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Modelling consumers behaviour towards e-waste management: a planned behaviour theory approach

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Abstract

The challenge of waste minimization is a matter of concern for many countries. Since it depletes the natural resources, it negatively impacts environment as well as human health. Every small change in the environmental factor affects the quality of human life. Thus there is a need to build the concept of zero waste amongst people. Though waste management is closely related to environment but it affects economy and society as well. According to the figures mentioned in the report given by Central Pollution Control Board in 2020, India is generating not less than 1,014,961 tonnes of e-waste every year which increases every year (TARUN, SAJAL JAIN, 2021). As far as Nagpur is concerned according to the reports total e-waste generated is 10 lakh tonnes/annum and less than 1% recycled (Behl, Manka, 2021). Hence this issue has been taken very seriously by many industries and they are working successfully towards solving the e-waste recycling problem. In order to do it effectively there is a need to understand the awareness amongst consumers and their overall behaviour towards e-waste collection and recycling. This study is conducted in Nagpur city. The respondents were selected using snow ball sampling technique, around 525 responses were collected through structured questionnaire prepared in the google form. This study is based on the planned behaviour study and unlike the theory in the current study the five variables attitude, perceived belief, perceived behavioural control, intention and behaviour are studied. The researcher has developed AMOS model which studies the mediating effect of habit of e-waste recycling and moderating effect of customer engagement on consumer benefits.

Keywords: Attitude, perceived belief, perceived behavioural control, intention and behavior.

INTRODUCTION

During the COVID-19 period when people were forced to remain at home everyone started feeling the emergence of new normal. In this new normal the usage of electronic equipments increased. Our dependency on gadgets increased with an enormous speed. According to the figures India generated near about 3 million tonnes (MT) of e-waste annually after China and United States and expected to rise to more than 5 million tonnes (Rao, Rukmini, 2021). This is an alarming situation. Today's consumer is fast changing. He can adopt to changing situation very comfortably but for that he has to make aware about the pros and cons of the situations then he will find his own ways.

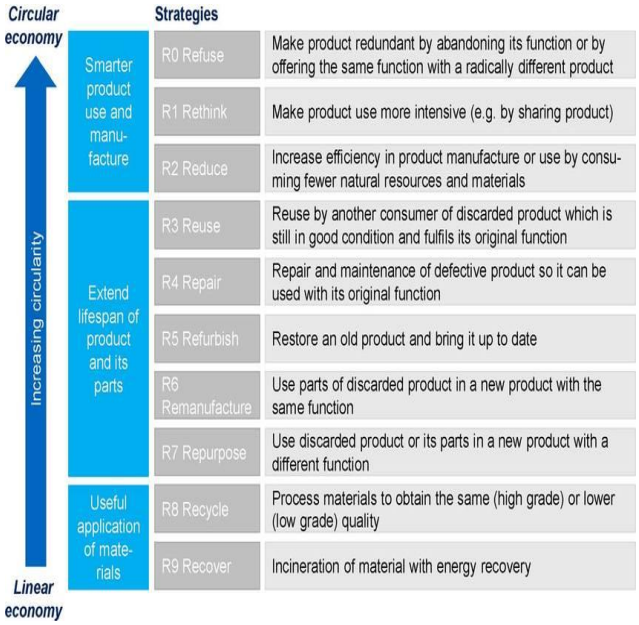
Market has touched a critical point, where discovering new ways to exist has become an essential thing for survival. Looking at the increase in the amount of e-waste annually today's marketers and eventually the consumers are heading towards "destination zero" (McCullagh, Justine, 2020). Destination zero is nothing but walking on the path of Sustainable Development Goals of our country

which are given by United Nations General Assembly way back in 2015 and are proposed to be attained by the year 2030. The concept of zero destination is based on the sustainable improvement in the quality of life which can be possible by utilizing the resources judiciously by reducing the wastage so that our future generation can be secured. By doing this we can safeguard society, economy and environment.

Zero Waste International Alliance (ZWIA, 2018) has defined the concept of Zero Waste as an ethical, economical, effective and innovative way of thinking wherein all the discarded and unwanted materials are recycled and converted into useful things. This concept has emerged as an approach towards elimination of wastage from the society. This approach has changed the approach towards waste material from useless things to useful things. This approach has not only proved its utility for industry but also for each and every individual.

