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A STUDY OF CONSUMER RECYCLING BEHAVIOUR TOWARDS BEAUTY AND COSMETICS PRODUCTS

Nur Damia Abdul Malek

Department of Management and Humanities, Universiti Teknologi PETRONAS, Malaysia

*E-mail: nur_20000901@utp.edu.my

ABSTRACT

This research aims to study factors influencing consumer recycling behaviour (RB) to participate in the beauty and cosmetics industry Recycling Programs where Planned Behaviour (TPB) and Attitude-Behaviour-Condition (A-B-C) Theory were combined. The variables tested in this study are Environmental Attitudes (EA), Social Norms (SN), Environmental Knowledge, Publicity and Education (EP), Environmental Facilities and Services (EF), and Social Media Usage (SM). Through a Google Form, 304 questionnaire samples are collected and distributed to consumers 18-70 years old in Kuala Lumpur using social media platforms. The data were analysed using SPSS software, and reliability and validity tests were conducted. The correlation tests of the data indicated that all variables have a significant relationship to the study. The result of this study discovered that EP and SM are statistically significant in impacting RB towards beauty and cosmetics products. This study could support the policy formation of recycling beauty and cosmetics products. Moreover, the government, the beauty industry, and educational institutions should raise awareness regarding recycling beauty and cosmetics products.

Keywords: *waste management, recycling, recycling beauty and cosmetics products, recycling behaviour, environmental knowledge*

INTRODUCTION

Waste management is a significant issue that requires immediate attention in many developing countries (Sujata et al., 2019; Shahril, 2020). One example is Malaysia, a highly urbanised country with a population of 33 million. The Industrial Revolution fuelled population growth, creating a surge in demand and raw material needs (Sujata et al., 2019). According to the Organisation for Economic Cooperation and Development (OECD), plastic waste is predicted to triple by 2060, with landfills overflowing and recycling rates rising slightly. Malaysia aims to cut 40% of landfill waste by 2025. According to Bernama News Strait Times (2022), paper and plastic top the landfill list, costing the country millions in recyclable resources. A growing population adds pressure—Malaysia's population booms (600,000 annually), straining waste management. Landfills overflow as 95% of 14 million tons of waste ends there daily. Malaysians waste valuable trash. Despite government efforts, recycling remains low (31.5% in 2021) (Roslan & Mohd Said, 2022). Currently, the beauty and cosmetics industry is thriving in the consumer markets with various beauty products produced by different brands. The growth of this industry is in tandem with the increasing rate of plastic waste as more consumers purchase, use, and dispose of the product containers. Millions of tons of plastic waste plague Malaysia (WWF-Malaysia, 2022), with 70% of packaging from beauty products ending up as waste (British Beauty Council, 2020), which is a significant contributor. Combating beauty product plastic waste starts with informed consumers. Recycling awareness and a shift towards sustainable practices fostered by social media and education are essential.

Due to the rising concern towards the environment, beauty and cosmetics companies are shifting their business operations towards sustainability. They address plastic waste with a Recycling Program, a much-

needed initiative in Malaysia, where beauty product recycling remains low due to minimal public awareness (Jamaluddin, 2021). While high-end brands like The Body Shop and Kiehl's offer recycling programs, drugstores like Watsons are making sustainable progress. Their recent efforts include a greener store with sustainable products and a recycling program with WMAM (Watsons Asia, 2023). They also promote eco-friendly practices through campaigns like #GoGreen. Unlike Watsons, Guardian seems to be lagging in sustainability efforts. Hence, a gap exists between luxury and drugstore brands regarding beauty product recycling.

This research is conducted to study factors that influence consumer recycling behaviour (RB) towards recycling beauty and cosmetics products. Although studies on beauty product recycling are scarce, the industry is implementing recycling programs for a greener future. Hence, this research will leverage past literature reviews regarding factors of recycling behaviour. In this study, latent variables "EA", "SN", "EP", "EF" and "SM" will be used to measure the RB. The objectives of this research are as follows:

1. To examine the influence of EA towards RB of beauty and cosmetic products
2. To examine the influence of SN towards RB of beauty and cosmetic products
3. To examine the influence of EP towards RB of beauty and cosmetic products
4. To examine the influence of EF on RB of beauty and cosmetic products
5. To examine the influence of SM on RB of beauty and cosmetic products

A study on beauty product recycling could significantly support policy formation and implementation. These laws would enable drugstores, pharmacies, and beauty retailers to establish recycling programs. Such initiatives, incentivising consumers to return empty containers, would encourage long-term recycling practices. Ultimately, consumers, retailers, and wholesalers would all contribute to achieving sustainability.

