



Determinants of Behavioral Intention to E - waste Recycling Among the Youth.

Ravi Varma .V * MalarMathi . K **

* Ph.D , Research Scholar, Bharathiar School Of Management and Entrepreneur Development, Bharathiar University , Coimbatore-641046,TamilNadu,India. Email:ravivijayan3@gmail.com

** Professor,Bharathiar School Of Management and Entrepreneur Development, Bharathiar University , Coimbatore - 641046,TamilNadu,India. Email: malarmathi6505@ gmail.com

Abstract :

Understanding the factors influencing recycling behavior can lead to better and more effective recycling programs in a community. This study presents a survey to identify recycling behavioral intention regarding e - waste in Coimbatore city ,and also identify the profile of the consumers who are more or less prone to this behavior. To this end, The study applied theory of planned behavior to examine the factors associated with youth recycling behavioral intention on e - waste. Totally 138 youth agreed to participate in the study. The analysis of the relationship between theory of planned behavior variables and recycling behavioral intention using multiple regression. The TPB model explained 47 % of the variance in the student's recycling behavioral intention. The predictor individual responsibility appeared to have the strongest impact on the student's recycling behavioral intentions followed by attitude, subjective norm , and perceived behavioral control. It indicated that individual factors are driving the Indian youth's recycling behavioral intentions. Provide adequate facilities to the public so that they can participate in recycling activities without facing difficulties. Schools and Colleges have a important role in increasing student's awareness of recycling and motivating them to participate in house hold waste management practices

Keywords: E - waste, E- waste Legislation, Theory of Planned Behavior, Individual Responsibility.

1.Introduction

Electronic and electrical waste (e - waste) is a world wide problem. It is a complex stream of waste as it contains both hazardous chemicals and precious metal components. E waste includes discarded computer monitors , motherboards, mobile phones, and charges, headphones, television sets, air conditioner and refrigerators. According to the Global E-waste Monitor 2017, India generates about 2 million tonnes(MT) of e waste annually and ranks 5th among e waste producing countries after the US, China, Japan and Germany. *Down to Earth* stated that only 0.036 MT of its e - waste treated in India. It's a compound Annual growth rate is growing at about 30% in the country. The report of ASSOCHAM estimated that e waste generation was 1.8 MT per annum in 2016 and its reach 5.2 MT per annum by 2020. The 97% of e - waste is managed by unorganized sector and scrap dealers .

The Associated Chambers of Commerce and Industry of India (ASSOCHAM) study on e - waste in India identified that Computer equipment 70%, Continued by Telecommunication Equipment (12%), Electrical equipment (8%) and Medical Equipment (7%) with remains from house hold.

The low levels of recycling and more production are major factors to lead increasing the pollution . It is the major and most potential pollution streams in environment The electronic waste contains 1000 different substances and 60 elements from the periodic table many of which are toxic to human health and the environment. The United Nations Investigations found out that around 20 -50 million tons of e - waste are generated on a global scale, and is increasing 3 times faster than the entire solid waste stream and generation global is projected to increases by 16 – 28 % annually. Recycling helps to reduce the negative environmental and economic impacts of resource use. It is most important key component of modern waste reduction and third hierarchy of waste.

1.2 E - waste Legislation

To overcome the e - waste problem, policies and legislative are gradually being developed to address the proper handling of E waste. The two recent e - waste associated rules in India are “The E - waste management & Handling Rules 2011, & The E - waste management 2016” have emphasized EPR as a model for ensuring responsible E - waste management practices in India. According to the E - waste management Rules 2016, “Extended Producer Responsibility “ means responsibility of any producer of electrical or electronic equipment for channelization of e waste to ensure environmentally sound management of such waste, producers pay in an EPR framework or consumers pay in frameworks such as the advanced recycling/ Disposal fee (ARF/ ADF). Consumers pay a tax or a fee before hand , while purchasing the products, which is then used to treat the E - waste. The implementation of the E - waste Rules 2016, adequate awareness among the diverse “Bulk” and individual consumers about the disastrous health and environmental consequences of irresponsible disposal of E - waste.