Although it seems very unlikely to get implemented and accepted amongst all customers but it's not so difficult. Since already people have started thinking on these lines. In the early stages of marketing the marketeers used to sell whatever he can manufacture better without taking into consideration whether the customers really need it or not. But today's marketeers have changes their views. Now he will first do a pilot study to identify what is the exact need of the customers and then he will also try to ensure whether the things made by him are matching with the customer expectations or not? (McCullagh, Destination zero: The latest consumer trends around sustainability, 2020)

Today's the consumers are not only started altering their habits of using the commodities, rather than increasing the trash they are trying to reduce the wastage. This is nothing but a model of circular economy, which talks about 9 R's concept: Resource-efficient, Refusing to use certain products/resources, Redesigning, Reusing, Repairing, Refurbishing, Re-manufacturing, Re-purposing and Re-cycling. (Kirchherr, Julian, 2017)



The 9R Framework. Source: Adapted from Potting et al. (2017, p.5)

Despite of this there is a need to have a profound understanding about it amongst people. This study tries to bridge this gap of understanding by providing guidelines on creating awareness amongst people, developing habit of e-waste recycle and various types of e-waste.

Theoretical support:

According to theory based on sustainable consumption (Connolly, John & Prothero, Andrea, 2003) in this study the authors have mentioned about the level of awareness of consumers and how they take care of environmental issues related to demand and supply. They have also mentioned that the consumers also have green options i.e. eco-friendly way of dealing with the consumption of goods. This is possible because of the awareness. These days' consumers are becoming very sensitive about the environmental issues and they are very conscious about their consumption habits, this behaviour is termed as socially responsible consumers (Gerard Paul Prendergast, Alex S.L. Tsang, 2019) who will eventually contribute towards attainment of Sustainable Development Goals of the country.

According to the report there is awareness in 80% of the consumes about e-waste (ET Bureau, 2018) but unfortunately proper disposal is not being done by the consumers. Sometimes they do not understand where to disposal the e-waste so the consumers either keep it dumped in their homes or they take help of online exchanges or local electronic vendors (ET Bureau, 2018). Many people say that the e-waste collector doesn't collect materials from their area. According to the study (Samar Lahiry, 2019) around 95% of the e-waste is recycled in India in informal.

According to the research paper published by Alessandra DiGiacomo et.al (Alessandra DiGiacomoa, David W.-L. Wua, Peter Lenkic, Bud Fraser, Jiaying Zhao and Alan Kingstone, 2018) it was observed that convenience is one of the most essential element in the process of recycling which influence the process of e-waste management. It was proved in the study that increasing the convenience promotes recycling.

Economic Benefit of Zero-waste practices:

There are many economic benefits of zero-waste practices. Using zero waste products means reducing the ecological impact of waste created from the products. According to the report (Ribeiro-Broomhead, J. & Tangri, N, 2021) it was mentioned that the practice of zero waste practices creates various employment opportunity. Earlier it was the understanding that the zero waste practices create low level and low waged jobs but this is not the reality. According to the study (Ribeiro-Broomhead, J. & Tangri, N, 2021) which was conducted worldwide it was found that the opportunities created by zero waste practices are diverse in nature, with high-skill creation and highly paid.

Customer Engagement:

According to a report by (Cora Craigmile , 2021) customer engagement by giving some responsibilities to the customers such as segregating the waste during the process of disposal, will make the task of waste management easy. Customers will join hands and undertake this responsibility with full cooperation since everybody faces the same issue of waste management and sanitisation inefficiencies. This activity of passing the burden of waste segregation to certain extent on the customers.

Consumer Behaviour:

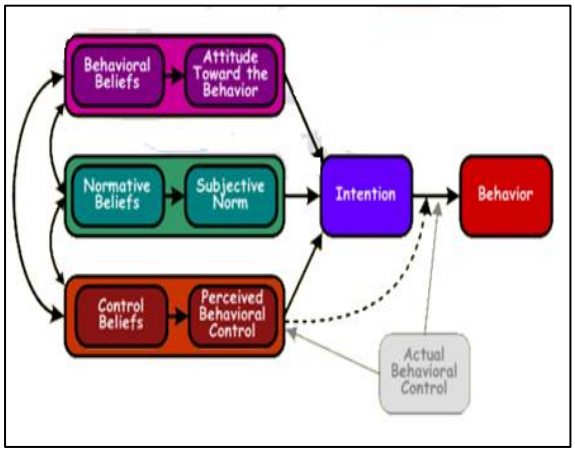
Today biggest threat is the increasing pollution, climate change along with many other environmental issues. Hence, there is a great need to change the consumption pattern. There still exists a gap between what consumer's values and what they buy. According to a study (Vineta Gleba, Jacen Greene, 2018) people can adopt such kind of behaviour pattern which can reduce the carbon footprints and eventually causes less harm to the environment.

