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Meat Processor's Intention to Manage Abattoir Solid Waste in Kano State, Nigeria

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Abstract: This study aimed at development of clear understanding of real factors that determines the carcasses' attitude towards abattoir solid waste management in the study area. The study employed questionnaire in form of Likert Scale to meat processors. All items were measured on five-point Likert-scale descriptors ranging from strongly disagree to strongly agree. For the analysis, Pearson Product Moment Correlation was used to identify the relationship between dependent variable (intention of meat processors to manage ASW) and independent variables or predictors. The result of this study reveals that there is moderate relationship experience (years spent in the business) and facilities; social norm (influence of importance people around) and facilities; control (space, time & convenience) and location. In addition, control (space, time & convenience) and intention moderately correlated. Similarly, there is high correlation between experience and social norm; experience and control; social norms and control; and social norm and location. The findings show that meat processors' intention to manage ASW is influenced by education, experience, social norm and control positively. Some of the recommendations made by this research are Kano state government should come up with awareness campaign to enlighten people about the benefit of managing ASW to oneself and to the environment. This awareness campaign should include the health and environmental consequences of a poor intention of meat processors towards waste handling.

Keywords: Behavioural intension; Intension to waste management; Theory of Planned Behaviour; Abattoir solid waste

INTRODUCTION

Livestock is part of agriculture and occupies almost 38.4% as of 2017's GDP in Nigeria (National Bureau Statistics [NBS], 2017). Moreover, Nigeria is among the world top countries that produce goat meat. It was ranked third in the world that produces goat meat in 2011 after China (58%), India (18%), Nigeria and Pakistan 9% each with Bangladesh with 6% (Central Pollution Control Board [CPCB], 2017). In terms of cattle production, Nigeria ranked 14th in the world and 4th in Africa in 2015 (Cook, 2019) and occupied 17th position in the world for cattle production. Nigeria is endowed with abundance of animals.

The average of world meat production is on rising by circa 2% per annum (FAO, 2017) which means increase in abattoir waste if the present practice continues unchecked. In Africa, abattoirs produce 80-90% of organic waste which left to decay without proper management. This causes communicable diseases like tapeworm, trichinosis, tuberculosis among the others. It can produce organisms which cause diseases such as headache, asthma, heart burn, dysentery, general body weakness, fever and typhoid fever pneumonia, respiratory and chest diseases, coughing, burning eyes, skin rash or irritation, wool sorter diseases, nausea or vomiting, foot, mouth diseases and dengue (Robert, De jager & Blight, 2009; Wing & Wolf, 2000). Besides, reduces life expectancy in most developing countries especially in Africa it has been associated with inadequate and hazardous waste management, among other factors (WHO, 2005).Similarly, despite animal dung could be served as manure, but it contains viruses, bacteria, microorganisms and salt which could impair quality of water in an environment when washed into river or stream (Adewumi, Babatola & Adejuwon, 2016).

At the same time this waste produces bad odour in the vicinity (Fearon et al., 2014). For years, abattoir solid waste disposal in many developing nations has been a major problem. Many abattoirs in

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Sub-Saharan Africa especially Nigeria deposits their wastes within the immediate locations or disposes them into water bodies (Osibanjo & Adie, 2007). This is as a result of lacks of waste recovery and treatment facilities and lack of knowledge about environmental implication of abattoir solid waste (Adeyemo, Adeyemi, & Awosanya, 2009). Therefore, this research is cogent in order to find the factors that determine the meat processors' intention towards abattoir solid waste management in Kano state.

Statement of the Problem

The problem of waste management in Nigeria is that most policies made by the government are not well publicized so that people at local level can be aware of them. Incorporating followers or people concerned (for example butchers in decision making) is very scare (Palczynski, 2009). Another problem is that most of the models adopted for waste management in Nigeria were adopted from advanced countries without necessarily considering socio-economic and environmental differences. So, this research aimed at assessing the factors that determine meat processors' attitude towards abattoir solid waste management.

Nevertheless, little studies were conducted on empirically validated theory to investigate the key variables that influence meat processors' participation in managing ASW which pinpoint presence of a research gap. So, this research utilizes both top-down and bottom-up approaches in order to involve waste generators and manager in participation of managing ASW in an environmentally sound approach.