1.3 Importance of the Youth Participation in Recycling in India.

In the world, India has the highest number of people in the 10 – 24 years age group (242 million United Nation world Population Prospects 2015) as per World population prospects. According to the census data of 2011, the country is expected to have about 34 % share of youth (15 – 24,Central statistics Office in India, 2017) years, in the total population by 2020. In this connection .” Recycling intention can be defined as an individuals self commitment to engage in recycling behaviors. The usage of electronic goods such as mobile phone, computers and fashionable items such as clothing , bags, and accessories has been growing rapidly among the youth in Indian cities and continue in the future as urban households wealth. The youths should be aware of the problems related to un managed wastes that they can participate in waste management practices and become responsible citizens.

From these perspective present study aims to explain students recycling intentions by applying the framework of the Theory of Planned Behaviour (TPB) developed by Ajzen (1991) , which is a widely applied socio psychological theory explaining individuals behavioral intentions.

1.4 Theory of Planned Behaviour

The Intentions are determined by peoples attitudes as well as by what they see as expectations of them held by others. The Theory of Reasoned Action was slightly amended by Ajzen and Madden 1986 and framed the ‘Theory of Planned behavior’. Since it’s introduction , the TPB has been applied to a wide range of behavior with significant success including food waste (Graham - Rowe et.al. 2015; Stefan et al., 2013, Visschers et al., 2016), healthy eating (Conner et al.,2002; McEachan et al.,2011),waste management and composting(Taylor and Todd,1995, 1997), recycling behavior (Aguilar - Luzon et al.,2012, Greaves et al.,2013, Ramayah et al .,2012; Rhodes et al.,2015; Stancu et al., 2016;White and Hyde, 2012). The TPB model consists three independent variables – Attitude,Subjective norm and Perceived Behavioral Control which together act as the predictor of a wide range of intentions (Dependent Variables). According to the theory of Planned Behaviour model, an individual intention to perform a given behavior is determined by the positive evaluation of the behavior . Perceived social pressure (SN) from others who are important to them to behave in a certain manner (Family, Friends, Colleagues) and their motivations to comply with those views , and Perceived Behavioral Control (PBC) shows how difficult it is to perform recycling behavior and how confident an individual is performing about waste separation behavior etc. Ajzen’s Theory of Planned Behaviour framework has been applied in many studies for explaining individuals recycling intentions.In this regard , recycling intention can be defined as , “an individual’s self - commitment to engage in recycling behaviors” (Park, J Ha,S. 2014). Nevertheless, several studies reported the tendency of behavior to predict intentions and behavior (Carrus et al.,2008;Conner et al., 2000; Klockner and Matthies, 2012;Terry et al.,1999; White and Hyde, 2012).

2. Review of Literature .

Sai leung NG (2019) conducted a study which is focused on predicting multifamily dwelling recycling behavior using SEM. The data was collected from households with age range of 15 – 64 .Finally 1016 data collected successfully. The results indicated that housing type, property manager initiative, Attitude and convenience affected the recycling behavior of Hongkong residents. Property manager had a significant effect on attitude and convenience.

Yue Zhangetal (2020) examined the conscientiousness and risk perception influence behavior intentions in regard to smart phone recycling . The empirical data was collected through 802 valid questionnaire and were analyzed using Structural Equation Modelling .The results supported conscientiousness is positively related to attitude, subjective norm and perceived behavioral control towards smart phone recycling . The theory of Planned Behaviour constructs are positively related to recycling intention and risk perception moderates the relationships between conscientiousness and Theory of Planned Behaviour Constructs.