Previous Studies on zero waste consumers:

Author(s)	**Country**	**Context**	**Outcome**
Borthakur, A., Singh, P	India	Consumers' perspectives of electronic waste	Usually it was found that the mobile phones are kept in the home itself or are given to younger users
Sylwia Badowska, Liwia Delińska	Poland	zero waste concept from the young consumer's perspective	Women show more zero waste consumption behaviour than men
Abhishek Kumar Awasthi, V.R. Sankar Cheela *et.al*	India	Sustainable waste management	Increasing resource consumption results in waste generation
Zsuzsa Saplacan, Brigitta Márton	Europe	Zero waste consumer lifestyle	Dimensions and determinants of zero waste consumer lifestyle
Jonathon Hannon and Atiq U. Zaman	New Zeland	Zero waste, resource conservation, urban metabolism, circular economy	Implementation of zero waste goal can increase community engagement

Saima Hamid, Bhat Mohd Skinder and *et.al*	India	Resource Management, Product Management	Zero waste strategy can be applied to all sectors for sustainability and managing the resources properly.
Arti Jaiswal and Dr. Alka Bharat	India	Waste generation, waste composition, Integrated solid waste management	Problem solving approach towards solid waste management
Dr. Meera Mathur	India	Sustainable development, sustainable consumption	Focuses on global sustainable consumption
Vilhelm Sjölund	Sweden	Zero waste, package free, life cycle assessment, food waste	Zero waste framework, food industry, inventory management and environmental impact
A. Baul Das, C. Gurung	India	Domestic Solid waste management, zero waste management, reuse and recycle	Reducing in the domestic waste by following the 3R Principles of zero waste

Adopted theoretical model:



Source: Theory of planned behaviour (Icek Ajzen, 1985)

Hypothesis development:

According to the model the intension of any consumer towards decision making is dependent on his attitude, subjective norms and perceived behaviour control (Icek Ajzen, 1985). In this case the intention of customer is about e-waste management which is dependent on his attitude which includes level of awareness as well, subjective norms which means when a behaviour is approved by the known people (including your family members, other relatives, neighbours, peer group etc.) and they also support your way of thinking. Perceived behaviour control includes self-confidence of the consumer and his assurance about the method he/she has adopted to manage the e-waste generated by him over a period of time. The term intention includes his persistent effort towards managing the e-waste since his understanding. Past behaviour here is a kind of assurance about the behaviour of the customer that in coming future he/she will continue working towards managing the e-waste.

The broken line shown in the above model which is connecting perceived control behaviour and behaviour shows that the effect on the actual behaviour can be direct or indirect depending on the situation.

According to the planned theory (Icek Ajzen, 1985)the perceived behaviour control can predict behaviour to a significant extent. For example, a person may have a negative attitude towards any specific act and may be under the influence of his social class he was unable to leave it or quit the activity. In this case we can say that the person is getting controlled by the behaviour rather it should have been a reverse case. In such situations the variable becomes less significant.

Hence, the variables attitude, perceived behavioural control and subjective norms differs from person to person, situation to situations and behaviour to behaviour (K. Wallston, 2001). Thus, they are distinct constructs and ideally they correlate strongly with the variable intentions.

In practical life people may have various beliefs but in reality they can follow only few. These few beliefs shape his behaviour (Bobby Hoffman, 2015).

Based on the above explanation the following hypothesis are formed:

HA1: Attitude, perceived norms and perceived behaviour control are strongly correlated with each other.

HA2: Attitude, perceived norms and perceived behaviour control affects behaviour intension.

HA3: Perceived behavioural control affects the future behaviour.

HA4: Intension of customer affects the future behaviour.

