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INTEGRATING EXTENDED THEORY OF PLANNED BEHAVIOR AND NORM ACTIVATION MODEL TO EXAMINE THE FACTORS AFFECT MANAGERS INTENTION TO RECYCLE HOSPITAL WASTE

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Abstract:

Environmental pollution is a serious global issue that has received increasing attention from scholars, policymakers, regulators, environmental activists, and the public. The healthcare industry does not run away from contributing problems to the environment. Therefore, managers are seen as important people in overcoming this problem. The purpose of this study to investigate managers intention to recycle hospital waste in their organization. This study integrates the theory pf planned behaviour and Norm activation model to conceptualize the factors of managers intention to recycle hospital waste. Standardized structured questionnaires are distributed through email where the targeted respondent must be ranked manager position and above with medical background. A total of 181 respondents usable were collected and data analyse by partial least square structural equation model (PLS-SEM). This study revealed that managers intention is significantly affect by the attitudes towards recycling intention, ascription responsibility and personal norm. However, the finding on the factor awareness of consequences and subjective norms are not supported in affecting the intention to recycle hospital. A total 6 hypotheses was tested and four hypotheses were accepted and two hypotheses rejected. The findings of this study provide important theoretical and practical implications for scholars, managers, and policymakers.

Introduction

Rapid industrialization in developing countries has leads detrimental effect on the natural environment, such as environmental pollution and contamination, and sharp depletion of natural resources. Contaminated hospital waste is composed of various types of hazardous waste that are generated because of health care activities (Adu et al., 2020; Kalińska, 2016). Many hospitals produce waste that is similar to domestic waste, which makes it increasingly imperative that hospitals find a way and devise initiatives to manage their wastes sustainably (Baaki et al., 2018). Mismanagement of these wastes does not only result in a harmful effect on the health of the workers but also on the climate (Ali et al., 2017). Most importantly, accumulated hospital waste is often an indicator of poor waste management, which is reflected in the increasing trend in the amount of waste generated (Kwikiriza et al., 2019). Therefore, the responsible parties play a critical role in ensuring a successful implementation of hospital waste recycling. This study will help decision-makers in assessing the capability of managers to implement effective hospital waste recycling at their workplace. Hospital waste management is a significant concern for health-care organisations because inappropriate hospital waste can have substantial health consequences for hospital workers and the surrounding community (Melanen, 2014). According to Ghasemi & Yusuff, (2016) disposal of hospital waste through incineration method produces acid gases in air emissions, heavy metals in ash residues, conversion of biological issues into possible air quality emission concerns and is a major source of dioxin and furan emissions. Recycling is viewed as the best solution to reduce for reducing hospital waste (Budiarani et al., 2021). However, research on hospital waste is still limited, as most researchers studying hospital waste management have focused on practices, assessment, hospital waste generation, and environmental impact (Adu et al., 2020; Musa, Mohamed, & Selim, 2020; Susi, Enri, & Chaerul, 2020; Tfaily & Moussa, 2020; Ugwu et al., 2019; Yi & Nataraajan, 2018). He recommended recycling hospital waste can prevent from environment pollution from waste generated by hospital. It has been observed that the literature ignores some factors that could contribute to improving hospital waste reduction activities, such as recycling behaviour and other factors. Therefore, there is an urgent need to understand the factors influencing hospital waste recycling in order to leverage its implementation in hospitals.

Literature Review

Hospital waste is defined as any waste generated from medical activities such as immunization, treatment, and diagnosis on humans and animals, as well as the testing of a biological specimen, including those for scientific purposes (Ansari et al., 2019). According to WHO (2021), Health-care waste contains potentially harmful microorganisms that can infect hospital patients, health workers and the general public. The hospital waste primarily comprises wound dressings and swabs, infusion and irrigation equipment, catheters, blades, syringes, and needles. In addition, the waste also includes tissue and postmortem waste, waste from clinical laboratories, sanitary waste that includes incontinence pads and nappies, and waste from pharmaceutical activities (Blenkharn, 2015).