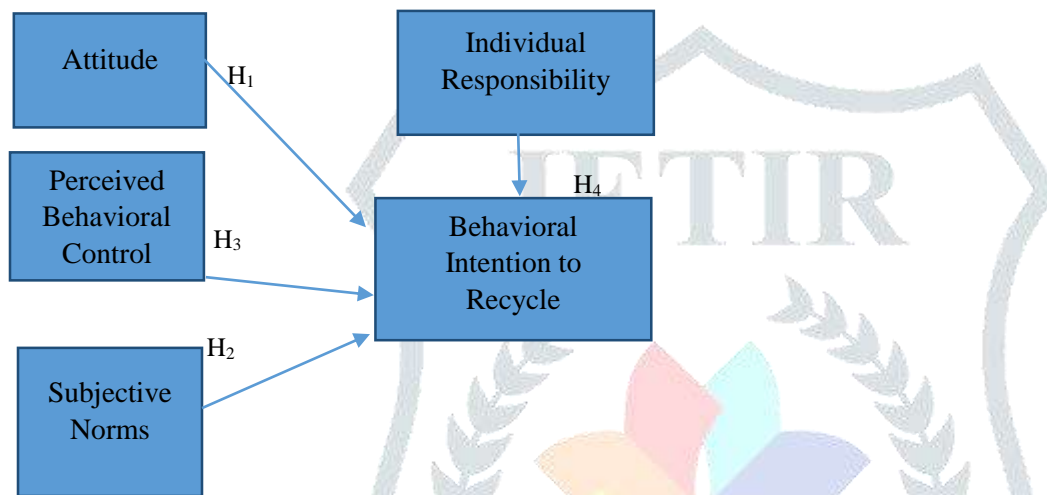
Pradeep Kaulish et al., (2019)studied the moderating influence of environmental consciousness and recycling intentions on green purchase behavior. The data were analyzed via structural equation modelling . self administrated questionnaire was given to the

respondents and finally 312 consumers were found. The results supported that environmental consciousness and recycling intentions significantly moderate the perceived consumer effectiveness and willing to be environmental friendly on green purchase behavior.

Pradipta Halder et al., (2018) investigated a predictors of recycling intentions among the youth in a developing country perspective. In these study Theory of Planned behavior was applied to predict school students recycling intentions in National Capital Region (Delhi) and the highest producers of municipal solid waste in the country. Data were collected from school students in NCR and the sample size consists of 272 students from 9th and 10th grades. The results indicated that subjective norm have the strongest impact on the students recycling intentions continued by Attitude , and perceived behavioral Control.

Hong Thi Thu Ngeyen et al., (2019) examined determinants of residents E - waste recycling behavioral intention -A case study from Vietnam. In this study , based on the theory of Planned Behaviour ,the SEM model was used to identify the key factors influencing e waste recycling behavioral intentions of residents in Danangcity, Vietnam. 520 questionnaires were collected and analyzed. The results indicated that environmental awareness , Attitude, Social Pressure, Laws and Regulations have significantly to predict individual intention . Inconvenience and past experience have negative impact on behavioral intention .

Figure. 1 Research Model



The model is based on the Theory of Planned Behaviour and extended variables from review of literature on e - waste recycling intentions .

3. Research Methodology

The present study aims to investigated the socio psychological factors determining students recycling intentions by applying the formalized TPB framework with additional variables. The main hypotheses of the study were as follows.

H₁: Attitude is positively related to behavioral intention of e - waste recycling

H₂: Subjective Norm is positively related to behavioral intention of e - waste recycling

H₃: Perceived Behavioral Control is positively related to behavioral intention of e - waste recycling

H₄: Individual Responsibility is positively related to behavioral intention of e - waste recycling

3.1 Methods

The present study was conducted to explore recycling intentions among the students . It is descriptive in nature . Questionnaire were distributed directly to the students and follow the link with uploaded questionnaire. The target population assured young and educated. The internet is appropriate and the most effective way for collecting answers. In prior of that , the students were informed about the purpose of the survey and the use of the survey. TPB variables have five point likert scale type ranged from Strongly Disagree to Strongly Agree. All of the TPB variables have Multiple statements which is recommended by Ajzen (1991) .

3.2 Sample Characteristics and measurement

About 152 students participated in the survey. However only 138 students completed the questionnaire in all aspects with a male and female respondents. The respondents were identified using the purposive sampling method. A reliability check of TPB

constructs was checked to evaluate the internal consistencies of the items . Cronbach's Alpha values for all the constructs appeared to be more than 0.7 which showed good internal consistency.

