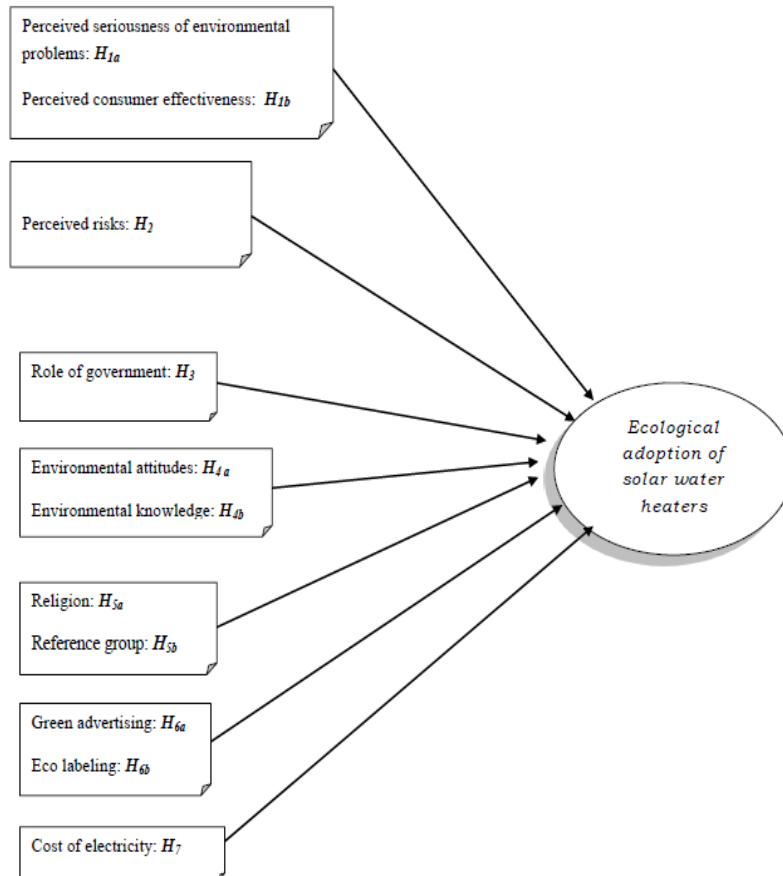
- **Cost of Electricity**

Yoo and Kwak (2009) have depicted that the cost of electricity can influence consumer decision processes for green or eco-friendly products (Yoo and Kwak 2009). In a similar vein, Drozdenko *et al.* (2011) have stated that electricity bills can positively impact on consumers while they are adopting energy efficient products. Moreover, Gerpott and Mahmudova (2010) have proposed that consumers with lower consumption of electricity normally purchase green power after analyzing the relevant electricity prices and companies' social responsibility. However, very few research have been conducted to demonstrate whether electricity bills have an impact on consumer buying decision (Roche *et al.* 2009; Unruh, 2011)

In view of the above, we posited the following research hypothesis:

*H<sub>7</sub>: Cost of electricity can impact on consumer decision processes for the adoption of solar water heaters.*

The proposed conceptual model as illustrated in Figure 1.0 below has emerged from the above seven research hypotheses that the paper seeks to answer and these seven hypotheses will be tested empirically.



**Figure 1: Proposed Conceptual Framework**

### **3. Research Methodology**

A structured questionnaire consisting of several sections was developed whereby the questionnaire items were constructed and adapted from existing intensive literature review and the list of sources has been included in the list of references. Table 1.0 highlights the original scale development for the questionnaire design for the survey as outlined in Appendix I. In this study, the ecological perceptions of customers towards solar water heaters were assessed on five-point Likert scale (1: Strongly Disagree, 5: Strongly Agree) and nominal scale (1: Yes, 2: No). Statistical techniques were used to process the data with statistical programme SPSS 17.0.

#### **Sampling Plan**

The targeted population consisted of ecological customers of urban and rural areas of Mauritius. The target population sampled was the ecological customers

above 18 Years who were already owners of at least one solar water heater. The sample size amounted to 250 respondents through the convenience sampling technique and the response rate for the present study was 91.2 per cent. Face to face interviews were carried with the respondents in the nine districts across Mauritius for greater geographical representativeness.

### **Internal consistency of the questionnaire**

The Cronbach's Alpha overall value for the entire questionnaire was 0.934 and such a high figure infer that the questionnaire is a very good indicator of what the researcher wants to investigate. According to Hair *et al.* (1995), a coefficient of less than 0.6 indicates marginal to low internal consistency and a value of 0.60 or more indicates satisfactory internal consistency reliability (Churchill, 1979).

### **Data analysis**

The proposed conceptual model (Figure 1.0) was tested by using inferential analysis such as factor analysis, multiple regression analysis and chi-square tests. Factor analysis was developed to assess the relative significance of the factors in sustaining the ecological adoption of solar water heaters in Mauritius. A variable with factor loadings of 0.40 was considered, that is, items less than 0.40 were excluded. Only factors with eigenvalue equal to or greater than one were considered significant and chosen for interpretation. The multiple regression analysis was also applied to explore eight (8) factors influencing the sustained adoption of solar water heaters among customers in Mauritius. The influencing factors impacting on the adoption of solar water heaters in Mauritius were then used as independent variables in explaining ecological behavior. The factors with various degrees of significance resulting from the regression analysis were then shown in order of importance based on their  $\beta$  co-efficient. For example, a factor with a high  $\beta$  co-efficient is more likely to suggest that the factor itself carries a heavier weight in explaining the sustained adoption of solar water heaters among ecological customers of Mauritius. Chi-Square test has been done to test the relationship between environmental aspects, religion, reference group and the ecological adoption of solar water heaters. The empirical estimates for the main-effects model indicated that, from a statistical point of view, the data fit the conceptual model acceptably; supporting fully all the hypotheses.

### **Empirical findings**

#### **Part A: Demographic Profile**

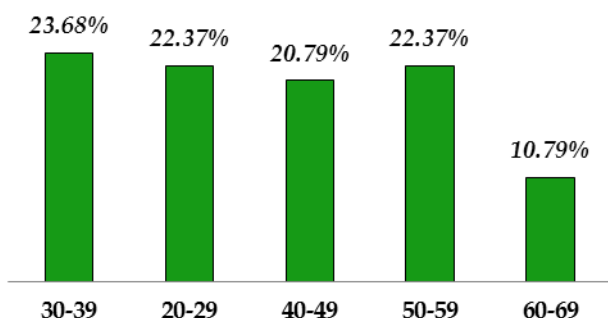


## Gender



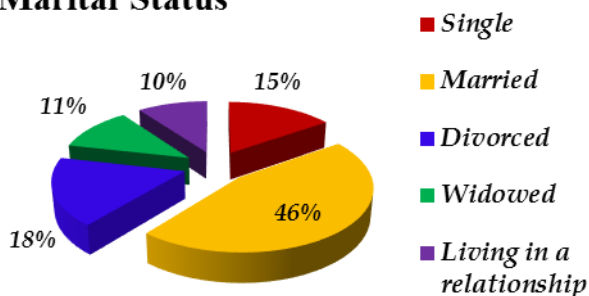
In terms of gender classification, the majority were male respondents (56%), followed by females (44%).