It every important to consider the future implementation of an effective treatment for hospital waste generated by the healthcare industry. A study by Baaki et al. (2018) suggested that there are challenges in finding the middle ground between ensuring the safety of patients and staff and establishing sustainable waste management protocols that include proper waste documentation and segregation, which can be achieved via various approaches such as minimization, recycling, and other sustainable treatments and disposal initiatives. Table 1 shows alternative treatment methods as suggested in previous research regarding the disposal of hospital waste. Based on the table, minimizing and recycling of hospital waste have been proposed in all previous research as the most feasible method in managing hospital waste as compared with other methods such as incineration, SFE, reusable container, autoclaving, and microwave treatment.

Table 1 Alternative Treatment Method

Alternative Treatment Methods	Sources						Total
Waste minimizing and recycling	3	4	5	6	7	8	6
Incineration process		4					4
SF CO2 Sterilization				3			3
Reusable Container	1						1
Stim Autoclaving	1						1
Microwave	1						1

Note: 1. (Wei et al., 2017),2. (Ghasemi & Yusuff, 2016),3. (Razali et al., 2010), 4. (Marinković, Vitale, Afrić, & Janev Holcer, 2005),5. (Blenkharn, 2007),6.(Razali et al., 2020) 7. (Chul Jang, Lee, Yoon, & Kim, 2006) and 8. (Lee et al., 2002).

Theories Justification

In the recycling context, many theories have been proposed by scholars, each with its own set of justifications. Many researchers have used TPB as a foundational model to examine recycling intention and further extended the TPB (Arli et al., 2020; Dunn et al., 2018; Guerin & Toland, 2020; Hossain Parash et al., 2020; Jain et al., 2020; Sulaiman et al., 2019). Currently, there are only two research conducted on the behaviour concerning recycling Intention using TPB and NAM Fang et al., (2019); Hussain et al., (2018) and Ofstad et al., (2017) has been applied in a range of studies on environmentally friendly behaviour, including those related to waste reduction (Hu et al., 2019). Schwartz (1977) developed NAM in the context of altruistic behaviour to examine individuals' eco-friendly behavioural intention (Doran & Larsen, 2016). The findings demonstrated that the integrated model is suitable for studying the recycling intention to recycle waste. Many scholars have combined the TPB and TAM in various studies across diverse fields, such as multimedia (Weng et al., 2018) technology (Gao & Ye, 2021) and online services (Renny et al., 2013) . Many scholars have also applied the NAM to test environmental behaviour in various areas such as psychology, cost reduction, agriculture, household, and others. Inadequate studies in this area present an opportunity for the researcher to integrate these two theories.

Hypothesis Development

Awareness of Consequence and Personal Norms
Awareness of consequence refers to an individual's beliefs concerning the acquisition of knowledge about their actions and the impact on the environment (Groot & Steg, 2009). Furthermore, the awareness and personal norms regarding the consequences have a positive influence on the willingness to mitigate environmental pollution. In addition, Schultz et al., (1995) demonstrated that individuals who are aware of the consequences of their actions are more likely to feel morally responsible and engage in environmentally friendly consumption behaviours. This hypothesis implies that those who have a higher level of awareness about the consequences of recycling are more likely to integrate recycling as a personal norm in their everyday lives. Based on these considerations, the present study formulates the following hypothesis:
Hypothesis 1 (H1). A positive relationship exists between awareness of consequences and personal norms.