The important of this research cannot be over emphasized. As it determines the factors that determine meat processors' attitude towards abattoir solid waste. This will help government to understand where it should lay emphasis on. At the same time, the negative effects of abattoir solid waste would be eliminated. Most of researches carried out in the past give little or no attention at environmental psychological theory in finding attitude towards managing abattoir solid waste.

Objectives of the Study

The research aim is to develop a clear understanding of real factors that determines the carcasses' attitude towards abattoir solid waste management in the study area. This main objective can be achieved through the followings:

- To find out the relationship between dependent variables and independent variables such as social norms, location of the abattoir dumping site, perceived behavioural objective and so on.
- To develop mathematical equations that represents the model.
- To provide solutions to the model equations based on realistic assumptions.
- To present numerical examples to ascertain the validity of the model developed.
- To find out the most influential factors that determine carcass processors' attitude towards managing abattoir solid waste.

Literature Review

Determinants Of Abattoir Solid Waste Management (ASWM)

Attitude towards abattoir solid waste management

Attitude refers to the degree to which a person has a good or bad, positive or negative, favourable or unfavourable evaluation of the behaviour of interest. It entails a consideration of the outcomes of performing a specific behaviour. The attitude must be specific, since this specificity will allow the prediction in the resulting behaviour (Ajzen, 1991; Abubakaret.al, 2023). Previous studies revealed that behaviour is influenced by other determinants such as norms, personality, and facilitating conditions, not only by attitude due to low relationship between attitude and behaviour as shown in some researches such as Van Liere and Dunlap (1978). In contrary, some of past researches have shown that attitude was the strongest factor in recycling (waste management) behaviour (Lee & Paik 2011; Mosler *et al*. 2008).

Intention to waste management

The theory assumes that people behave rationally, when they consider the implications of their actions. The TPB hypothesizes that the immediate determinant of behaviour is the individual's intention to perform, or not to perform that behaviour in question. Intentions have been defined as a person's subjective probability that he/she will perform the behaviour in question. Intentions are the immediate factor of behaviour in the TPB; they represent motivational factors that affect behaviour. Generally, the more favourable the attitude and subjective norms, and the greater the perceived control, the stronger should be the person's intention to perform the behaviour in question. Intention is assumed the immediate antecedent of behaviour. It is assumed that stronger intentions indicate a greater willingness to engage in a given behaviour (Ajzen 1991). Many previous studies have revealed that intention is significantly influence the behaviour of waste management (Chan & Bishop 2013).

Perceived Behavioural Control (PBC)

The perceived behavioural control of an individual is a one's perception or his ability to perform a specific behaviour. Taylor and Todd (1995) found that both attitudes and perceived behavioural control have positive relationship to one's intentions. Similarly, Davies and Morgan (2008) found that PBC and attitude are the strong determinants of intention to recycling not subjective norms. Contrarily, the results of Tonglet *et al.* (2004) which indicated that attitude was the strongest determinant of intention to recycle, followed by PBC and subjective norms. As stated in TPB, perceived behavioural control will influence actual behaviour only if the behaviour is not completely under the individual's volitional control.

Environmental knowledge

Environmental knowledge is defined as a general knowledge of facts, concepts, and relationships concerning the natural environment and its major ecosystems. Most people do not know enough about environmental problems or issues to act in an environmentally manner. According to Mostafa (2009) environmental knowledge and altruism are among the factors that influence an individual's PEB.
Many researchers failed to provide significant positive relationship between environmental knowledge and environmental awareness, and actually practicing pro-environmental behaviour. They believed that people aware of and concerned about environmental problems, but yet they do not put it into practice (Ali, Khan & Ahmed 2011; Dunlap *et al.,* 2000).

Subjective Norms (Social Norms)

Social norms refer to "rules and standards that are understood by members of a group, and that guide and/or constrain social behaviour without the force of laws" (Cialdini and Trost, 1998:152). Subjective norms are divided into two; injunctive and descriptive norms. Injunctive norms refer to beliefs of people on what others think might be done. It deals with what is expected to be done by the society without considering whether it is done by majority of people or not. On the other hand, descriptive norms connote what most people do (practice). It describes what may be popular in the social environment, and are based on perceptions of what is done by most members of one's social group (Ajzen, 1988).

Perceived Lack of Facilitating Conditions (PLFC)

This variable PLFC refers to the extent to which the perception of unavailability or lack access to abattoir solid waste facilities and local collections affect individual's participation in managing ASW (Khalil *et al.,* 2017). The finding of Khalil *et al.* (2017) showed that perceived lack of facilitating conditions has significant negative effect on recycling intention.