## Age group



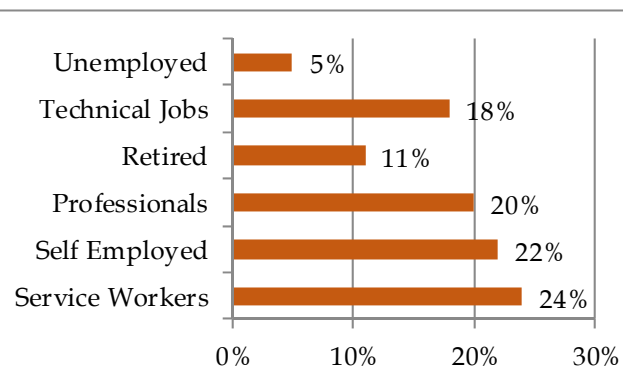
As regards to the age classification of respondents, 23.68 % of respondents were aged 30-39, 22.37% were of 20-29 and 50-59, 20.79% were of 40-49, and 10.79% were aged between 60-69 years.

## Marital Status

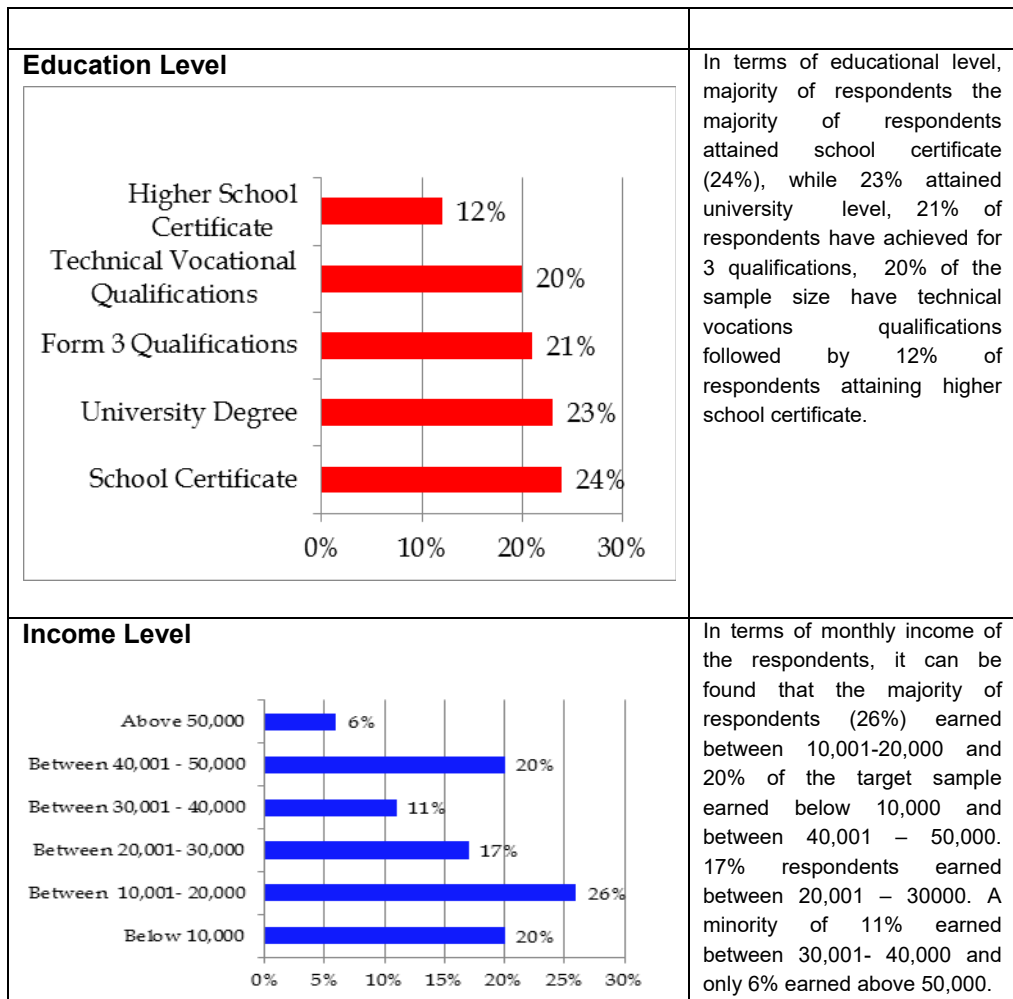


In terms of marital status, the majority of respondents were married (46%); followed by Divorced (18%); Single (15%); Widowed (11%) and Living in a Relationship (10%).

## Occupational Classification



In terms of occupational classification, the majority of respondents are service workers (24%), and the minority group of respondents are unemployed (5%). 20 % of the respondents are professionals, 11% are retired, 18 % are involved in technical jobs and 22% of the targeted sample is self-employed.



**Figure 2: Demographic Profile of Respondents**

## **Part B: Survey Findings**

### **Results of Factor analysis**

We tested the hypothesis on perceived seriousness of environmental problems, perceived consumer effectiveness, perceived risks and role of government in our proposed model by using factor analysis. Principal Component Analysis with Varimax rotation was conducted on the 32 attributes and eight factors representing 79.611 percent of the explained variance were extracted from the 32 dimensions. The eight main dimensions which promote ecological adoption of solar water heaters have emerged and labeled as depicted in Table 2.0 below and the results indicate that, from a statistical point of view, the data fit our conceptual model, supporting H<sub>1a</sub>, H<sub>1b</sub>, H<sub>2a</sub> and H<sub>3</sub>.

- Factor 1 – Perceived seriousness of environmental problems
- Factor 2 – Perceived ecological consumer effectiveness towards solar water heaters
- Factor 3 – Functional risks associated with the adoption of solar water heaters
- Factor 4 – Financial risks aspects for solar water heaters
- Factor 5-Temporal risks related to the adoption of solar water heaters
- Factor 6 – Governmental policies, sensitization campaigns and national laws on environmental protection
- Factor 7– Government incentives for solar water heaters
- Factor 8 – Government policies for a greener Island

### **Results of Regression Analysis**

#### **Relative importance of factor impacting on the sustained adoption of solar water heaters**

Table 3.0 illustrates the results of the stepwise regression model by having sustained ecological adoption of solar water heaters as the 'dependent' variable and the factors as presented above as the 'independent' variables. The higher the co-efficient the more the factor is deemed to contribute towards sustaining the ecological adoption of solar water heaters in Mauritius.

There are eight (8) most important predictive factors which account for 15.2 % of the variance for the sustained adoption of solar water heaters. Based on the results of the factors influencing the adoption of solar water heaters, a regression model was developed by using the standardized factor scores for each respondent. The  $R^2$  was 0.152 which indicated that 15.2 % of the sustained adoption of solar water heaters is explained by the regression model. The model also indicates that that 84.8 per cent of the variance can be explained by other factors and it clearly indicates that further research is needed to identify additional factors that can influence the ecological adoption of solar water heaters in Mauritius.

The factor which had the greatest influence on the sustained adoption of solar water heaters has been *“Government incentives for solar water heaters”* with a co-efficient of ( $\beta$  of 0.278). In addition *“Perceived ecological consumer effectiveness for solar water heaters”* had a co-efficient of ( $\beta$  of 0.266) and played a big role in influencing adoption for solar water heaters. Another ecological implication of the findings revealed that *“Governmental policies, sensitization campaigns and national laws on environmental protection”* with a co-efficient of ( $\beta$  of 0.259) was able to educate the population and encourage them to adopt solar water heaters.