Ascription of Responsibility and Personal Norm
The ascription of responsibility refers to the belief that an individual's actions can either prevent or contribute to potentially undesirable consequences (Moller et al., 2018). It can be described as one's responsibility to minimize negative environmental impacts (Verma & Chandra, 2018). Moreover, when individuals hold enduring beliefs and values related to environmental preservation, these pro-environmental sentiments give rise to personal norms (Davari & Strutton, 2014). Therefore, ascription of responsibility can serve as a powerful motivator in shaping personal norms. As the Ascription of responsibility for recycling hospital waste decreases among healthcare professionals, personal norms related to recycling will weaken (Johnson et al., 2000). Research by Landon et al., (2017) also agreed that the ascription of responsibility is positively related to personal norms. This hypothesis suggests that the degree of personal responsibility plays a significant role in shaping personal norms for recycling intention behaviours. It implies that those who feel a heightened sense of responsibility for their environmental impact are more inclined to integrate such behaviours into their personal norms and daily routines. Individuals working in healthcare settings who perceive a higher level of responsibility for recycling medical waste ascription of responsibility will have stronger personal norms related to recycling (Thiounn & Smith, 2020). Based on these considerations, this study formulated the following hypothesis:

Hypothesis 2 (H2). A positive relationship exists between the ascription of responsibility and personal norms.

Attitude to Recycle and Personal Norms
This study articulated a relationship between attitude and personal norms. Attitude refers to one's positive or negative evaluation of recycling, while personal norms relate to the sense of moral obligation or responsibility to recycle (Park & Ha, 2014). The finding shows that the results supported the hypothesis that personal norms and attitudes influence the intention to recycle. This relationship has been widely used to measure sustainable and environmental behaviour (Chen, 2020; Wang et al., 2018). An individual's attitude toward recycling can significantly influence the development and adherence to their personal norms (Babaei et al., 2015). Furthermore, a positive attitude toward recycling reinforces behavioural intentions and individuals with favourable attitudes are more motivated to engage in recycling activities and

are likely to form strong intentions to do so (Ee & Ze, 2018). These intentions, in turn, contribute to the establishment of personal norms. When personal attitudes and behavioural intentions are consistent with recycling, it reinforces the development of robust personal norms that prioritize recycling. This hypothesis proposes that individuals who hold favourable attitudes toward recycling are more inclined to establish personal norms that prioritize recycling. It aligns with the theory of planned behaviour (Ajzen, 1991) and the norm-activation model (Hopper & Nielsen, 1991) which both suggest that positive attitudes play a significant role in influencing pro-environmental behaviours, such as recycling. Based on these considerations, this study formulated the following hypothesis:

Hypothesis 3 (H3). A positive relationship exists between attitude to recycle and personal norms.

Personal Norms and Intentions to Recycle Hospital Waste.
Personal norms refer to individual norms that pertain to the sense of personal responsibility toward engaging in specific behaviours (Schwartz, 1970). Thøgersen, (2006) proposed a categorization of norms, where personal norms represent an individual's perception of the moral correctness or incorrectness of actions, evoking feelings of pride when adhering to them and guilt or shame when deviating from them. These intrinsic values serve as a basis for evaluating the rightness or wrongness of certain behaviours (Bamberg et al., 2007). Previous studies have operationalized personal norms using constructs such as ethical beliefs, personal norms, and moral obligations (Groot & Steg, 2009). It is important to note that intentions and personal norms are distinct constructs (Schwartz, 1977; Stern et al., 1999). Previous scholars found significant within personal norms and intention to participate in recycling program (Nigbur et al., 2010). Others scholar also got same result in their researcher such as intention to choose eco-friendly travel options (Doran & Larsen, 2016) intention to adopt green sustainability intention. Esfahani et al., (2017); and intention to build eco-friendly house. Therefore, the following hypothesis was formulated:

Hypothesis 4 (H4). A positive relationship exists between personal norms and intentions to recycle hospital waste.