LITERATURE REVIEW

Theory of Planned Behaviour

Ajzen's Theory of Planned Behavior (TPB) highlights attitudes, social norms, and perceived control as factors influencing behaviour (Ajzen, 1985). Vargas-Sanchez (2016) defined attitude as how an individual assesses a situation and their inclination to react positively or negatively. Moreover, social pressure is the expectation of significant people, which influences intentions and behaviour to meet people's expectations, while perceived behaviour control is how people perceive their ability to engage in specific behaviours (Fishbein & Ajzen,1975). For example, a person believes they can contribute to reducing the waste thrown in landfills by recycling waste at recycling centres. TPB offers a structured approach to systematically examine the factors that impact behavioural decisions and has proven effective in recycling-related research (Razali et al., 2020). Although TPB has much support, authors have claimed it fails to explain recycling behaviour fully and recommended that the model incorporate other factors (Tonglet et al., 2004). Hence, this study will identify whether the theory can explain recycling behaviours.

Attitude- Behaviour- Condition Theory

The theory of Attitude-Behaviour-Condition (A-B-C) by Guagnano et al. (1995) states that consumers' attitudes (Attitude, A) and external conditions (Condition, C) have a combined impact on the consumers' behaviour (Behaviour, B). The theories propose that attitudes influence behaviour. However, situational factors ultimately determine whether someone acts on their Attitude. Moreover, Zain and Rahman (2021) stated that the A-B-C research emphasises the role of external factors in shaping consumers' green behaviour. Favourable environmental conditions enhance the connection between attitudes and behaviour, while unfavourable circumstances weaken it.

This research combines TPB and A-B-C to study the factors influencing consumer behaviour towards recycling beauty and cosmetics products. The potential factors may derive from environmental attitudes, an individual's significant people, environmental knowledge, availability of facilities and services for environmental purposes, and social media usage. Therefore, this research assumes the latent variables EA, SN, EP, EF, and SM positively influence RB towards beauty and cosmetics products. However, no study has been done on RB toward beauty and cosmetics products.

Environmental Attitudes (EA)

EA is the beliefs and values of individuals or societies concerning nature, ecology, or the environment. According to Singh et al. (2018), attitudes can directly influence an individual's action toward environmental behaviours. In this study, the following items reflect consumer environmental attitudes: consumer environmental literacy (Fishbein & Ajzen, 1985), willingness to participate (Nguyen et al., 2015), recognising the value of sorting and recycling (Li et al., 2015), and the awareness in conserving resources and safeguarding the environment (Wan et al., 2013).

Environmental Literacy (EA1)

Significant environmental issues have a negative impact on a nation's economy. Knowledge is key to becoming environmentally literate. Shamuganathan and Karpudewan (2015) claimed that individuals with desirable Attitudes, beliefs, and conservation knowledge tend to engage in responsible environmental behaviour. Roth (1992) emphasised that education is crucial for environmental literacy, fostering a more responsible society where individuals actively engage in sustainable practices. Educational programs offered at universities and beyond can equip individuals with the problem-solving, organisational, and teamwork skills needed to address environmental challenges. These skills and a positive attitude towards the environment empower individuals to contribute to environmental well-being.

Willingness to Participate in Recycling (EA2)

Individuals are willing to participate in an activity when they know its benefits. This is supported by a study about Vietnamese with solid personal ethics, suggesting a willingness to participate in waste management programs and comply with regulations, although involving fines (Nguyen et al., 2015). This indicates a commitment to environmental stewardship, ensuring nature's continued well-being. Yang et al. (2021) studied the impact of government rewards and penalties in China to address take-out packaging waste. Their findings offered recycling take-out packages to indicate improvement in recycling activities while penalties were imposed on take-out vendors upon non-conformance. Additionally, advertising recycling activities by take-out vendors enhances public image while encouraging consumers to recycle. Thus, studies suggest potential benefits influence consumers' willingness to participate in recycling activities.