Reinforcement

Reinforcement includes both reward and punishment. Reward refers to something of value given in return for certain deed or an act. Reward in this context is any monetary, certificate offered or discount of levy to an individual managing ASW. Punishment or penalty is act or process of imposing and/or apply sanction for breaking a law, rule, or contract. It can be monetary fine, imprisonment or both which is assigned for individuals who abstain from managing ASW. Some researches indicated

the influence of reinforcement on waste management for example, Reinforcement has significant relationship with households' recycling intention; penalty influence perceived behavioural control while reward significantly influence attitude (Amini, Ahmada, & Ambali, 2014).

Demographic factors

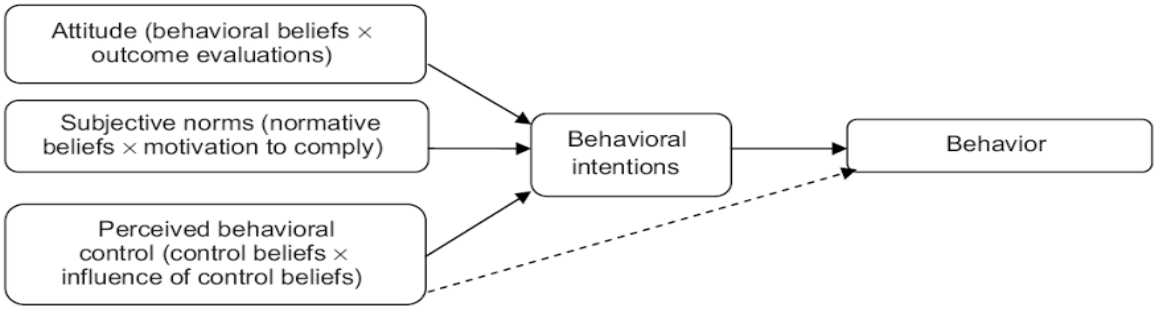
The research conducted by some researchers showed that demographic variables such as gender, age, income, year of experience, work status and student status indicated no statistically significant differences were found. Contrarily, some researches indicated that statistically there is a significant difference between male and female students and revealed that demographic factor is to be one of the most influencing factors in pro-environmental behaviour (Harris *et al.*, 2000; Kollmuss & Agyeman, 2002). The result of Khalil *et al.* (2017) indicated the relationship between recycling intention and income.

Theory of Planned Behaviour (TPB)

Theory of planned behaviour was developed to address the deficiencies of the theory of reasoned action (TRA). It was in 1985 Ajzen expanded a Theory of Reasoned Action (TRA) in his proposed article titled "From Intentions to Actions: A Theory of Planned Behaviour" in order to address the deficiencies of the Theory of Reasoned Action (TRA). One of the limitations raised on TRA was that behaviour is not solely determined by intention, for that; one's control over the behaviour is incomplete. As a result, he added a new variable "perceived behavioural control". Theory of Planned Behaviour is a theory that explains human behaviour. The theory assumes that a number of reasons or variables including attitude, subjective norm, and perceived behavioural control are engaged in the formation of intentions to perform specific behaviour (Heidari *et al.*, 2018). Asare (2015) lamented that combination of these three constructs; Attitude toward the behaviour (At), subjective norm (SN), and perceived behavioural control (PBC) influence behavioural intention of humans within a defined environmental context (Figure 1).

Theory of Planned Behaviour is widely applicable to a variety of behaviours in different contexts, including different areas such as Parents' intentions to allow youth football (Murphy, Askew, & Sumner, 2017); recycling household waste (Khalil *et al.*, 2017); health care waste segregation behaviour among health workers (Akulume & Kiwanuka, 2016); Youth and sustainable waste management (Heidari *et al.*, 2018); Predicting household food waste reduction (Graham-Rowe, Jessop & Sparks, 2015). Furthermore, pollution reduction preferences (Cordano & Frieze, 2000); reduced use of environmentally friendly modes of transportation caused by perceived mobility necessities (Haustein & Hunecke, 2007), just mentioned few. One of the strengths of this theory is that it gives room for including new construct (variable) provided it is theoretically justified and contain significant variables in behavioural intention (Ajzen, 1991).