Table no. 1 Internal Consistency Of derivative measures

Elements of TPB	No.of. Items	Cronbach's Alpha Value
Attitude	4	0.750
Subjective Norm	3	0.713
Perceived Behavioural Control	4	0.841
Individual Responsibility	3	0.629

4. Results

To find out the differences between all TPB constructs and demographic profile , Independent t- test and ANOVA were conducted .

Table no.2 Demographic Profile of the respondents:

General Information	Characteristics	Frequency	Percentage
Gender	Male	79	57.2
	female	59	42.8
Age	18 – 23 years	86	62.3
	24 – 29 years	52	37.6
Marital Status	Unmarried	117	84.8
	Married	21	14.5
Education Qualification	SSLC	14	10.1
	HSC	22	15.9
	UG	86	62.3
	PG	16	11.5

From the above table, 57.2% of the respondents are male and 42.8 % of the respondents are female. The Age group details showed that 62.3 % of the respondents are fall in age category between 18 – 23 years, 24 – 29 years of the respondents are 37.6%. 84.8% are Unmarried and 14.5 % are Married. Majority of the respondents are fell into the category of degree holders 86 (62.3%),22 (15.9%) were Higher secondary level, 16 (11.5%) were PG degree holders and remaining 14 (10.1%) were SSLC level categories.

Table . 3 Descriptive Statistics

S.No	Extended Theory of Planned Behaviour variables.	Mean	Standard Deviation
Attitude			
1.	Participation in recycling will make me feel satisfied	4.13	1.024
2.	I think participating in recycling is contributing to society.	4.27	.993
3	Recycling is sensible and rewarding	4.09	.951
Subjective Norm			
4	Most people who are important to me think I should engage in recycling	3.66	1.181
5	My friends /peer expect me to recycle	3.52	1.181
6	Media influences me to recycle	3.14	1.297
Perceived Behavioral Control			
7	I have enough time to sort the materials for recycling	3.30	1.175
8	I know how to recycle my electronic items	2.92	1.323

9	I know where to take my electronic items	3.07	1.310
10	I have full control over recycling my electronic goods	3.11	1.333
Individual Responsibility			
11	It would be wrong of me not to recycle waste	3.47	1.233
12	I have a strong personal responsibility towards recycling	3.97	.935
13	I would feel guilty if I did not perform recycling.	3.56	1.202
Behavioral Intention			
14	I am willing to contact formal e waste recycling organization to deal with e waste in the future	3.72	1.052
15	I intended to drop off my e waste if formal collection systems are available	3.73	1.000
16	I am willing to participate in environmental programs held by the governments	3.72	1.031
17	I am willing to tell my relatives about the e waste recycling experience	3.93	.998
18	When I buy electronic products in the future, I tend to choose products that promise to be recycled.	3.91	1.046

The mean and standard deviation of all the items which is used in this research. A2 has the highest mean value at 4.27 whereas PBC 2 has the lowest mean value of 2.92. standard deviation for all the variables falls between 1.024 to 1.046. It shows that the mean value of dependent variable , recycling intention , ranged from 3.72 to 3.91. Whereas attitude ranged from 1.024 to .951, SN1 to SN3 ranged from 3.66 to 3.14, PBC 1 to PBC4 ranged from 3.30 to 3.11,and Individual responsibility ranged from 3.47 to 3.56.

Table 4. Independent t - Test between gender and TPB variables.

Constructs	Gender	N	Mean	Standard Deviation	T	Significance (2 tailed)
Attitude	Male	79	4.16	.715	-1.017	.311
	Female	59	4.28	.635	-1.035	.303
Subjective norm	Male	79	3.39	.853	-1.569	.119
	Female	59	3.62	.900	-1.554	.123
Perceived Behavioral Control	Male	79	3.11	1.048	.114	.910
	Female	59	3.09	1.076	.113	.910
Individual responsibility	Male	79	3.68	.909	.267	.790
	Female	59	3.64	.790	.272	.786
Behavioral Intention	Male	79	3.82	.726	.273	.785
	Female	59	3.78	.870	.266	.790

The gender is most expected differentiating factor for the behavior and society socializing patterns.The results showed that there is no significance differences between gender and Theory of planned Behaviour constructs.