<b>Sample (n=228)</b>	<b>r<sup>2</sup> /Significance</b>	<b>Dimensions</b>	<b>B</b>	<b>Beta</b>	<b>t</b>	<b>Significant t</b>	<b>F- statistic**</b>
Sustained Adoption of Solar Water Heaters	0.152/0.000	<b>Factor 7 :</b> Government incentives for solar water heaters	0.320	0.278	0.000	4.725	62.051
		<b>Factor 2:</b> Perceived ecological consumer effectiveness for solar water heaters	0.306	0.266	0.001	4.331	54.662
		<b>Factor 6 :</b> Governmental policies, sensitization campaigns and national laws on environmental protection	0.276	0.259	0.002	3.671	42.870
		<b>Factor 6:</b> Functional risks associated with the adoption of solar water heaters	0.250	0.246	0.004	3.487	30.931
		<b>Factor 5:</b> Temporal risks associated with the adoption of solar water heaters	0.223	0.084	0.006	2.950	21.483
		<b>Factor 1:</b> Perceived seriousness of environmental problems	0.194	0.073	0.011	2.876	18.906
		<b>Factor 4:</b> Financial risks related adoption of solar water heaters	0.175	0.061	0.013	2.568	17.043
		<b>Factor 8 :</b> Governmental policies for a greener Island	0.164	0.045	0.016	2.239	16.185

*Table 3.0: Regression Analysis*

Notes: Total variance explained ( $r^2$ ) = 0.152 (15.2%); Dependent variable [Ecological Sustained Adoption of Solar Water Heaters], : Constant: 2.634 &  $t = 62.34$  (significant = 0.000): \*\*The F statistics for the regression model had a p-value < 0.000

### **Environmental aspects and other associated factors impacting on the adoption of solar water heaters**

Environmental attitudes were hypothesized to have a significant positive influence on adoption of solar water heaters in Mauritius as illustrated in Table 4.0 above with  $\chi^2$  values ranging from 1.355 to 3.641 at  $p < 0.05$ , supporting **H<sub>4a</sub>**. These findings are similar to past research in the field of environmental consumerism and ecological behavioral intentions has depicted that environmental attitudes can positively encourage ecological behavior among customers (Datta, 2011; Smith and Paladino, 2010; Dagher and Itan, 2012).

It is also interesting to note the positive impact of environmental knowledge on the adoption of solar water heaters in Mauritius with  $\chi^2$  values ranging from 1.329 to 3.871 at  $p < 0.05$ , meaning that the relationship between the two variables was truly

significant, proving that  $H_{4b}$  should be supported. This result corresponded with the work of several researchers who have confirmed that environmental knowledge leads to the adoption of green products (Thøgersen, 2006; Pickett-Baker and Ozaki, 2008; Tilikidou, 2007 and Gram-Hanssen, 2010).

Environmental Attitudes	$\chi^2$ Value
It is important for customers to protect the environment.	1.355*
Customers should adopt a green environmental lifestyle.	3.233*
Customers share the opinion that adopting a green environmental practice is wise.	3.641*
Customers are environmental conscious around the globe.	2.761*
Customers share a guilt feeling when polluting the environment.	2.543*
<b>Environmental Knowledge</b>	
I can understand the implications of "global warming".	1.547*
I know the causes of environmental problems.	1.329*
I know the sources of environmental problems.	1.674*
I am aware that solar water heater is an eco-friendly product derived from renewable energy	3.567*
I am conscious of the benefits that solar water heaters bring to the environment.	3.871*
<b>Religion</b>	
Holy books encourage me to protect the environment.	1.430*
Customers adopt solar water heaters to follow the holy morals.	1.002*
Religious facts have a crucial role to play in the protection of the environment in Mauritius.	1.347*
<b>Reference Groups</b>	
I consult my friends and colleagues before the adoption of solar water heaters.	3.509*
My friends and colleagues' suggestions and ideas can influence me to adopt solar water heater.	3.622*
I consult my family members to know their opinions before adopting the solar water heater.	4.812*
The support of my family is important for the adoption of solar water heaters.	4.231*
My family members are aware of the environmental benefits of using solar water heaters.	3.678*
I encourage my family members and friends to protect the environment.	3.500*
<b>Green Advertising</b>	
Green advertising campaigns inform customers about the benefits of solar water heaters.	4.157*
I believe in green advertising claims for solar water heaters.	2.980*
Green advertising facilitates the adoption of solar water heaters.	3.654*
Green advertising is a useful tool to promote the adoption solar water heaters.	3.675*
<b>Eco-labeling</b>	
I can understand the meaning of eco labels.	0.355*
I am aware of the benefits of eco label for the environment.	3.897*
I have a preference for eco labeled solar water heaters.	2.431*
I am willing to pay more for eco labelled solar water heaters.	1.931*
Eco labels make me more confident to adopt solar water heaters.	3.219*
<b>Cost of Electricity</b>	
I had to incur high electricity bills before the adoption of the solar water heater	3.401*
The rising prices of electricity act an important motivator towards the adoption of solar water heater.	3.709*
The reduction in the price of electricity fall promotes the adoption solar water heater.	2.505*

\* $p < 0.05$  Table 4.0: Environmental aspects and other associated factors impacting on the adoption of solar water heaters

The quantitative results clearly demonstrate that religion of customers has a significant impact on the adoption of solar water heaters in Mauritius with  $\chi^2$ -values ranging from 1.002 to 1.430 at  $p < 0.05$ , supporting  $H_{5a}$ . These findings are similar to past research conducted by Baqer (2012), affirming that religion positively influences green purchases.

As proposed in the conceptual model, reference groups can significantly encourage the adoption of solar water heaters with  $\chi^2$ -values ranging from 3.500 to 4.812 at  $p < 0.05$ , proving that  $H_{5b}$  should be supported. Similarly, these results correspond with the views of Murali *et al.* (2005), Wiser (2007), Gerpott and Mahmudova (2010) and Ek and Soderholm, (2008) who asserted that consumers trust the members of their social interface for stimulating the adoption of green products.

Our results demonstrate the theoretical relevance of conceptualizing green advertising as an important construct stimulating the adoption of solar water heaters,  $\chi^2$ -values ranging from 2.980 to 4.157 at  $p < 0.05$ , hence, supporting  $H_{6a}$ . The empirical survey findings have tallied with the work of Haytko and Matulich (2008) and Gandhi Rao (2013) who pointed out that green advertising is a determining factor impacting towards the adoption of ecological products.

Survey findings have also depicted that eco-labeling can influence the adoption of solar water heaters in Mauritius with  $\chi^2$  values ranging from 0.355 to 3.219 at  $p < 0.05$ , hence, supporting  $H_{6b}$ . In this respect, the empirical estimates of the present study are aligned with research conducted by Rashid (2009) and Loureiro and Lotade, (2005) who have affirmed that eco-labeling can incline customers to adopt energy efficient products, and hence eco-labeling is also a key factor in explaining adoption of solar water heaters in Mauritius.

Survey findings have demonstrated a direct significant relationship between cost of electricity and adoption of solar water heaters ( $\chi^2 = 2.505 - 3.709$ ,  $p < 0.05$ ), supporting  $H_7$ . Our hypothesized empirical estimates are aligned with several studies whereby cost of electricity can encourage adoption of energy efficient products (Yoo and Kwak 2009; Gerpott and Mahmudova (2010); Roche *et al.* 2009; Unruh, 2011).

#### **4. Managerial Implications**

The study has brought about some interesting findings that solar marketers should take into account. The empirical findings from the regression analysis have demonstrated that 'Government incentives for solar water heaters' acts as a significant predictor for the sustained adoption of solar water heaters ( $\beta = 0.479$ ,  $p < 0.001$ ). Hence, solar marketers should ensure that they disseminate effective information pertaining to specific governmental incentives and additional grants for firms and in turn, environmental protection should be considered as one of the important priorities of the government. The state should also promote greater participation from policy makers and solar experts of the booming solar industry to introduce attractive and appealing incentives such as free vouchers for householders to encourage greater adoption of solar energy. The government should organize ongoing ecological workshops and green seminars to educate customers on the incentives and associated benefits of adopting solar water heaters in their households (Ali *et al.* 2011; Fraj and Martinez, 2007; Haron *et al.* 2005). Survey findings equally urge for a close collaboration between the government and solar policy makers to promote solar water

heaters across the Island as an ecological product which can create greater ecological value for customers in the long term, and at the same time, contributing towards environmental protection in Mauritius. Moreover, it is crucial for solar marketers to increase greater awareness on the seriousness of environmental problems as pointed out by Pahl *et al.* (2005) and Milfont (2007).