Environmental Awareness (EA3)

Environmental awareness is understanding how actions impact the environment upon adopting eco-friendly practices, and individuals contribute towards a greener environment. According to Ramayah et al. (2012), while environmental awareness greatly influences attitudes toward recycling intentions, their studies suggest that attitudes and social norms significantly affect recycling behaviour. However, another study identifies that Knowledge of environmental issues alone may not be enough to motivate consistent recycling efforts, according to Elgaaied (2012); anticipated shame directly influences behaviour and mediates the relationship between environmental problems and the motivation to recycle. Although environmental consciousness is a significant factor, it may not be the sole driver of recycling behaviour. Social pressures, such as the potential disapproval or shame associated with not recycling, may significantly influence individuals to adopt this practice. Environmental awareness seems to affect recycling behaviour by assumptions positively.

Behavioural Attitude (EA4)

Behavioural Attitude is the response to positive or negative feelings. According to Wan et al. (2013), an individual's attitude determines their behaviour when performing an action. For instance, individuals with positive Attitudes regarding recycling, believing it benefits the environment, will potentially adopt recycling behaviour. Li et al. (2015) suggsted that behavioural Attitude is measured by understanding the value of classification and recycling practices, which encourages waste recycling according to categories. Contrary to Li et al. (2015), Byrne and O'Regan (2014) hypothesised that attitudes towards waste management do not reflect the public's actions and behaviours. Households in Ireland behave in an environmentally conscious manner and understand recycling and its benefits. However, they refrain from paying more for eco-friendly packaging. Hence, there is no association between attitudes and behaviour in waste management.

Hence, the research hypothesis is:

H1: EA influence RB towards beauty and cosmetic products

Social Norms (SN)

According to Mcleod (2023), social norms are the unwritten rules of behaviour in a group or culture. Previous studies focus on four significant aspects: consumer social responsibilities, laws and regulations, the influence of families and friends, and social recognition (Nguyen et al., 2015; Park & Ha, 2014).

Consumer Social Responsibilities (SN1)

According to Nguyen et al. (2015), belief in the personal and public benefits of recycling is essential to consumer recycling participation. Additionally, Wan et al. (2014) suggsted that individuals considering both human and environmental consequences when making choices demonstrate a more vital link between their environmental awareness and actual behaviour. As a result, consumers with a high sense of responsibility are inclined to adopt recycling behaviour.

Laws and Regulations (SN21)

Clear environmental regulations promote positive environmental behaviour, increasing waste separation and recycling efforts (Wan et al., 2014). This is supported by a social survey conducted in Hong Kong (Wan et al., 2015). Locals were receptive to the government's "carrot and stick" policy, offering incentives and imposing penalties for waste separation and recycling, thus encouraging garbage separation and recycling. Additionally, researchers claim obligatory recycling programs have been proven to have higher participation rates than voluntary programs. Moreover, the most successful mandatory recycling programs have active enforcement, enhanced education, financial incentives, and socioeconomic characteristics that encourage law-abiding behaviour (Noehammer & Byer, 1997). Thus, enforcing laws and regulations pertaining to waste management will help encourage consumers to engage in recycling behaviour.

Influence of Families and Friends (SN3)

Park and Ha (2014) suggested that individuals are motivated to recycle due to the participation of families and friends. They discover that family and friends impact environmentally friendly behaviours like composting, recycling, and conservation. Thus, we assume family and friends can influence and encourage the recycling behaviour of consumers.

Social Recognition (SN4)

Social recognition refers to the acknowledgement and validation of one's behaviour by others in a social context. According to Meng et al. (2019), the satisfaction gained from participating in recycling motivates individuals to continue these actions, potentially forming a long-term psychological connection that promotes environmental habits. Mak et al. (2019) discovered that offering social recognition or economic rewards encourages the construction industry to implement recycling practices for sustainable construction and demolition waste management. Hence, social recognition influences consumers' behaviour towards recycling. However, Meng et al. (2019) indicate that social norms fail to influence recycling behaviour. In Malaysia, social pressure is essential in influencing peers (Sujata et al., 2019). Therefore, it is assumed that consumer social responsibilities, laws and regulations, the influence of families and friends, and social recognition reflect and positively affect Social Norms (SN).