There are limited researches used TPB in Nigeria such as Khalil *et al.*, (2017); Raimi, Adelopo and Yusuf (2019). This research is among the first researches that will utilize TPB to investigate abattoir carcass processors' perception and attitude about solid waste management in Nigeria. Moreover, the research will test one variable (perceived lack of facilitating conditions (lack of facilities and local collection) used by Khalil et al., (2017) in their expanded TPB. Additionally, this research will also add or introduce reinforcement as variables to determine if it influences intention in ASWM. Demographic variables play the role of a mediator between the dependent variable (Abattoir carcass processors' perception and attitude of ASWM) and the independent variables (Distance, Environmental knowledge, Reinforcement, Subjective Norms, Perceived behavioural control and Perceived lack of facilities).



Source: Ajzen (1991)
Figure 1. Conceptual Framework of Theory of planned behaviour

METHODS

Similarly, questionnaire in form of Likert Scale was administered to meat processors. All items were measured on five-point Likert-scale descriptors ranging from strongly disagree to strongly agree. The instrument used underwent reliability and validity tests based on pilot-study using 50 abattoir meat processors in Kano State.

For the analysis, Pearson Product Moment Correlation was adopted to find out the relationship between dependent variable (intention of meat processors to manage ASW) and independent variables or predictors (environmental knowledge, reinforcement, perceived lack of facilitating condition [PLFC], perceived behavioural control [PBC], attitude and social norms). However, Logit model used to analyse the effect of education, income, control, social norms, experience and location on meat processor's intension to manage ASW. SPSS software Version 22 would be used to carry out the analysis of the model.

Diagrammatical Representation of the Model

Table 1. Regression Model Expectation

S/N	Relationship	Independent Variables	The degree of relationship (R^2) between IVs and DV	P-Value
1	Intention to manage ASW	→	Environmental knowledge	
2	Intention to manage ASW	→	Reinforcement	
3	Intention to manage ASW	←	PLFC	
4	Intention to manage ASW	→	PBC	
5	Intention to manage ASW	→	Attitude	
6	Intention to manage ASW	→	Social Norms	

The above table is the expected result to be gotten from the above relationship between independent and dependent variables.

The Binary Logit model is generally specifying as:
$Yi = \beta' Xi * \mu i$ (1)
Where:
Yi = Dependent variable
Xi = Independent variables
μi = error margin
Furthermore, Mathematical expression of the model is express as:
Y= f (Educ, Income, Exp, Control, Facil, Loc) (2)
The empirical form of the use is re-specified as:
$Y= \beta_0 + \beta_1 Educ + \beta_2 Income + \beta_3 Exp + \beta_4 Control + \beta_5 Facil + \beta_6 Loc. + \mu i$ (3)

Justification of the model:

β_0 = this is constant variable which shows variation that might occur not from other independent variables.

$B_1 - \beta_6$ = the coefficient of the independent variables.

Educ. = this refers to education level of the abattoir meat processor which is a continuous variable measured in years spent in acquiring the qualification

Income = refers to the amount of money earn per month which is also a continuous variable and measured in naira (′000).

Exp. = this refers to environmental knowledge acquired due to the years of experience in the business. It is multiple categorical variables measured as 1 = lower experience, 2 = moderate experience and 3 = high experience.

Contr = it refers to space, time and facilities available for ASWM. This is categorical variable which is measured in binary form; 1 = have control of ASW, 0 = Otherwise.

Fac. = it represents the availability of materials used in the ASWM. It is a categorical variable measured as 1 = Available and 0 = Otherwise.

Loc. = this refers distance between working or processing place and dumping site for ASW which is scale variable measured in meter.

RESULTS AND DISCUSSION

Correlation between Dependent Variable and Independent Variables

Table 2 shows that there is positive and significant correlation between dependent variable (meat processor's intention to manage ASW) and independent variables (education, income, experience, social norm, control, facilities, and location) at 1% and 5% level of significance. Though, the result revealed that no relationship between education and income; education and facilities; education and location; income and facilities; income and location; income and intention; facilities and intention; and location and intention. This finding negates the previous results which indicated that the intention towards recycling tend to be low when there are no recycling facilities and/or local collections as slated by Chen and Tung (2014), Khalil *et al.* (2017), Knussen and Yule (2008) and Wan *et al.* (2014).