Another major implication of the present study relates to green advertising impacting on the adoption of solar water heaters. In fact, Chi-square hypothesis test results have shown that green advertising stimulates the adoption of solar water heaters ( $\chi^2$  values = 2.980 to 4.157,  $p < 0.05$ ). Hence, solar marketers should emphasize on the effectiveness of green advertising campaigns. It is important for the advertising experts working on green advertising campaign for solar water heaters to ensure that the green advertising messages appeal to customers, that is, the unique selling proposition of the green campaign for solar water heater should touch the heart and minds of the ecological customers.

Inferential survey findings have highlighted the importance of eco-labelling impacting upon the adoption of solar water heaters. Likewise, Mei *et al.* (2012) have suggested that eco-label is an important factor that would enable customers to engage in ecological adoption of products. Therefore, solar marketers should view eco-labels as an essential ecological marketing tool in promoting the adoption of solar water heaters as there is enough empirical evidence in the present study demonstrating that eco labelling encourages the adoption of solar water heaters.

The survey results clearly demonstrate that reference groups have a significant influence to stimulate the ecological adoption of solar water heaters ( $\chi^2$  values = 3.500 to 4.812,  $p < 0.01$ ). Various authors have affirmed a positive relationship between the influence of reference groups and the adoption of green products as outlined in the ecological and environmental marketing literature (Anic and Radas, 2006; Foroughi *et al.* 2012; Mourali *et al.* 2005; Wiser, 2007; Gerpott and Mahmudova, 2010). In this respect, solar marketers and policy makers should find innovative ways to present the testimonials of families, friends or colleagues who had a positive experience with the adoption solar water heaters. These ecological recommendations will provide positive word of mouth and inspire greater trust in solar water heaters. Eminently, the above empirical findings can be a pragmatic marketing tool for policy makers and the various players in the booming solar industry of Mauritius.

## **5. Conclusion, Limitations and Directions for Future Research**

Far from having reached its pinnacle, the ecological adoption of solar water heaters has still a long road to travel in both research and practice. There is strong empirical evidence in the present research demonstrating that government policies, influence of reference groups and environmental attitudes can promote the adoption of solar water heaters in Mauritius. Indeed, the research results can be useful and form practical tools for the solar water policy makers and the various players of the

emerging solar water industry to re-orient their existing marketing strategies in order to stimulate greater adoption of solar water heaters in Mauritius.

#### *Overall Limitations of Research*

The study had some potential limitations as focus was only on understanding ecological adoption patterns of customers in Mauritius based upon the convenience sampling method and the perceptions of business executives, policy makers and solar marketers have not yet been tapped for the scale validation. These ecological findings need to be further validated as the empirical results have provided a broad investigation on the adoption of solar water heaters in Mauritius. Specific constructs and predictors for encouraging the adoption of solar water heaters have been predetermined, but yet, the research has some major conceptual limitations in the arena of ecological adoption of solar water heaters.

#### *Directions for Future Research*

It is crucial to look at the ecological adoption of solar water heaters from a more focused perspective and the sampling method for the ecological study has to be based on the stratified methods. Additional research could be extended to solar managers and executives to have a thorough understanding of the factors impacting on the ecological adoption of solar water heaters. Likewise, the existing conceptual model could be further broadened to include multidimensional constructs such as personal norms, values and culture amongst others can be proposed and validated in order to overcome the conceptual limitations.

## **6. References**

- Adams, M. and Raisborough, J. (2010). *Making a difference: ethical consumption and the everyday*. The British Journal of Sociology, Vol. 61no. 2, pp.256-274.
- Ali, A., Khan, A., Ahmed, I. Shahzad, W. (2011). *Determinants of Pakistani Consumers' Green Purchase Behavior: Some Insights from a Developing Country*. International Journal of Business and Social Science, Vol 2 no. 3, pp. 217-226.
- Anic, I.D. S. Radras. (2006). *'The Impact of Situational Factors on Purchasing Outcomes in the Croatian Hypermarket Retailer'*, Ekonomski Pregled, Vol 57 no. 11, pp. 730-752.
- Arvola, A., Vassallo, M., Dean, M., Lampila, P., Saba, A., Lähteenmäki, L. Shepherd, R. (2008). *Predicting intentions to purchase organic food: The role of affective and moral attitudes in the Theory of Planned Behaviour*. Appetite, Vol 50 no. 2-3, pp.443-454. January, available online at: <http://www.joe.org/joe/2007february/tt2>.
- Bang, H., Ellinger, A., Hadjimarcou, J. Traichal, P. (2000). *Consumer concern, knowledge, belief, and attitude toward renewable energy: An application of the reasoned action theory*. Psychology and Marketing, Vol 17 no. 6, pp.449-468.



- Baquer, S., (2012). *True Green Consumers: An Investigation of Consumers' Genuine Willingness to Share Environmental Responsibility*. Global Journal of Business Research Vol 6 no. 3, pp. 37-48.
- Beckford, C., Jacobs, C., Williams, N. Nahdee, R. (2010). *Aboriginal Environmental Wisdom, Stewardship, and Sustainability: Lessons from the Walpole Island First Nations, Ontario, Canada*. The journal of environmental education, Vol 41 no. 4, pp. 239-248.
- Berr, (2008). *Microgeneration Strategy*. London: UK Department for Business Enterprise & Regulatory Reform.
- Budget Speech. (2008-09). Building an Attractive, Modern, Inclusive, Green, open. Mauritius.
- Chan, R.Y.K. Lau, L.B.Y. (2000), "*Antecedents of green purchases: a survey in China*", Journal of Consumer Marketing, Vol. 17 no. 4, pp. 338-57.
- Chang, C. (2008). *Ad framing effects for consumption products: An affect priming process*. Psychology & Marketing, Vol 25 no. 1, pp. 24-46.
- Chen, T., and Chai, L., (2010). *Attitude towards the environment and green products: Consumers' perspective*. Management Science and Engineering Vol 4 no. 2, pp. 27-39.
- Cherian, J. Jacob, J. (2012). *Green Marketing: A Study of Consumers' Attitude towards Environment Friendly Products*. Asian Social Science, Vol 8 no. 12, pp. 117-126.
- Churchill, G. A., (1995). *Marketing research: methodological foundations*. 6th ed. South-Western/Thomson Learning: Mason.
- Cleavel, M., Kalamas, M. Laroche, M. (2005). *Shades of green: linking environmental locus of control and pro-environmental behaviors*. Journal of Consumer Marketing, Vol 22 no. 4, pp. 198-212.
- Cleveland, M., Kalamas, M. Laroche, M. (2005), "*Shades of green: linking environmental locus of control and pro-environmental behaviours*", Journal of Consumer Marketing, Vol. 22 no. 4, pp. 198-212.
- Cornelissen, G., Pandelaere, M., Warlop, L. Dewitte, S. (2008). *Positive cueing: Promoting sustainable consumer behaviour by cueing common environmental behaviours as environmental*. International Journal of Research in Marketing, Vol 25, pp. 46-54.
- D'souza, C. Taghian, M. (2005). *Green Advertising Effects on Attitude and Choice of Advertising Themes*. Asia Pacific Journal of Marketing and Logistics, Vol 17 no. 3, pp. 51-66.
- D'souza, C., Taghian, M., Lamb, P. Peretiatko, R. (2007). *Green decisions: demographics and consumer understanding of environmental labels*. International Journal of Consumer Studies, Vol 31 no. 4, pp. 371-376.
- Dagher, G., & Itan, O. S. (2012). *The Influence of Environmental Attitude, Environmental Concern and Social Influence on Green Purchasing Behavior*. Review of Business Research, Vol 12 no. 2, pp. 104-111.
- Datta, S. (2011). *Pro-environmental concern influencing green buying: A study on Indian consumers*. International Journal of Business and Management, Vol 6 no. 6, pp. 124-133.
- Do Paco, A., Reis, R., (2012). *Factors Affecting Skepticism toward Green Advertising*. Journal of Advertising, Vol 41 no. 4, pp. 147-155.
- Do Paco, A., Raposo, M. Leal Filho, W. (2009). *Identifying the green consumer: a segmentation study*. Journal of targeting, measurement and analysis for marketing, Vol 17 no. 1, pp. 17-25.
- Drozdenko, R., Jensen, M. & Coelho, D. (2011). *Pricing of green products: premiums paid, consumer characteristics and incentive*. International Journal of Business Marketing and Decision Sciences, Vol 4, pp. 106-116.