Hence, the research hypothesis is:

H2: SN positively influence RB toward beauty and cosmetic products

ENVIRONMENTAL KNOWLEDGE, PUBLICITY AND EDUCATION (EP)

Environmental Knowledge (EP1)

Environmental Knowledge is the capacity to understand environmental issues and recognise actions to protect the environment. Reddi et al. (2013) indicated that consumers' engagement in garbage separation and recycling will be hampered by their lack of environmental awareness and information. Knowledge and information are required for consumers to carry out waste classification and recycling (Meng et al., 2019).

Publicity and Education (EP2)

Wan et al. (2013) suggested that public education campaigns can effectively enhance new recycling

legislation and Knowledge to classify and recycle waste. According to Meng et al. (2019), consumers receive recycling education through media, advertisements, and institutions. Moreover, Moh and Manaf (2017) highlighted that SWCorp in Malaysia continuously conducts awareness and educational programs to introduce the importance of waste management. Therefore, consumers with strong environmental knowledge are likely to possess recycling behaviour. Public education through social media, advertisements, government programs, and institutions can instil recycling behaviour. This research assumes that environmental knowledge, publicity, and education (EP) positively influence recycling behaviour.

Hence, the research hypothesis is:

H3: EP positively influences RB toward beauty and cosmetic products

ENVIRONMENTAL FACILITIES AND SERVICES (EF)

Environmental facilities refer to waste recycling sites. This study's latent variable is the accessibility to classification and recycling facilities, economic and cost benefits, time spent, and occupied storage.

Accessibility to Classification Facilities (EF1) and Recycling Facilities (EF2)

According to research, the availability of waste classification facilities will influence consumer willingness to participate in domestic waste classification (Liu et al., 2019). Moreover, increasing the provision of recycling facilities aids in raising the recovery rate of waste. Abbott et al. (2011) discovered increased recycling activity due to the proximity of recycling facilities to residential areas.

Economic Cost and Benefit (EF3)

Meng et al. (2019) discovered that consumers are less likely to actively reduce waste generation or participate in recycling when disposable fees are insufficient. This indicates the impact of economic factors on consumer waste management behaviour. Consumers are willing to recycle waste upon gaining monetary value. Meng et al. (2018) discovered that a policy change might enhance waste management behaviour.

Time Spent (EF4) and Occupied Storage Space (EF5)

Furthermore, Liu et al. (2018) claimed that waste categorisation and recycling are influenced by the time committed to performing the tasks and the amount of space at home. Sidique et al. (2010) discovered that a system demanding less time and effort for waste management would increase recycling rates. In comparison, the low recycling rate in cities is due to limited storage space (Knickmeyer, 2020). Medium and high-density homes have little space for waste disposal storage. Hence, time spent sorting and available storage space influence recycling behaviours. Based on the previous literature, it is assumed that accessibility to classification and recycling facilities, economic and cost benefits, time spec, and occupied storage will reflect Environmental Facilities and Services (EF). Therefore, by reflecting on observed variables, this research assumes that EF positively influence recycling behaviour.

Hence, the research hypothesis is:

H4: EF positively influences RB towards beauty and cosmetic products

SOCIAL MEDIA USAGE (SM)

There are various social media outlets. According to GlobalStats Statcounter, in 2023, the most prominent social media usage will be Facebook, Twitter, Instagram, Pinterest, and YouTube. Social media is a valuable communication tool in the digital age that connects people with a common interest. Internet users utilise social media to generate ideas, cooperate with others who share their interests, and circulate information among like-minded people in online groups (Sujata et al., 2019). In their research, social media platforms provide an ideal space to investigate how this mode of communication can promote adopting environmentally conscious behaviour. Moreover, Oakley and Salam (2014) discovered that social networks influence consumer behaviour toward the environment. The authors stated that people are more aware of their environmental protection involvement as they engage online. Furthermore, media and door-to-door outreach are utilised to successfully convey information on current waste disposal and recycling practices (Moh & Manaf, 2014). Hence, it is assumed that social media is feasible and practical in engaging and attracting consumers to adopt recycling habits.