Table no.5 One way ANOVA with Age and All TPB variables

Constructs		Sum of Squares	df	Mean Square	F	Sig.
Attitude	Between Groups	.505	2	.253	.540	.584
	Within Groups	63.191	135	.468		
	Total	63.697	137			
SBN	Between Groups	.565	2	.283	.360	.698
	Within Groups	105.975	135	.785		
	Total	106.540	137			

PBC	Between Groups	.889	2	.444	.395	.674
	Within Groups	151.881	135	1.125		
	Total	152.770	137			
INDR	Between Groups	5.224	2	2.612	4.518	.013
	Within Groups	78.041	135	.578		
	Total	83.265	137			
BI	Between Groups	4.068	2	2.034	3.390	.037
	Within Groups	81.009	135	.600		
	Total	85.077	137			

Table shows the One way ANOVA result between Age and Theory of Planned Behaviour variables (Attitude, Subjective norm, Perceived Behavioral Control, Individual Responsibility, and Behaviour Intention). One way ANOVA was applied whether to find out any significance difference between category of Age and all factors. It could be inferred from the table, there is a significance difference exist between two variables that is individual responsibility ($F= 4.518, p=0.13$), Behavioral Intention ($F=3.390, p= 0.037$). The probability value is less than 0.05, hence the null hypotheses is rejected.

Table.6 Multiple Regression between Theory of planned behavior and Recycling Behaviour Intention

Dependent variable and model coefficients		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
Recycling Intention N= 138 $R^2 = 0.47$ P=0.000	(Constant)	2.987	.471		6.342	.000
	Attitude	.119	.133	.103	.894	.002
	SBN	-.048	.115	-.053	-.414	.032
	PBC	.147	.098	.197	1.496	.001
	INDR	-.229	.114	-.250	-2.020	.045

a. Dependent Variable: BI

Significance at 0.05 %. (SBN - Subjective Norms, PBC - Perceived Behavior Control, INDR - Individual Responsibility).

The multiple regression table results shows the relationship between Theory Planned Behaviour variables and recycling Behaviour Intention. It is inferred that Attitude, Subjective norms, Perceived Behavioral Control is positively influence the recycling intention. Individual responsibility is positively influence the Intention of recycling and its major predictor of recycling behavior. Many studies reported that TPB variables as the strongest predictors of individuals recycling intention (Wan, C et al., 2012; Pikturiniene et al., 2016; Wan C, Shen et al 2017).

5. Discussion and Recommendations :

The study analyzed that socio – psychological determinants of students recycling intentions by applying extended theory of planned behavior. The study found that, Individual responsibility significantly influences the recycling behavior Intention from all the TPB constructs. Lack of knowledge among the students results in improper e - waste separation and ultimately the efforts. So educating and created awareness is very important for e - waste recycling. The youth feel that their participation in recycling could definitely contribute to the well being of the society. Most of them feel that recycling e - waste is very satisfying as well as rewarding.

The change in attitude is also due to the friends and peer influence. Media too playing an important role in changing the behavior. Youth's are willing to take of the responsibility to recycle and they would feel guilty if they don't perform these activity. They are not only willing to initiate the action but are also willing to participate in the environmental program and inform their friends and relatives about the ill effect of e - waste. Moreover, when it comes to developing recycling behaviors, schools, colleges and Universities can

play an important role. They can initiate various environmental activities in their local communities involving students and residents, which can enhance their awareness of waste separation and motivate them to take required practical actions both at the house hold and community levels Zhang D et al (2015). There are already a few policies and initiatives existing in India related to urban waste management and therefore, it is the responsibility of the citizens, both young and old, to come forward and help implementing those policies successfully throughout the country.

5.3 Conclusion:

The result in this study shows that there is a significant and positive relation ship between individual responsibility and recycling behavioral intention. It is important to provide sufficient information related to recycling concept through various media like , internet, radio, television and newspaper. In order to encourage students, the number of recycling facilities in campus area such as recycling bin should be increased. Supporting laws and regulations are required to encourage recycling activities as well as changing behavior. E- waste management initiatives, together with consumers disposal behavior and awareness should be locale specific.

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