- D'souza, C., Taghian, M. Khosla, R. (2007). *Examination of environmental beliefs and its impact on the influence of price, quality and demographic characteristics with respect to green purchase intention*. Journal of Targeting, Measurement and Analysis for Marketing, Vol 15 no. 2, pp. 69-78. .
- D'souza, C., Taghian, M. Lamb, P. (2006). An empirical study on the influence of environmental labels on consumers. *Corporate Communications: An International Journal*, 11 (2), pp. 162-173.
- D'souza, C., Taghian, M., Lamb, P. Peretiatkos, R. (2006). *Green products and corporate strategy: an empirical investigation*. Society and Business Review, Vol 1 no. 2, pp. 144-157.
- Durif, F., Roy, J. Boivin, C. (2012). *Could Perceive Risks Explain the 'Green Gap'in Green Product Consumption?* Electronic Green Journal, Vol 1 no. 33, pp. 1-15.
- EECA. (2002). Review of overseas initiatives that have been taken to increase the uptake of solar water heating. Energy Efficiency and Conservation Authority, February.
- Ek, K. Soderholm, P. (2008). *Norms and economic motivation in the Swedish green electricity market*. Ecological Economics, Vol 68 no. 1-2, pp. 169-182.
- Flamm, B. (2009). *The impacts of environmental knowledge and attitudes on vehicle ownership and use*. Transportation research part D: transport and environment, Vol 14 no. 4, pp. 272-279.
- Foroughi, A., Sherilou, M. Hajmirsadeghi, R. (2012). *Exploring the role of brand image in explaining consumer shopping behavior of counterfeits*. Elixir International Journal, Vol 51, pp.1-4.
- Fraj, E. Martinez, E. (2007). *Ecological consumer behaviour: an empirical analysis*. International Journal of Consumer Studies, Vol 31 no. 1, pp. 26-33.
- Gan, C., Wee, H., Ozanne, L. Kao, T. (2008). *Consumers' purchasing behavior towards green products in New Zealand*. 1st ed. [ebook] New Zealand: business perspectives, p.10. May Available online [http://businessperspectives.org/journals\\_free/im/2008/im\\_en\\_2008\\_1\\_Gan.pdf](http://businessperspectives.org/journals_free/im/2008/im_en_2008_1_Gan.pdf)
- Gandhi, A. Rao, M. (2013). *Green Marketing: Impact of Green Advertising on Consumer Purchase Intention*. Advances in Management. Vol (6) no. 9, pp. 14-17.
- Gerpott, T. Mahmudova, I. (2010). *Determinants of green electricity adoption among residential customers in Germany*. International Journal of Consumer Studies, Vol 34 no. 4, pp. 464-473.
- Gleim, M., Smith, J., Andrews, D. Cronin, J. (2013). *Against the Green: A Multi-method Examination of the Barriers to Green Consumption*. Journal of Retailing, Vol 89 no. 1, pp.44-61.
- Goswami, P. (2008), *'Is the Urban Indian Consumer Ready for Environment-Friendly Apparel?'* International Journal of Green Economics, an Inderscience Publication, Vol. 2, No. 4, pp 411-426.
- Gram-Hanssen, K. (2010). *Standby consumption in households analyzed with a practice theory approach*. Journal of Industrial Ecology, Vol 14 no. 1, pp. 150-165.
- Griskevicius, V., Tybur, J. Van Den Bergh, B. (2010). *Going Green to Be Seen: Status, Reputation, and Conspicuous Conservation*. Journal of Personality and Social Psychology, Vol 98 no. 3, pp. 392-404.
- Grundey, D. (2009). *Eco-marketing and eco-labelling: does it ensure customer loyalty for eco-products in Lithuania*. Transformations in Business & Economics, Vol 8 no. 1, pp. 152-179.

- Gupta, S. Ogden, D. (2009). *To buy or not to buy? A social dilemma perspective on green buying*. Journal of Consumer Marketing, Vol 26 no. 6, pp.376-391.
- Hair, J. F., Jr., Anderson, R. E., Tatham, R. L. Black W. C.(1995) *Multivariate Data Analysis*, 3rd ed, Macmillan Publishing Company, New York.
- Haron, S., Paim, L. Yahaya, N. (2005). *Towards sustainable consumption: an examination of environmental knowledge among Malaysians*. International Journal of Consumer Studies, Vol 29 no. 5, pp. 426-436.
- Hartmann, P. Ibanez, V. (2006). *Green value added*. Marketing Intelligence & Planning, Vol 24 no. 7, pp. 673-680.
- Haytko, D. Matulich, E. (2008). *Green advertising and environmentally responsible consumer behaviors: Linkages examined*. Journal of Management and Marketing Research, Vol 1, pp. 2-11.
- Hopkins, M. (2009). *What the 'Green' Consumer Wants*. MIT Sloan Management Review, Vol 50 no. 4, pp. 87-89.
- Juwaheer, T., Pudaruth, S. & Noyaux, M. (2012). *Analysing the impact of green marketing strategies on consumer purchasing patterns in Mauritius*. World Journal of Entrepreneurship, Management and Sustainable Development, Vol 8 no. 1, 36 – 59.
- Kalamas, M., Cleveland, M. Laroche, M. (2014). *Pro-environmental behaviors for thee but not for me: Green giants, green Gods, and external environmental locus of control*. Journal of Business Research, Vol 67 no. 2, pp.12-22.
- Kang, J., Liu, C. Kim, S. (2013). *Environmentally sustainable textile and apparel consumption: the role of consumer knowledge, perceived consumer effectiveness and perceived personal relevance*. International Journal of Consumer Studies, Vol 37 no. 4, pp.442-452.
- Kangun, L., Carlson, L., Grove, S. (1991), "Environmental advertising claims: a preliminary investigation", *Journal of Public Policy & Marketing*, (10) (2), pp.47-58.
- Kaufmann, H., Panni, M. Orphanidou, Y. (2012). *Factors affecting consumers' green purchasing behavior: An integrated conceptual framework*. Amfiteatru Economic, Vol 14 no. 31, pp. 50-69.
- Kianpour, K., Anvari, R., Jusoh, A. Fauzi Auzi Othman, M. (2014). Important motivators for buying green products. *IC*, 10(5).
- Kim, Y. Choi, S. (2005). *Antecedents of green purchase behaviour: An examination of collectivism, environmental concern and PCE*. Advances in Consumer Research, Vol 32 no. 1, pp. 592-599.
- Krarup, S. Russell, C. (2005). *Environment, information and consumer behaviour*. [e-book] UK: Edward Elgar Publishing Limited. pp. 1-244.
- Lee, K. (2008). *Opportunities for green marketing: young consumers*. Marketing intelligence & planning, Vol 26 no. 6, pp. 573-586.
- Lee, K. (2009). *Gender differences in Hong Kong adolescent consumers' green purchasing behavior*. Journal of consumer marketing, Vol 26 no. 2, pp. 87-96.
- Leire, C. Thidell. (2005). *Product-related environmental information to guide consumer purchases--a review and analysis of research on perceptions, understanding and use among Nordic consumers*. Journal of Cleaner Production, Vol 13 no. 10-11, pp. 1061-1070.
- Loureiro, M. Lotade, J. (2005). *Do fair trade and eco-labels in coffee wake up the consumer conscience?* Ecological Economics, Vol 53 no. 1, pp. 129-138.
- Majlath, M. (2010). *Can Individuals do anything for the Environment? The Role of Perceived Consumer Effectiveness*. Proceedings of FIKUSZ, Vol 10, pp 157-166.