Hence, the research hypothesis is:

H5: Social Media Usage positively influences RB toward beauty and cosmetic products

METHODOLOGY

Sample and Sample Size

The research scope is conducted among Malaysian citizens 18-70 years old living in Kuala Lumpur. It is assumed that this age range consumes beauty and cosmetic products. The sample size of the respondents is 304 through The Survey System platform. Upon obtaining data of the population in Kuala Lumpur, which is 8,622,000, the data must be inserted into the system along with a confidence interval of 5%.

Questionnaire Design and Data Collection

The data collection used in this study is quantitative data. The data was collected through Google Forms. The survey link was shared through social media platforms like WhatsApp, Instagram, Facebook, and Twitter. The survey question is divided into two sections: (1) Introduction and background to the study and (2) The items measuring the research hypothesis. This research's independent latent variables are environmental attitudes, social norms, environmental knowledge and publicity, education, environmental facilities and services, and social media usage. There are 15 observed variables tested to measure the latent variable. The dependent variable for this research is the recycling behaviour of consumers towards beauty and cosmetics products. The questionnaire is measured using a 5-point "Likert" scale, with 1 = Strongly Agree and 5 = Strongly Disagree.

Measurement model

This research employs IBM SPSS software to test the hypotheses. The initial step in this study is to measure the reliability and validity of the variables. Descriptive statistics are included to check the dataset's central tendency, spread, and frequency distribution. A regression model is obtained to measure the significance of each variable to the dependent variable "RB". Figure 1 displays the research framework, and Table 1 displays measurement instruments for the latent variables of the hypothesised model.

Conceptual Framework Development

In this study, variables EA, SN, EP, EF, and SM were used to measure RB.

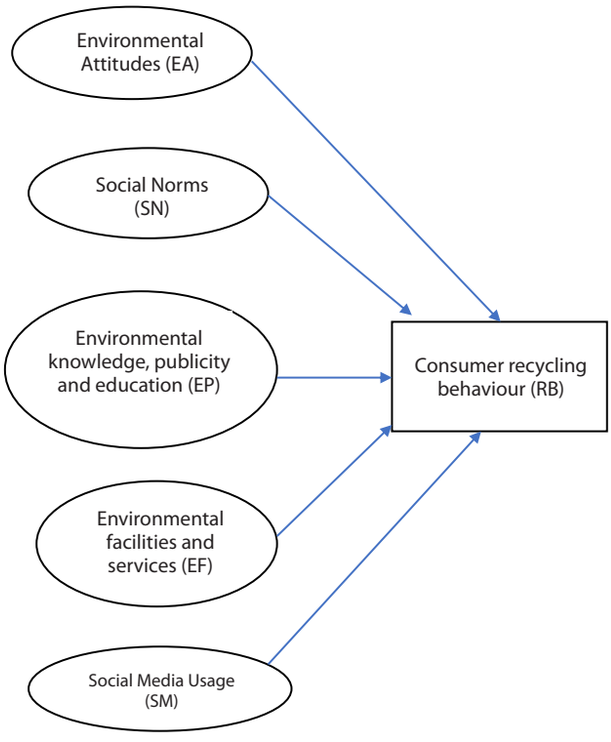


Figure 1 Research framework

The following displays the variables and items used to measure RB.

RESULT AND DISCUSSION

Reliability and Validity Results

Reliability data is crucial in research to ensure trustworthy and replicable findings. The reliability of observed variables is by calculating Cronbach's Alpha. The results indicate Cronbach's Alpha coefficient is 0.882. Taber (2017) stated that a construct is reliable when the Alpha (α) value is more significant than 0.70. Hence, the overall reliability of this study is Good. In Table 2, all latent variables have Cronbach's Alpha greater than 0.70. However, based on Cronbach's Alpha for recycling, consumer behaviour is 0.306. The variable holds low reliability due to the low number of items and the nature of items in the Yes/No answer. There is no universal level of alpha acceptance (such as 0.70). Instead, instruments with low Alpha can still be effective