Furthermore, the research revealed that the following relationship is positive and significant; though it is weakly correlated. The correlations are: between education and experience (years spent in the business) ($r = .103$, $p < .05$); education and social norm (influence of importance people around) ($r = .106$, $p < .05$); education and control (space, time & convenience) ($r = .237$, $p < .01$); education and intention ($r = .160$, $p < .01$); income and experience ($r = .125$, $p < .05$); income and social norm ($r = .130$, $p < .05$); income and control ($r = .192$, $p < .01$); experience and location ($r = .192$, $p < .01$); experience and intention ($r = .160$, $p < .01$). This validates the result of research conducted in Kano by Khalil *et al.* (2017), Wang *et al.* (2016) in China which reported that respondents' level of awareness (experience) determines their level of recycling intention. In contrary, some researchers believed that most people have environmental knowledge (experience), but yet they do not have intention to put it into practice (Ali, Khan & Ahmed 2011; Dunlap & Mertig, 1995; Dunlap *et al.*, 2000; Kaplan, 2000).

Similarly, there is positive correlation between intention and social norm (($r = .146$, $p < .01$)), though it is weak correlation. It is reported from Khalil *et al.* (2017); Ramayah *et al.* (2012) that attitude and social norms were significant predictors of recycling behaviour in Nigeria and Malaysia respectively. Additionally, Huffman *et al.* (2014) stated that when individuals perceived a strong social influence by the significant people around them to manage solid waste, they would have intention to recycle. Also, there is positive and significant relationship between control and facilities ($r = .147$, $p < .01$).

Table 2. Correlation Matrix of the Independent variables and the Dependent variable

Variables	Educ.	Incm	Exp.	Soc. Norm	Contr	Fac.	Loc.	Int
Educ.	-							
Incm	**0.095**							
Exp.	.103*	**.125***						
Soc. Norm	.106*	.130*	**.668****					

Contr	.237**	.192**	.586**	**.733****				
Fac.	-0.084	0.059	.399**	.347**	**.147****			
Loc.	-0.061	0	.498**	.690**	.369**	**.477****		
Int	.160**	0.086	.160**	.146**	.323**	-0.076	**-0.058**	-

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed)
Note: Int: Intention; Incm: Income; Fac.: Facilities; Contr.: Control; Loc.: Location; Exp.: Experience; Educ.: Education

Additionally, the research discovered that the following relationship is moderated: experience (years spent in the business) and facilities (r = .399, p< .01); social norm (influence of importance people around) and facilities (r = .347, p< .01); control (space, time & convenience) and location (r = .369, p< .01). Furthermore, control (space, time & convenience) and intention (r = .323, p< .01) is moderately correlated. So, the finding of this research coincides with results of Davies and Morgan (2008) and Tonglet *et al.* (2004) which indicate positive but strong significant relationship between perceive behavioural control and intention to recycle solid waste. And also, facilities and location (r = .477, p< .01) is moderately correlated.

Similarly, the correlations which have higher effect are: experience (years spent in the business) and social norm (influence of importance people around) (r = .668, p< .01); experience and control (space, time & convenience) (r = .586, p< .01); social norms and control (r = .733, p< .01); social norm and location (r = .690, p< .01).

Table 3. Frequency of Willingness to manage ASW

Intention to manage ASW by meat processors	Frequency	Percentage (%)
Unwilling to clean (manage ASW)	12	3.1
Willing to clean (manage ASW)	376	96.9
Total	**388**	**100.0**

Source: Questionnaire, 2020

Based on the result presented in Table 3, majority of the respondents are willing to manage abattoir solid waste which represent 96.9% while those are not willing to manage the ASW constitutes only 3.1%. As identified by the respondents, some of the reasons given for the willingness to manage the ASW include the following: majority of the respondents have secondary qualification that means that they spent 12 years in acquiring formal education. This helps them to be able to read and write most of environmental issues. Similarly, they have experience about the butchering business and the abattoir environment together with consequences of poor ASWM; since most of them spent more than five years in the business. This assists them in understanding issues related ASWM. Additionally, majority of the respondents stated that there is adequate space for the respondents to manage ASW. Equally, customer attractiveness; that is, customer buy meat in a cleaner environment. Therefore, most of the meat processors clean their environment for attracting customer. In the same way, some clean their environment for prevention of pollution especially air pollution. In addition, environmental conservation is among the reason for cleaning environment. That is, for financial motive where paunch, pieces of bones, fat and meat are used for manure.