- Martin, B., Simintiras, A. (1995), "*The impact of green product lines on the environment*", Marketing Intelligence & Planning, Vol 13, no. 4, pp 16-23.
- Masango, M. (2008). *Making residential solar water heating compulsory*. Finweek Vol 1, pp 61-62.
- Mei, O., Ling, K. Piew, T. (2012). *The Antecedents of Green Purchase Intention among Malaysian Consumers*. Asian Social Science, Vol 8 no. 13, pp. 248-263.
- Milfont, T. (2007). Psychology of environmental attitudes: *A cross-cultural study of their content and structure*. June, Available online at: [https://www.researchgate.net/publication/37985782\\_Psychology\\_of\\_environmental\\_attitudes\\_A\\_cross-cultural\\_study\\_of\\_their\\_content\\_and\\_structure](https://www.researchgate.net/publication/37985782_Psychology_of_environmental_attitudes_A_cross-cultural_study_of_their_content_and_structure)
- Milton S. & Kaufman S., (2005), *Solar Water Heating as a Climate Protection Strategy: The Role for Carbon Finance* ; Green Markets International, Inc.;<http://www.green-markets.org>
- Minton, E., Kahle, L. Kim, C. (2015). *Religion and motives for sustainable behaviors: A cross-cultural comparison and contrast*. Journal of Business Research, Vol 68 no. 9, pp.1937-1944.
- Moser, G., Uzzell, D. (2003) *Environmental Psychology* In: Comprehensive Handbook of Psychology, Vol 5: Personality and Social Psychology. Wiley, New York, pp. 419-445.
- Mostafa, M. (2007). *A hierarchical analysis of the green consciousness of the Egyptian consumer*. Psychology & Marketing, Vol 24 no. 5, pp. 445-473.
- Mostafa, M. (2007). *Gender differences in Egyptian consumers' green purchase behavior: the effects of environmental knowledge, concern and attitude*. International Journal of Consumer Studies, Vol 31 no. 3, pp. 220-229.
- Mourali, M., Laroche, M. Pons, F. (2005). *Individualistic orientation and consumer susceptibility to interpersonal influence*. Journal of Services Marketing, Vol 19 no. 3, pp. 164-173.
- Nicholls, A, Lee, N. (2006). "*Purchase Decision-Making in Fair Trade and The Ethical Purchase Gap: Is There a Fair Trade Twix?*" Journal of Strategic Marketing, Vol. 14, no. 4, pp. 369–386.
- Nimse, P., Vijayan, A., Kumar, A., Varadarajan, C. (2007), "*A review of green product databases*", American Institute of Chemical Engineers, Vol 26 no. 2, 131-7.
- Nittala, R. (2014). *Green Consumer Behavior of the Educated Segment in India*. Journal of International Consumer Marketing, Vol 26 no. 2, pp.138-152.
- Ottman, J., Stafford, E. Hartman, C. (2006). *Avoiding green marketing myopia: ways to improve consumer appeal for environmentally preferable products*. Environment: Science and Policy for Sustainable Development, Vol 48 no. 5, pp. 22-36.
- Ozaki, R. (2011). *Adopting sustainable innovation: what makes consumers sign up to green electricity?* Business Strategy and the Environment, Vol 20 no. 1, pp. 1-17.
- Pahl, S., Harris, P., Todd, H. Rutter, D. (2005). *Comparative optimism for environmental risks*. Journal of Environmental Psychology, Vol 25 no. 1, pp. 1-11.
- Pickett-Baker, J. Ozaki, R. (2008). *Pro-environmental products: marketing influence on consumer purchase decision*. Journal of Consumer Marketing, Vol 25 no. 5, pp. 281-293.
- Plaza, M.P. Linares, P. (2007). Strategic decision for green electricity marketing: learning from past experiences. Unpublished research report. Funded by Gamesa Energia. JFK School of Government, Harvard.
- Pudaruth, S., Juwaheer, T. Seewoo, Y. (2015). *Gender-based differences in understanding the purchasing patterns of eco-friendly cosmetics and beauty care products in Mauritius: a study of female customers*. Social Responsibility Journal, Vol 11 no. 1, pp.179-198.

- Qader, I. Zainuddin, Y. (2011). *The impact of media exposure on intention to purchase green electronic products amongst lecturers*. *International Journal of Business and Management*. International Journal of Business and Management, Vol 6 no. 3, pp. 240-248.
- Rahbar, E. Wahid, N. (2010). *Ethno-cultural differences and consumer understanding of eco-labels: an empirical study in Malaysia*. *Journal of Sustainable Development*, Vol 3 no. 3, pp. 255-262.
- Rahbar, E. Wahid, N. (2010). *The Malaysian Consumer and the Environment: Purchase Behavior*. *Global Business and Management Research: An International Journal*, Vol 2 no. 4, pp. 323-336.
- Rahbar, E. Wahid, N. A. (2011). *Investigation of green marketing tools' effect on consumers' purchase behavior*. *Business Strategy Series*, Vol 12 no. 2, 73-83.
- Ramayah, T. Rahbar, E. (2013). *Greening the environment through recycling: an empirical study*. *Management of Env Quality*, Vol 24 no. 6, pp.782-801.
- Rashid, N. (2009). *Eco-labelling perspectives amongst Malaysian consumers*. *Canadian Social Science*, Vol 5 no. 2, pp. 1-10.
- Rezai, G., Teng, P., Mohamed, Z. Shamsudin, M. (2013). *Going Green: Survey of Perceptions and Intentions among Malaysian Consumers*. *International Business and Management*, Vol 6 no. 1, pp. 104-112.
- Roche, C., Manget, J. Munnich, F. (2009). *Capturing the Green Advantage for Consumer Companies*. Boston Consulting Group. October, Available at :<http://www.businessinsociety.eu/resources/3208>
- Schlegelmilch, B., Bohlen, G., Diamantopoulos, A. (1996), *"The link between green purchasing decisions and measures of environmental consciousness"*, *European Journal of Marketing*, Vol 30 no. 5, pp 35-55.
- Serralvo, F., Sastre, P., Joao, B., (2010). *Reference group on consumer Decision making process: A study in the Brazilian Sports Utilitarian Vehicles Segment*. *Journal of the Academy of Business & Economics*. Vol 10 no. 2, pp 157-161.
- Sharma, P. D. 2009. *Solar power – Sustainable green energy to protect our economy and environment*. March available online at: <http://saferenvironment.wordpress.com/2009/02/02/solar-power-%E2%80%93-sustainable-green-energy-to-protect-our-economy-and-environment/>
- Sinnappan, P. Rahman, A. (2011). *Antecedents of green purchasing behavior among Malaysian consumers*. *International Business Management*, Vol 5 no. 3, pp. 129-139
- Smith, S. Paladino, A. (2010). *Eating clean and green? Investigating consumer motivations towards the purchase of organic food*. *Australasian Marketing Journal (AMJ)*, Vol 18no. 2, pp.93-104.
- Tan, B. (2011). *The roles of knowledge, threat, and PCE on green purchase behaviour*. *International Journal of Business and Management*, Vol 6 no. 12, pp. 14-27.
- Tanner, C. Wolfing Kast, S. (2003). *Promoting sustainable consumption: Determinants of green purchases by Swiss consumers*. *Psychology & Marketing*, Vol 20 no. 10, pp. 883-902.
- Tarkiainen, A. Sundqvist, S. (2005). *Subjective norms, attitudes and intentions of Finnish consumers in buying organic food*. *British Food Journal*, Vol 107 no. 11, pp.808-822.
- Thøgersen, J. (2006). *Media attention and the market for 'green' consumer products*. *Business Strategy and the Environment*, Vol 15 no. 3, pp. 145-156.
- Tilikidou, I. (2007). *The Effects of Knowledge and Attitudes upon Greeks' Pro-environmental Purchasing Behaviour*. *Corporate Social Responsibility and Environmental Management*, Vol 14 no. 3, pp. 121-134.