Table 1 Measurement instruments for latent variables of the hypothetical method

Latent variables		Measurement items (observed variables)	Sources
EA	EA1	I care about survival and life issues, not environmental issues such as recycling beauty and cosmetics products.	Ajzen (1985)
	EA2	In order to save resources and protect the environment, I am willing to participate in recycling beauty and cosmetics products.	Nguyen et al. (2015)
	EA3	Recycling beauty and cosmetic products is conducive to saving resources and turning waste into treasure.	Wan et al. (2015)
	EA4	I produce less recyclable waste, so I do not need to separate and recycle beauty and cosmetic products.	Li et al. (2015)
SN	SN1	It is satisfying for me to participate in recycling beauty and cosmetic products.	Young (1990)
	SN2	Waste separation and recycling laws and regulations can constrain me to recycle beauty and cosmetic products.	Wan et al. (2014, 2015)
	SN3	Waste classification and recycling are the responsibility of the government and enterprises and have nothing to do with me.	Timlett and Williams (2008)
	SN4	Seeing my friends and families recycle beauty and cosmetic products encourages me to do the same.	Park and Ha (2014)
EP	EP1	I have mastered the waste classification method and I know the location of the nearby waste recycling sites to recycle beauty and cosmetic products.	Reddi et al. (2013)
	EP2	I have been exposed to enough publicity and education on recycling beauty and cosmetic products daily.	Grazhdani (2016)
EF	EF1	Beauty and Cosmetic recycling sites/shops are close to home, and the service of recyclers is good.	Abbott et al. (2011)
	EF2	There are classified garbage bins and garbage kiosks in the community to recycle beauty and cosmetic products with clear identification and close distances.	Bach et al. (2004)
	EF3	I sell used beauty and cosmetics products in order to obtain economic benefits.	Guagnano et al. (1995)
	EF4	Classification and recycling beauty and cosmetic products is a waste of time.	Matsumoto (2014)
	EF5	Sorting and collecting recyclable beauty and cosmetic products takes up a lot of storage space in my house.	Izagirre-Olaizola et al. (2015)
SM	SM1	Posts of links to recycling websites of beauty and cosmetic products appear in my newsfeed of my social media account.	Oakley and Salam (2014)
	SM2	Posts of statements referring to recycling activities of beauty and cosmetic products appear in my news feed on my social media account.	
	SM3	Posts of videos on recycling events of beauty and cosmetic products appear in my news feed on my social media account.	

in certain situations. Furthermore, Convergent validity describes the extent to which different measurements of a construct are related. Convergent validity is evidenced by Average Variance Extracted (AVE) larger than 0.50 (Hair et al., 2017). Hence, this study indicates that the constructs and items are valid as all AVE >0.50. This study utilises Pearson's correlation to confirm the strength of the existing linear association between variables. Hence, the items in this study show high validity as the obtained value of each item > critical value of 0.195 with a significant value $p<0.05$. The critical value 0.195 is obtained from the Pearson Product-Moment Correlation Coefficient with df of 302. The results are as shown in Table 3.

Table 2 Results of reliability and validity of all latent variables

Variables	Number of Items	Cronbach's Alpha	AVE	Reliability	Validity
EA	4	0.742	0.579	Acceptable	Valid
SN	4	0.760	0.631	Acceptable	Valid
EP	2	0.919	0.925	Excellent	Valid
EF	5	0.927	0.779	Excellent	Valid
SM	3	0.984	0.969	Excellent	Valid

Note. EA: Environmental Attitudes, SN: Social Norms, EP: Environmental Knowledge & Publicity and Education, EF: Environmental Facilities, SM: Social Media Usage.

Table 3 Pearson's correlation coefficients for measuring the validity of the questionnaire's internal consistency

Item	Pearson Correlation	Sig. (2tailed)	Item	Pearson Correlation	Sig. (2tailed)
EA1	0.800**	.000	EP2	0.885**	.000
EA2	0.546**	.000	EF1	0.858**	.000
EA3	0.553**	.000	EF2	0.846**	.000
EA4	0.822**	.000	EF3	0.858**	.000
SN1	0.566**	.000	EF4	0.864**	.000
SN2	0.607**	.000	EF5	0.836**	.000
SN3	0.868**	.000	SM1	0.888**	.000
SN4	0.537**	.000	SM2	0.900**	.000
EP1	0.849**	.000	SM3	0.888**	.000

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed)

REGRESSION

Table 4 displays the coefficient results from regression analysis. The unstandardised coefficients (B) represent the estimated regression coefficients for each model's independent variable (predictor). They indicate the dependent variable (CRB) change for a one-unit change in each independent variable. Table 4 shows that CRB is estimated to increase by 0.045 units for every one-unit increase in EA. Similarly, for a one-unit increase in SN, EP, EF, and SM, the dependent variable CRB is estimated to decrease by 0.031 units, 0.060 units, 0.028 units, and 0.049 units.