Logistic Regression Analysis

Table 4. Binomial Regression Model

Independent Variables	Coefficient	Std. Error	P-Value	Exp(B)
Educ	.925	.460	.045	2.522
Incm	.042	.569	.942	1.043
Soc. Norm	-3.197	1.179	.007	.041
Exp.	5.557	1.984	.005	259.069
Lack of Fac.	-1.704	.799	.033	.182

Contr	1.802	.611	.003	6.059
Loc.	3.194	1.556	.040	24.388
Constant	-12.537	7.189	.081	.000

a. Variable(s) entered on step 1: Educ, incm, Soc. Norm, Exp., Lack of Fac., Contr, Loc.
Note: Int: Intention; Incm: Income; Lack Fac.: Lack of facilities; Contr.: Control; Loc.: Location; Exp.: Experience; Educ.: Education; Soc. Norm: Social Norms

The result of this study revealed that years spent for acquiring formal education has positive and significant relationship with intention to manage ASW (Table 4). The higher the education level one has, the higher will be the likelihood of that person to manage ASW. As an individual receive formal education, he may tend to realize the need for ASWM better. The odd ratio indicated that, one-year increase in the level of education, the meat processor would be 2.5 times more likely to manage the ASW.

Moreover, the result of the logistic regression model further explains that, the income level of the meat processor is a positive; though insignificant factor to determine the respondent's intention to manage ASW. On the other hand, social norm (influence of importance people around) is negative and significant at 1% level of significance. This explains that, people who have esteem to meat processor are less likely to concern about the environment and sanitation. An increase in the number of influential people will influence the meat processors to be 0.041 times less likely to clean their environment or manage the ASW.

The coefficient of experience (years spent in the business) variable is significant at 1% level of significance (Table 4). This shows that years spent in the business together with understanding of the environment (abattoir) and consequences of poor ASWM will positively influence meat processor to manage ASW. As it was stated by some traditional head of butchers (Sarakunan Pawa) that, some meat processors died due to some diseases which to them were related to poor ASWM. These diseases include cholera, tetanus, etc. The add ratio shows that an additional one-year of experience of the meat processor in the business, would increase the probability of meat processor's intention to manage ASW by 259.069.

Furthermore, the coefficient of location of ASW dumping site variable is significant at 5% level of significance (Table 4). The result indicates that as the distance from meat processing place to ASW dumping site increases the likelihood of the respondents' intention to manage ASW increase. This is because, respondent close to dumping site do not worry about ASWM. They dispose it not in an appropriate place, since they pull the ASW without holding. But those are far from dumping site have to pay for waste management services. The result further explains that a one metre increase in distance to dumping site, the likelihood of individual's intention to manage ASW or pay for improved waste management services increases by 24.388 times more likely.

Additionally, the control (space, time & convenience) one has on ASW generated by him shows positive relationship with meat processor's intention to manage ASW (Table 4). This indicates that the more control one has, the higher will be the probability of meat processor's intention to manage the ASW. The odd ratio revealed that as one has control (space, time & convenience) of the ASW he more likely to increase his intention to clean or manage ASW is 6.059 times.

The coefficient of lack of facilities variable is negative and significant at 5% level of significance (Table 4). This result revealed that the more facilities are lacking for ASWM, the less the meat processor's intention would likely have to manage ASW. That is the higher the facilities, the higher would be intention and vice-versa. The odd ratio indicated that, as facilities increase by 1 unit, the probability of the meat processor's intention to reduce by 0.182.

CONCLUSION

The finding discovered that there is positive and significant correlation between dependent variable (meat processor's intention to manage ASW) and independent variables (education, income, experience, social norm, control, facilities, and location) at 1% and 5% level of significance. Moreover, there is no relationship between income and intention; facilities and intention; as well as location and intention.

The findings show that meat processors' intention to manage ASW is influenced by education, experience, social norm and control positively. Therefore, Kano state government should come up with awareness campaign to enlighten people about the benefit of managing ASW to oneself and to the environment. This will help to strengthen people that already have a positive intention as well as encourage others with a less positive intention toward ASWM. Some of the issues that should be highlighted in the ASWM awareness campaign should include the health and environmental consequences of a poor intention of meat processors towards waste handling.

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Conflict of interests

No conflict of interests

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