- Todd, A.M. (2004). *The aesthetic turn in green marketing*. Ethics & the Environment, Vol 9 no. 2, pp 86-102.
- Tsen, C., Phang, G., Hasan, H. Buncha, M. (2006). *Going green: A study of consumers' willingness to pay for green products in Kota Kinabalu*. International Journal of Business and Society, Vol 7 no. 2, pp. 40-54.
- Tu, J., Kao, T. Tu, Y. (2013). *Influences of framing effect and green message on advertising effect*. Social Behavior and Personality: an international journal, Vol 41 no. 7, pp. 1083-1098.
- Unruth, G. (2011). *No, Consumers Will Not Pay More for Green*. [online] October available online at: <http://www.forbes.com/sites/csr/2011/07/28/no-consumers-will-not-pay-more-for-green/>
- Verhoef, P. (2005). *Explaining purchases of organic meat by Dutch consumers*. European Review of Agricultural Economics, Vol 32 no. 2, pp. 245-267.
- Vermeir, I. Verbeke, W. (2006). *Sustainable food consumption: exploring the consumer "attitude-behavioral intention" gap*. Journal of Agricultural and Environmental Ethics, Vol 19 no. 2, pp. 169-194.
- Walsh, G., Mitchell, V., Jackson, P. Beatty, S. (2009). *Examining the antecedents and consequences of corporate reputation: a customer perspective*. British Journal of Management, Vol 20 no. 2, pp. 187-203.
- Webb, D., Mohr, L. Harris, K. (2008). *A re-examination of socially responsible consumption and its measurement*. Journal of Business Research, Vol 61 no. 2, pp. 91-98.
- Wiser, R. (2007). *Using contingent valuation to explore willingness to pay for renewable energy: a comparison of collective and voluntary payment vehicles*. Ecological economics, Vol 62 no. (3-4), pp. 419-432.
- Wolsink, M. (2007). *Wind power implementation: The nature of public attitudes: Equity and fairness instead of 'backyard motives'*. Renewable and Sustainable Energy Reviews, Vol 11 no. 6, pp.1188-1207.
- Wong, W., and MO, H., (2013). *Purchase Behaviour related to recycled product in China*. Review of Business Research, Vol 13 no. 2, pp 125-131.
- Yoo, S. Kwak, S. (2009). *Willingness to pay for green electricity in Korea: A contingent valuation study*. Energy Policy, Vol 37 no. 12, pp. 5408-5416.
- Young, W., Hwang, K., McDonald, S., Oates, C. J. (2010). *Sustainable consumption: green consumer behaviour when purchasing products*. Sustainable Development, Vol 18 no. 1, pp 20-31.
- Zaiem, I. (2005). *Le comportement écologique du consommateur: Modélisation des relations et déterminants*. La Revue des Sciences de Gestion: Direction et Gestion, Vol 40 no. (214-215), pp. 75-88.
- Zhu, B. (2012). *The Impact of Green Advertising on Consumer Purchase Intention of Green Products*. SSRN Electronic Journal. Available online at: <http://papers.ssrn.com/>

Factor items	loadings	Eigen values	% of variance explained	Cronbach alpha
<b>Factor 1: Perceived Seriousness of Environmental Problems</b>		5.290	10.155	0.760
Disposal of chemicals and waste from industries and households	0.876			
Pollution by fossil fuels	0.761			
Pollution of rivers	0.650			
Destruction of ocean and marine life	0.631			
Air pollution caused by buses and cars	0.543			
Destruction of forest and natural reserves	0.528			
<b>Factor 2: Perceived Consumer Effectiveness towards Ecological Solar Water Heaters</b>		4.593	11.781	0.680
I contribute to a green cause by adopting solar water heaters.	0.712			
I adopt solar water heaters to reduce noise pollution.	0.654			
I adopt solar water heaters to reduce air pollution.	0.541			
I can protect the environment by adopting ecological products that do not harm the ecosystem.	0.454			
A change in my lifestyle can contribute towards the protection of the environment.	0.429			
<b>Factor 3: Functional risks associated with the adoption of solar water heaters</b>		4.564	10.508	0.780
Solar water heaters do not last longer than electric/gas water heaters	0.628			
Quality of the solar water heaters matters for ecological customers.	0.563			
<b>Factor 4: Financial risks aspects for solar water heaters</b>		5.118	12.781	0.640
Solar water heaters are costly compared to other heating substitutes.	0.509			
I have to incur additional maintenance and installation costs for solar water heaters.	0.499			
<b>Factor 5: Temporal risks related to the adoption of solar water heaters</b>		5.063	11.301	0.673
I have to incur transports cost for the delivery of the solar water heaters.	0.783			
There is very few information available on the location of the shops where solar water heaters are available	0.581			
It takes a lot of time to look for solar water heaters in shops of Mauritius.	0.569			
<b>Factor 6 : Governmental Policies, Sensitization Campaigns and National Laws on Environmental Protection</b>		7.184	10.029	0.801
I am conscious of the different policies and incentives to make Mauritius a sustainable Island.	0.821			
The government should conduct a national program on environmental education at secondary level to increase environmental awareness at an early age.	0.632			
The government should spend massively in universities for conducting scientific research on environmental protection.	0.653			
I am aware of the environmental benefits listed by the government on the use of renewable energy.	0.441			
Environmental protection should become one of the important national laws of Mauritius.	0.565			
<b>Factor 7 : Government incentives for solar water heaters</b>		7.417	11.816	0.879
The government should financially encourage firms to import recycled solar panels in Mauritius	0.764			
The financial subsidy of Rs 10000 from the government is helpful for the adoption solar water.	0.542			
Government should provide additional grants for firms to adopt solar water heaters.	0.431			
Government should invest in the promotion of green products like solar water heaters from the available resources of the financial budget.	0.421			
<b>Factor 8 : Government policies for a greener Island</b>		6.908	11.240	0.831
Government should encourage firms to go for eco certification in Mauritius.	0.792			
The government should include environmental protection in its economic and social development plans.	0.769			
Government should take the necessary legal actions against the most polluting industries.	0.673			
The government should collaborate with international bodies for conventions on environmental protection.	0.487			
Government should take the necessary legal actions against the most polluting industries.	0.459			
<b>Total variance explained</b>			89.611	