Attitudes and Intentions to Recycle Hospital Waste
The relationship between attitude and intention is essential in examining managers' intentions toward hospital waste recycling. Psychology research Bromley, (1995) found that attitude comprises three components: affect, cognition, and conduct, subject to people's preferences, knowledge of the attitudinal object, and reactions and intentions toward the object. In the recycling context, attitude is the primary predictor in determining recycling intention, according to a study on the role of social media on recycling behaviour (Sujata et al., 2019). Aboelmaged, (2021) affirmed that attitude should be the first target when developing an e-Other studies have shown that the relationship between a consumer's attitude toward using a particular product and their behavioural intention is statistically significant (Eshaghi Klour & OoshakSaraie, 2016). The significance of the recycling attitude has been demonstrated in many studies (Khan et al., 2019; Pivetti et al., 2020; Razali et al., 2020; Strydom, 2018). However, the significance of attitude in the recycling of industrial waste in terms of the use of recyclable express packaging was also demonstrated (Wang et al., 2021), as well as in e-waste Echegaray and Hansstein (2017), and construction and demolition waste recycling (Jain et al., 2020). Due to this, the reasons for recycling hospital waste are likely to be associated with a positive

attitude and intention toward recycling. Based on these considerations, this study formulated the following hypothesis:

Hypothesis 5 (H5): A positive relationship exists between attitudes and intentions to recycle hospital waste.

Subjective Norms and Intentions to Recycle Hospital Waste

Subjective norms refer to the perceived social pressure to engage or disengage in a specific action, often described as the influence of subjective rules (Bosnjak et al., 2020). It encompasses the collective set of normative beliefs about the perceptions of influential referents (Hage, 2012). The concept of subjective norms reflects an individual's perception of the social pressure surrounding the performance or non-performance of a particular behaviour (Ajzen, 1991). It is influenced by the views, opinions, emotions, and judgments of reference groups or systems such as family, peers, friends, and the community (Baber, 2019). Venkatesh and Davis (2000) highlighted the importance of individuals' willingness to meet the expectations of reference groups in predicting their intention to adopt a new system.

Due to the inconsistent relationship between subjective norms and intentions found in various research studies, the researcher must consider alternative variables and measurements to obtain consistent findings (Alam et al., 2019.Therefore, social norms refer to the perception of other people's opinions on how the individual should behave. Based on these considerations, this study formulated the following hypothesis:

Hypothesis 6 (H6): A positive relationship exists between subjective norms and intentions to recycle hospital waste.

By exploring the factors that affecting the recycling intentions, the findings of this study hold significant academic value and contribute to the advancement of knowledge in this field. In this study, a comprehensive analysis was conducted, identifying a total of 6 constructs, and providing detailed explanations of their relationships in subsequent subsections. To visually represent the research framework, Figure 2 was developed.
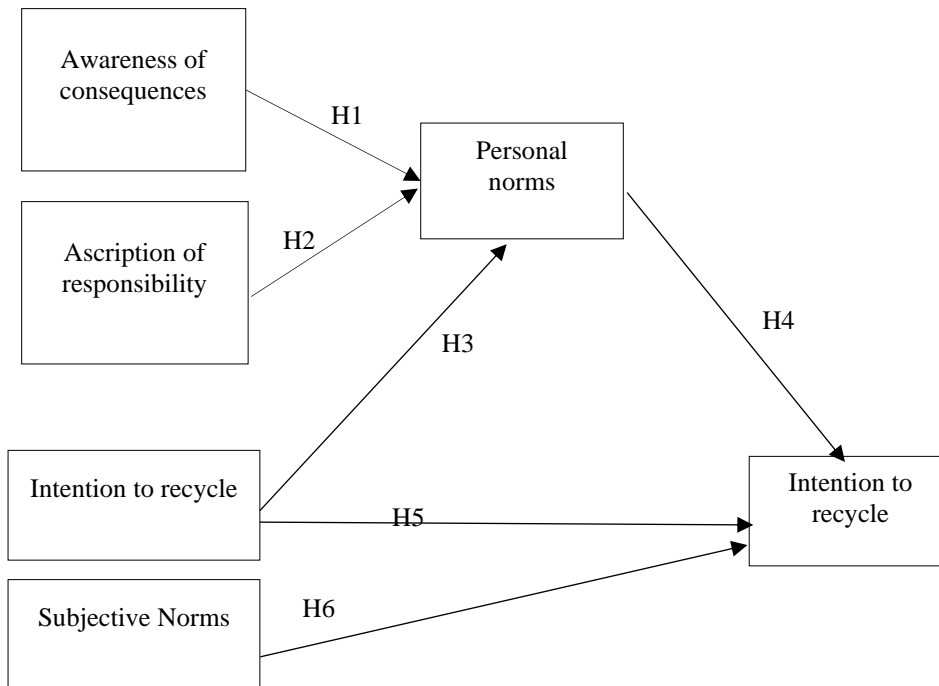
Figure 2 Research Framework