Research Methodology:

The current study aims to test the conceptual model proposed in this study which is based on the theory of planned behaviour (Icek Ajzen, 1985) and impacts the intention and behaviour of customer towards e-waste management. The researcher has collected the empirical data for this study through questionnaire structured questionnaire was prepared. The data was collected during the period of Jan 2022 to March 2022. The questionnaire was circulated through Google Form by using snow ball sampling technique amongst 700. Out of the total respondents 525 completely filled forms were used for the analysis. Rest were rejected for incomplete information. The following table shows the demographic profile of all the respondents.

In this study the researcher has used the five point Likert scale for data collection. The data is analysed by using SPSS software and AMOS for model testing.

Data Analysis and Results:

Testing the questionnaire before actual survey:

Testing survey questionnaire before actual survey is an important step to identify errors in the

measuring instrument. There could be multiple errors which, if allowed to propagate, could

severely impact the quality of data collected and hence the accuracy of the results for the theoretical model thus leading to incorrect conclusions of the research questions. Testing involves administering the survey questionnaire to a small sample (30 in this study) of the same population.

Data is collected and reliability and validity tests are performed to ensure robustness of the survey instrument (John W Creswell, 2014)

Bagozzi (1980) and Bagozzi and Philips (1991) recommend methods to ensure reliability and validity of measuring instrument itself. Initial data collection follows normal distribution based on skewness and kurtosis limits. Discriminant validity and composite reliability is found acceptable as per published guidelines (Fornell and Larcke, 1981). Reliability is the measure of consistency and high reliability indicates that there is negligible amount of random and unstable errors (Kothari, 2004). In this case it was in the good and satisfactory range.

Hypothesis testing:

H01: There is no correlation between Attitude, perceived norms and perceived behaviour control.

HA1: Attitude, perceived norms and perceived behaviour control are correlated with each other.

This hypothesis was tested using correlation. It measures the strength and direction of linear relationships between pairs of continuous variables.

Correlations

		Perceived norms	Perceived Behaviour control	Attitude
Perceived norms	Pearson Correlation	1	.120**	.020
	Sig. (2-tailed)		.006	.518
	N	998	525	998
Perceived Behaviour control	Pearson Correlation	.120**	1	.000
	Sig. (2-tailed)	.006		.994
	N	525	525	525

Attitude	Pearson Correlation	.020	.000	1
	Sig. (2-tailed)	.518	.994	
	N	998	525	998
**. Correlation is significant at the 0.01 level (2-tailed).				

Pearson's r (Pearson Correlation Coefficient and Interpretation in SPSS)

The first is the value of Pearson' r – i.e., the correlation coefficient. That's the Pearson Correlation between perceived norms and perceived behaviour control is 0.120, between perceived norms and attitude is 0.020, between perceived behaviour control and attitude is zero.

Pearson's r varies between +1 and -1, where +1 is a perfect positive correlation, and -1 is a perfect negative correlation. 0 means there is no linear correlation at all.

Our figure of .120 or 0.020 indicates a weak positive correlation and 0.000 indicates no correlation. The stronger the correlation between these variables the greater will be the intension towards e-waste management behaviour, but in this case the effect is very small.

Significance

The 2-tailed significance value in this case is >.000. The standard alpha value is .05, which means that our correlation is not significant.

H02: Attitude, perceived norms and perceived behaviour control do not affect behaviour intension

HA2: Attitude, perceived norms and perceived behaviour control affect behaviour intension.

In order to test this hypothesis one-way ANOVA is used. ANOVA is used when we have to check whether independent variables perceived norms, attitude, past behaviour control affects intention.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	283.013	3	94.338	24.524	.000[b]
	Residual	2004.156	521	3.847		
	Total	2287.170	524			

a. Dependent Variable: Intension

b. Predictors: (Constant), perceived_norms, Attitude, Past behavior control

From the above table we can interpret that the significance value is 0.00 (i.e., p = .000), which is below 0.05. so we can say that Attitude, perceived norms and perceived behaviour control affect behaviour intension.

To know the magnitude by which these factors affect behaviour intention multiple regression is applied the following output is obtained;

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.788	.282		31.169	.000
	Attitude	.047	.085	.023	.552	.581
	Past behavior control	-.154	.019	-.332	-8.066	.000
	perceived_norms	.282	.112	.103	2.510	.012

a. Dependent Variable: Intension

If we look at the Beta Value Attitude and perceived norms contributes on a positive side and past behaviour control contributed on negative side. But if we look at t significant values, we can see that the significance value of attitude is > 0.05, and in case of perceived norms and past behaviour control it is < 0.05, so we have to consider these two variables only to form the following equation:

Behaviour intention = 8.788 – 0.154 past behaviour control + 0.282 perceived norms

H03: Perceived behavioural control does not affect the future behaviour.