Table 2.0: Outcomes of Factor Analysis

Appendix I - Original Scale Development for the Survey on Ecological Adoption of Solar Water Heaters

Constructs	Scale Items	Source
Perceived Seriousness of Environmental Problems	<ul style="list-style-type: none"> <li>• Destruction of ocean and marine life</li> <li>• Air pollution caused by buses and cars</li> <li>• Destruction of forest and natural reserves</li> <li>• Pollution of rivers</li> <li>• Pollution by fossil fuels</li> <li>• Disposal of chemicals and waste from industries and households</li> </ul>	<p>Pahl <i>et al.</i>, (2005)  Milfont (2007)  Tan (2011)</p>
Perceived Consumer Effectiveness	<ul style="list-style-type: none"> <li>• I adopt solar water heaters to reduce air pollution.</li> <li>• I adopt solar water heaters to reduce noise pollution.</li> <li>• I contribute to a green cause by adopting solar water heaters.</li> <li>• A change in my lifestyle can contribute towards the protection of the environment.</li> <li>• I can protect the environment by adopting ecological products that do not harm the ecosystem.</li> </ul>	<p>Kim and Choi (2005)  Vermeir and Verbeke (2006)  Verhoef (2005)</p>
Perceived Risks	<ul style="list-style-type: none"> <li>• Quality of the solar water heaters matters for ecological customers.</li> <li>• Solar water heaters do not last longer than electric/gas water heaters</li> <li>• Solar water heaters are costly compared to other heating substitutes.</li> <li>• I have to incur additional maintenance and installation costs for solar water heaters.</li> <li>• It takes a lot of time to look for solar water heaters in shops of Mauritius.</li> <li>• There is very few information available on the location of the shops where solar water heaters are available</li> <li>• I have to incur transports cost for the delivery of the solar water heater</li> </ul>	<p>Datta (2011)  Zalem (2005)  D'souza <i>et al.</i>, (2007)  Griskevicius and Tybur <i>et al.</i>, (2010)  Dunif <i>et al.</i>, (2012)  Ozaki (2011)  Hopkins (2009)</p>
Role of Government	<ul style="list-style-type: none"> <li>• The financial subsidy of Rs. 10000 from the government is helpful for the adoption solar water.</li> <li>• I am aware of the environmental benefits listed by the government on the use of renewable energy.</li> <li>• I am conscious of the different policies and incentives to make Mauritius a sustainable Island.</li> <li>• The government should conduct a national program on environmental education at secondary level to increase environmental awareness at an early age.</li> <li>• The government should spend massively in universities for conducting scientific research on environmental protection.</li> <li>• Government should encourage firms to go for eco certification in Mauritius.</li> <li>• The government should have national awards for firms and hotels based on their contribution for a greener island in Mauritius.</li> <li>• Government should identify industries that cause more pollution in the</li> </ul>	<p>Sinnappan and Rahman (2011)  Chen and Chai (2010)  Rezaei <i>et al.</i> (2013)</p>



	<ul style="list-style-type: none"> <li>environment.</li> <li>Government should take the necessary legal actions against the most polluting industries.</li> <li>Government should provide additional grants for firms to adopt solar water heaters.</li> <li>The government should financially encourage firms to import recycled solar panels in Mauritius</li> <li>Government should invest in the promotion of green products like solar water heaters from the available resources of the financial budget.</li> <li>The government should collaborate with international bodies for conventions on environmental protection.</li> <li>The government should include environmental protection in its economic and social development plans.</li> <li>Environmental protection should become one of the important national laws of Mauritius.</li> </ul>	
<b>Environmental Attitudes</b>	<ul style="list-style-type: none"> <li>It is important for customers to protect the environment.</li> <li>Customers should adopt a green environmental lifestyle.</li> <li>Customers share the opinion that adopting a green environmental practice is wise.</li> <li>Customers are environmental conscious around the globe.</li> <li>Customers share a guilt feeling when polluting the environment.</li> </ul>	<p>Walsh <i>et al</i> (2009)  Mostafa (2007)  Cornelissen <i>et al.</i>, (2008)  Beckford <i>et al.</i>, (2010)  Krarup and Russell (2005)  Datta (2011)</p>
<b>Environmental Knowledge</b>	<ul style="list-style-type: none"> <li>I can understand the implications of "global warming".</li> <li>I know the causes of environmental problems.</li> <li>I know the sources of environmental problems.</li> <li>I am aware that solar water heater is an eco-friendly product derived from renewable energy</li> <li>I am conscious of the benefits that solar water heaters bring to the environment.</li> </ul>	<p>Fiamm (2009)  Mostafa (2007)  Thøgersen, (2006)  Pickett-Baker and Ozaki (2008)  Kaufmann <i>et al.</i> (2012)  Jilikidou ( 2007)  Gram-Hanssen (2010)</p>
<b>Religion</b>	<ul style="list-style-type: none"> <li>Holy books encourage me to protect the environment.</li> <li>Customers adopt solar water heaters to follow the holy morals.</li> <li>Religious facts have a crucial role to play in the protection of the environment in Mauritius.</li> </ul>	<p>Bager (2012)</p>
<b>Reference groups</b>	<ul style="list-style-type: none"> <li>I consult my friends and colleagues before the adoption of solar water heaters.</li> <li>My friends and colleagues' suggestions and ideas can influence me to adopt solar water heater.</li> <li>I consult my family members to know their opinions before adopting the solar water heater.</li> <li>The support of my family is important for the adoption of solar water heaters.</li> <li>My family members are aware of the environmental benefits of using solar water heaters.</li> <li>I encourage my family members and friends to protect the environment.</li> </ul>	<p>Mourali <i>et al.</i>, (2005)  Wiser (2007)  Gerpott and Mahmudova (2010)  Ek and Soderholm, (2008)  Serravallo <i>et al.</i>, (2010)</p>

<b>Green Advertising</b>	<ul style="list-style-type: none"> <li>• Green advertising campaigns inform customers about the benefits of solar water heaters.</li> <li>• I believe in green advertising claims for solar water heaters.</li> <li>• Green advertising facilitates the adoption of solar water heaters.</li> <li>• Green advertising is a useful tool to promote the adoption solar water heaters.</li> </ul>	Haytko and Matulich (2008) Gandhi Rao (2013)
<b>Eco-labelling</b>	<ul style="list-style-type: none"> <li>• I can understand the meaning of eco labels.</li> <li>• I am aware of the benefits of eco label for the environment.</li> <li>• I have a preference for eco labeled solar water heaters.</li> <li>• I am willing to pay more for eco labelled solar water heaters.</li> <li>• Eco labels make me more confident to adopt solar water heaters.</li> <li>• I believe that eco label claims on solar water heater are genuine.</li> <li>• Eco-labelled solar water heaters provide information to preserve the environment.</li> <li>• Energy star is vital for customers when choosing a solar water heater.</li> </ul>	Rashid (2009) Loureiro and Lotade, (2005) Gao <i>et al.</i> , (2008) Grundey (2009)
<b>Cost of Electricity</b>	<ul style="list-style-type: none"> <li>• I had to incur high electricity bills before the adoption of the solar water heater</li> <li>• The rising prices of electricity act an important motivator towards the adoption of solar water heater.</li> <li>• The reduction in the price of electricity promotes the adoption solar water heater.</li> </ul>	Drozdenko <i>et al.</i> (2011)

Table 1.0 – Original Scale Development for the Survey on Ecological Adoption of Solar Water Heaters