Research Method

Quantitative Method
This study begins by employing a quantitative approach utilizing a questionnaire to investigate the proposed research hypotheses. A cross-sectional design was selected for its ability to ensure sample representativeness and minimize response bias among respondents (Malhotra, 2012). The survey method, employing a structured questionnaire, was employed to gather specific information from a sample of the population (Malhotra, 2012). This approach has been widely used by researchers to collect data for quantitative analysis in behavioral studies.

Population and Sample Size
The population is a set that considers a comprehensive group of individuals, certain events, or interests that need further examination based on a particular problem (Sekaran, 2003). Malaysia has a total of 183 government hospitals and 146 private hospitals. A sample size is enough individuals in the population for data to be gathered and results to be presented by the entire population (Shalabh, 2014). The sample size is determined based on several factors, including the study's objective, confidence interval, time and cost limitations, and population size (Bryman & Bell, 2015; Sekaran, 2003). There are several ways to calculate sample size, but according to Sekaran & Bougie, (2016), a sample size of more than 30 and less than 500 is reasonable for most research. In this study, with ten predictors, the sample size used for this study was 160, calculated using G*Power.

Unit of Analysis
unit of analysis of this study is organization. The managers are medical personnel from various positions, such doctor, nurse managers, unit managers, and pharmacists, and those who are

involved in the hospital's daily operations. The manager is a person who manages the working level group and works closely with the process flow in detail and comprehensive. Managers responsible for that task with 3 years of working experience were selected as the target population due to their expertise and practical knowledge relevant to the study's focus. Their extensive experience ensures a valuable perspective that can contribute to a more informed and insightful analysis of the research problem.

Instrument Development
A questionnaire was developed and divided into four parts. Section A consisted of the company information/profile. Sections B and C explained the construct and the dependent variables. 21 questions were developed and adapted from previous literature in Table 3.

Section A: Demographic Profile
Section A contained demographic questions about the company profile, such as the type of hospital, certification, number of beds, country, state, and years of organization inception. This information is essential for descriptive analysis. Other questions regarding the respondent's background, such as gender, age, education background, position, and years of experience, were also included. This question aimed to identify the data input's reliability in this study.

Section B: Variables
Section B of the instrument was constructed with questions to measure the information of six independent constructs: Attitude to Recycling (ATR), Subjective Norms (SN), Perceived behavioural Control (PBC), All questions in section B were constructed based on the five-point Likert scale, with ratings ranging from one to seven, with one being strongly disagreed and seven being strongly agreed.

Section C: Dependent Variable
Section C of the instrument was constructed with questions to measure the information of dependent constructs in determining the intention to recycle. Questions in Section C were constructed based on the five-point Likert scale, with ratings ranging from one to seven, with one being strongly disagreed and seven being strongly agreed.

Table 2 Instrument Development

Name of Variables	Number of items	Sources	Scale
1. Attitude to recycle	Six items	Benda & Attili (2017) (Shen, Si, Yu, & Si, 2019) (Halder & Singh, 2018)	5-point Likert Scale
2. Subjective Norms (SN)	Six items	(Shen et al., 2019)	5-point Likert Scale
3. Awareness of Consequences	Four items	(Han et al., 2016) (Irfan, Zhao, Rehman, Ozturk, & Li, 2021) (Fang et al., 2021)	5-point Likert Scale
4. Ascription of Responsibility	Four items	(Fang et al., 2021) (Dalvi Esfahani et al., 2017b)	5-point Likert Scale