HA3: Perceived behavioural control affects the future behaviour.

In order to test this hypothesis one-way ANOVA is used. ANOVA is used when we have to check whether independent variable Perceived behavioural control affects future behaviour.

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1196.508	1	1196.508	66.258	.000[b]
	Residual	9444.570	523	18.058		
	Total	10641.078	524			
a. Dependent Variable: behavior control						
b. Predictors: (Constant), perceived Behavior control						

From the above table we can interpret that the significance value is 0.000 (i.e., p = .000), which is below 0.05. so we can say that perceived behaviour control affect future behaviour control.

To know the magnitude by which this factor affects future behaviour multiple regression is applied the following output is obtained;

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	10.653	.793		13.430	.000
	perceived Behavior control	-.723	.089	-.335	-8.140	.000
a. Dependent Variable: behavior control						

If we look at the Beta Value perceived behaviour control affects negatively on future behaviour control and if we look at t significant values, we can see that the significance value of perceived behaviour control is < 0.05, so we have to consider this variable to form the following equation:

Future behaviour control = 10.653 - 0.723 (perceived behaviour control)

We can interpret it as:

Perceived behaviour control can predict behaviour to a significant extent but if a consumer has a negative attitude towards any specific act and may be under the influence of his / her social class he /she and was unable to leave it or quit the activity. In this case we can say that the person is getting controlled by the behaviour rather it should have been a reverse case. In such situations the variable becomes less significant (as mentioned in the explanation of the planned behaviour theory above)

HA4: Intension of customer does not affect the future behaviour.

HA4: Intension of customer affects the future behaviour.

In order to test this hypothesis one-way ANOVA is used. ANOVA is used when we have to check whether independent variable intention affects behaviour control.

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1196.508	1	1196.508	66.258	.000[b]
	Residual	9444.570	523	18.058		
	Total	10641.078	524			
a. Dependent Variable: behavior control						
b. Predictors: (Constant), Intension						

From the above table we can interpret that the significance value is 0.000 (i.e., p = .000), which is below 0.05. so we can say that intension of customer affects the future behaviour.

To know the magnitude by which this factor affects future behaviour multiple regression is applied the following output is obtained;

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	10.653	.793		13.430	.000
	Intension	-.723	.089	-.335	-8.140	.000
a. Dependent Variable: behavior control						

If we look at the Beta Value behaviour control affects negatively on intention and if we look at t significant values, we can see that the significance value of perceived behaviour control is < 0.05, so we have to consider this variable to form the following equation:

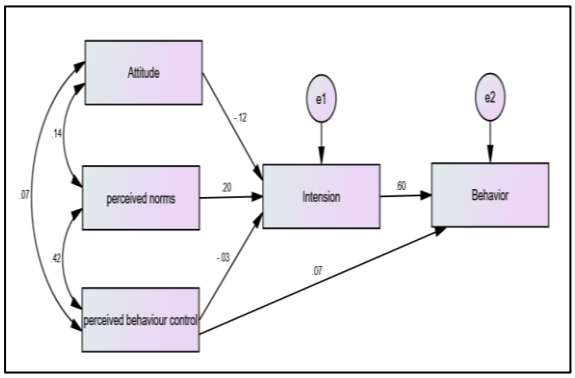
behaviour control = 10.653 - 0.723 (intention)

We can interpret it as:

Intention can predict behaviour to a significant extent but if a consumer has a negative attitude towards any specific act and may be under the influence of his / her social class he /she and was unable to leave it or quit the activity. In this case we can say that the person is getting controlled by the behaviour rather it should have been a reverse case. In such situations the variable becomes less significant (as mentioned in the explanation of the planned behaviour theory above)

Discussion:

The analysis was performed by using AMOS model. It was found that



Observation:

Absolute Fit Measures		
Test	**Recommended value**	**Reporting value**
X2	p > 0.05	6.114
CMIN / DF	< 3	2.038
RMSEA	< 0.10	0.030
Relative Fit Measures		
Test	**Recommended value**	**Reporting value**
CFI	> 0.95	0.985
NFI	> 0.90	0.973
RFI	> 0.90	0.864
TLI	>0.90	0.926
IFI	> 0.90	0.986
Parsimonious Fit Measures		
Test	**Recommended value**	**Reporting value**
PCFI	> 0.50	0.512
PNFI	> 0.50	0.520

According to Browne & Cudeck, 1993; Joreskog & Sorbom, 1993, RMSEA value less than 0.05 is suggest a close fit model. In this case the value is 0.030

According to Bentler and Bonett 1980, value of NFI, RFI, TLI, IFI if greater than 0.90 indicates an acceptable fit and in case of CFI the value should be greater than 0.95. In this case NFI = 0.973, RFI = 0.864, TLI = 0.926, IFI = 0.986 and CFI = 0.985.

In this case only the value of RFI is not upto the expectation but still we can say that the model is acceptable.

Conclusion:

There are many studies which are performed on the relationship between attitude and intention or behaviour of customer and it would not be a wrong statement if it is said that to analyse attitude and intention to act in a particular way is really very difficult to study. In this study a theoretical model of planned behaviour is used to study the effect of attitude, perceived behavioural control which are our believes and perceived norms on the behaviour of customer

about the management of e-waste. In this case we can see through the model values that the attitude contributes negatively to the intention of customer, i.e. in case if a customer has consistently bad experience about the process or the activity of e-waste management it is bound to affect negatively to his future intention towards that activity. The second factor perceived norms which are our believes (bound to differ from customer to customer) affects positively on intention. If we look at the third factor perceived behavioural control includes self-confidence of the consumer and his assurance about the method he/she has adopted to manage the e-waste generated by him over a period of time, has a negative impact on intention (efforts taken by customer). This happens because if the efforts taken by the customer are not consistent. But we look the relation between perceived behavioural control on behaviour its positive. This happens because if because of the social factors or peer pressure if a customer is not able to quit the activity of e-waste management. In such cases the behaviour is controlled by the customer and not the other way round. (Icek Ajzen, 1985)

According to the theory of planned behaviour the three important factors attitude, perceived control behaviour and perceived norms vary according to situation to situation, person to person and from different belief to belief.

In practice people may have 'N' number of beliefs but they can follow only couple of them, which shapes their behaviour.

Limitation and future scope of the study:

The author has identified the following limitations for the study:

First, the study is limited to management of e-waste only. Second, the data was collected through snow ball sampling technique so there was no control and connect with the respondents. Third, questionnaire was not administered while data collection. The respondents have filled it according to their understanding. Fourth, the data was collected from limited number of respondents. Lastly, there may be the existence of respondents biases.

If the responses can be collected in the presence of the researcher / author probably the result may get even better. This study can also be carry forward in the area of waste management in all types of wastes and the results can become the part of Government policy matter.

Theoretical implementation:

The theory contributes to the current literature available in the same domain. Many studies have been performed on consumer behaviour, e-waste management but impact of attitude, perceived behaviour control and perceived behaviour on intention of customer about whether to continue a specific activity about e-waste management or not which will be going to shape his future course of action is not studied so far. So this study will help to analyse how the perceived behaviour of customers and his beliefs impacts his intention and what a marketer should do to instigate the customers or try to form a new beliefs of the customers about the products or services provided by them.

Practical implementation:

Understanding the customers and their though process was always a changing matter for every marketer. There is a need to understand the real time change in consumer behaviour. In case if marketer doesn't do it his product will soon become obsolete. Today's customer is going towards the concept of zero-waste management, the niche where every marketer should focus. So being one of the important stake holders of the eco-system it's become our prime duty to take proper care of mother nature. Hence customers are also focusing on such products which are easy to use and dispose causing minimum harm to the environment. Thus, zero waste consumption is the future of the country (Justine McCullagh, 2020) and this is where the current study contributes by explaining how the planned behaviour will lay down the foundation of zero waste management.

Author's contribution:

The author has identified all the relevant studies for the literature review of this paper, he has studied the many research papers on the similar themes. The SPSS analysis along with AMOS modelling was done by the author himself. The research paper writing, data collection, analysis, proof ready was done by author himself.

Conflict of interest:

This is to inform you that there is no conflict of interest in the publication of this research paper. The author would like to publish it out of the academic interest only.

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