5. Intention to Recycle (IR)	Five items	Weng et al. (2018) (Halder & Singh, 2018) (Shen et al., 2019)	5-point Likert Scale
6. Personal Norms	Four items	(Joanes, 2019)	5-point Likert Scale
7. Intention to Recycle (IR)	Four items	Weng et al. (2018) (Halder & Singh, 2018) (Shen et al., 2019)	5-point Likert Scale
Total number of items	32 items		

Assessment Of Measurement Model

The software, SmartPLS4.0 is used to perform the data nalysis. Hair et.al (2019) suggested several criteria to assess the constructs validity and reliability of the measurement model. Specifically, Convergent Validity refers to the extent to which individual indicators reflect the constructs in comparison to indicators measuring other constructs (Schwarz & Black, 2014). To access Convergent Validity, the Average Variance Extracted (AVE) is measured. The value of AVE should be higher than 0.5, which explains at least 50 per cent of the assigned indicators 'variance (Hair et al., 2021). The results shown in table constructs recorded AVE values higher than 0.5 for each group of data. The lowest AVE value reported is for Ascription Consequences (0.744), Ascription Responsibility (0.824), Attitude to Recycle 0.766, Intention to Recycle (0.796), Personal Norms (0.749) and Subjective Norm (0.799) Aside, the discriminant validity in the study is presented in Table 2. Using the PLS Algorithm, as seen in Table 4.6, none of the respective constructs violates HTMT. The acceptable levels of discriminant validity (< 0.90) is as suggested by Henseler et al. (2015). This result concludes that construct validity is established in the measurement model, as seen in Table 3 shows none of the upper bound of the 95% confidence interval of HTMT is higher than 0.9. The findings also showed a satisfactory heterotrait-monotrait (HTMT) criterion. Finally, variance inflation factor (VIF) is assessed for lateral collinearity issued. Table 3 showed none of the inner VIF was lover than 5, hence it was concluded that all the construct in this study had no lateral collinearity issue (Hai et al,2017).

Table 3		**Convergent Validity**		
Constructs		**Indicator Reliability**	**Convergent Validity**	**Internal Consistency Reliability**
	Items	**Outer Loadings**	**AVE**	**Composite Reliability**
		>0.700	>0.500	>0.700
Ascription Consequences	AC1	0.748	0.819	0.921
	AC2	0.883		
	AC3	0.926		
	AC4	0.884		
Ascription Responsibility	AR1	0.866	0.744	0.932
	AR2	0.946		
	AR3	0.901		

Attitude to Recycle	ATR1	0.81	0.765	0.942
	ATR2	0.893		
	ATR3	0.907		
	ATR4	0.86		
	ATR5	0.899		
Intention to Recycle	IR1	0.838	0.778	0.933
	IR2	0.928		
	IR3	0.878		
	IR4	0.882		
Personal Norms	PN1	0.863	0.920	0.922
	PN2	0.813		
	PN3	0.914		
	PN4	0.863		
Subjective Norms	SN1	0.838	0.746	0.913
	SN2	0.919		
	SN3	0.886		
	SN4	0.892		
	PBC4	0.911		

Table 2 Discriminant Validity: HTMT

	AC	AR	ATR	IR	PN
AC					
AR	0.029				
ATR	0.097	0.670			
IR	0.057	0.719	0.863		
PN	0.126	0.701	0.841	0.889	
SN	0.049	0.621	0.582	0.655	0.616

Path coefficient analysis provides insight into the inter-relationship of various factors on intention of managers to recycle hospital waste. In the investigation using path coefficient analysis as presented in Table 4, eight hypotheses that examine the direct relationship that affects managers' intentions to recycle hospital waste were evaluated. Of these, six hypotheses showed significant support, evidenced by t-values above 1.65, confirming their validity. However, hypotheses H1(AC -> PN) and H6(SN -> IR) with its p value less than 1.65, indicating that this relationship is not supported by the data.

Table 4 Result of Hypotheses Testing

H	Path	Std Beta (ß)	Std error	t Values	P values	Bias	Confidence interval		Decisions
							5%	95%	
H1	AC -> PN	0.047	0.040	1.187	0.235	-0.001	-0.027	0.125	**Not Supported**

H2	AR -> PN	0.252	0.070	3.618	0.000	-0.000	0.124	0.396	Supported
H3	ATR-> PN	0.232	0.114	2.182	0.029	-0.016	0.021	0.450	Supported
H4	ATR -> IR	0.669	0.074	9.060	0.000	0.001	0.513	0.802	Supported
H5	PN -> IR	0.409	0.162	2.411	0.016	0.019	0.136	0.756	Supported
H6	SN -> IR	0.036	0.058	0.565	0.572	0.003	0.033	0.285	**Not Supported**

Note ***$p < 0.010$, **$p<0.05$,*$p<0.1$
Nine hypotheses are accepted based on their p-value

Assessment of Structural Model

Table 5 tabulate the R²value, coefficient of determination for each construct. The construct manager's recycling intention had R²value of 0.99, which indicated that exogenous contracts can explain 45.20% of the recycling intention. Furthermore. The R² value for personal norm was 0.88, which indicated the personal norm on the intention can explain 88%.
Table 3 R²value (coefficient of determination).

Table 5 R²value

	R Square	R Square Adjusted
ITR	0.992	0.992
PN	0.888	0.886

Path Coefficient Assessment

Suggested, 5000 resamples of bootstrap analysis for the assessment of coefficient and corresponding t-values. Investigation regarding path-coefficient analysis (Table 6) showed that number of Ascription of Responsibility had the highest positive direct effect in Personal Norms (0.761) following by Subjective Norms 0.575, Attitude to Recycle, Awareness Consequences 0.12, and Personal Norms 0.056.

Table 6 Path Coefficient

	ITR	PN
AC		0.12
AR		0.761
ATR	0.028	0.179
ITR		
PN	0.056	
SN	0.575	

Discussion And Conclusion

Based on a comprehensive analysis finding, ascription of responsibility was observed as an important factor influencing personal norms related to recycling behavior. This factor makes individuals more likely to be involved in recycling when they consider it their responsibility. This sense of responsibility can be shaped by various factors, including environmental awareness, institutional policies, and social influences. The finding that attitudes to recycle affects personal norms offers significant insight into the cognitive and behavioral interactions

surrounding recycling intention. According to (Groot et al., 2021) when individuals have a positive attitude towards recycling, it suggests that they are aware of its importance and value, which in turn can shape their internal norms or beliefs about the necessity and appropriateness of recycling. The finding that personal norms influence intentions to recycle hospital waste highlights the important role of individual beliefs and values in driving sustainable behavior. When these norms are strong, individuals are more likely to feel personally motivated to engage in recycling, even in complex environments such as hospitals. Moreover, attitude towards intention significantly predicts managers' recycling intention. When managers acknowledge that recycling hospital waste generates recycled material, which benefits the healthcare industry, they tend to develop a favourable attitude towards recycling. In addition, managers believe that recycling can reduce the amount of waste, lower disposal costs, and have an overall positive impact on the environment. These results support previous findings that hotel managers are highly willing to recycle food waste to generate bioenergy (Mensah & Ampofo, 2020). However, the finding on the factor subjective norms and intention to recycle are not supported in affecting the intention to recycle hospital waste holds significant implications for healthcare waste management practiced. The finding that awareness of consequences does not affect the personal norms among managers shows significant results in the field of waste management in the healthcare industry. Primarily, the researchers expected that there is an individual's understanding of awareness and responsibility in waste management, as well as their personal ethical norms, will have a positive effect on their intention to recycle hospital waste. To summarize, the factors ascription responsibility, personal norms, attitude to recycle affect managers to recycle hospital waste in Malaysia healthcare industry.

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