Furthermore, the standardised coefficients (Beta) represent the estimated regression coefficients upon standardised independent variables. In this study, it can be observed that EA has a standardised coefficient of 0.151, indicating it has a small positive effect on CRB. Similarly, SN and EF have a standardised coefficient of -0.100 and -0.137, indicating that both variables have a small negative effect on CRB. EP and SM have a standardised coefficient of -0.292 and -0.272, indicating that both variables negatively affect CRB. T-tests and significance levels (p-values) indicate if a predictor variable truly affects the outcome variable. From Table 4, EA has a t-value of 1.452 and a significance level of 0.147, suggesting that the relationship between EA and CRB is not statistically significant at the conventional 0.05 alpha level. Similarly, SN has a t-value of -1.183 and a significance level of 0.238, indicating that the relationship between SN and CRB is not statistically significant. However, EP has a t-value of -3.034 and a significance level of 0.003, suggesting a statistically significant relationship between EP and CRB. Like EA and SN, EF has a t-value of -1.050 and a significance level of 0.295, indicating that the relationship between EF and CRB is not statistically significant. Unlike SM, this variable has a t-value of -2.857 and a significance level of 0.005, suggesting a statistically significant relationship between SM and CRB. Furthermore, the 95% confidence interval indicates that the actual population coefficient lies within 95% confidence. The 95% confidence interval for EA ranges from -0.016 to 0.106, SN ranges from -0.084 to 0.021, EP ranges from -0.099 to -0.021, EF ranges from -0.079 to 0.024, and SM ranges from -0.082 to -0.015.

Table 4 Coefficient result of Regression Analysis

Model		Unstandardised Coefficients		Standardised Coefficients			95.0% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig	Lower Bound	Upper Bound
1	(Constant)	1.623	.071		22.968	.000	1.484	1.762
	EA	.045	.031	.151	1.452	.147	-.016	.106
	SN	-.031	.027	-.100	-1.183	.238	-.084	.021
	EP	-.060	.020	-.292	-3.034	.003	-.099	-.021
	EF	-.028	.026	-.137	-1.050	.295	-.079	.024
	SM	-.049	.017	-.272	-2.857	.005	-.082	-.015

DISCUSSION

This study investigates the effect of environmental attitudes, social norms, environmental knowledge, publicity and education, environmental facilities and services, and social media usage on RB of beauty and cosmetic products. The dependent variable "RB" was regressed in terms of predicting variables of environmental attitudes, social norms, environmental knowledge publicity, education, environmental facilities and services, and social media usage. Additionally, coefficients were further assessed to determine the influence of each factor on the dependent variable "RB". This study applies a confidence interval of 95%, with the significance of $p<0.05$.

Based on our findings, EP and SM are the factors that significantly influence RB. These two variables support the ABC theory, whereby environmental knowledge gained through education influences consumers to adopt environmentally conscious behaviour. This is further discussed in the following passage:

Environmental Knowledge, Publicity and Education (EP)

Hypothesis (H3) proposes a positive correlation between EP and RB to beauty and cosmetic products. It is anticipated that individuals with higher levels of environmental knowledge, greater exposure to environmental publicity, and a higher educational background will exhibit more favourable beauty and cosmetic product recycling behaviours. The significant variable influences the dependent variable ($B=-0.060$, $p = 0.003$). Thus, H3 is strongly supported. While some Malaysian consumers have received exposure and education on recycling beauty and cosmetic products, knowledge gaps remain. This highlights the need for consistent, comprehensive educational programs to improve recycling practices further. Literature supports this, Meng et al. (2019) stated that environmental knowledge encompasses the skills and information consumers require for proper waste recycling. Moreover, Ma et al. (2021) suggested that publicity and education are the most effective measures to promote green consumption behaviour. This effort may materialise in any communication channel, such as media, advertisements, and education from institutions. Therefore, EP can instil RB. An instance of government effort, Moh and Manaf (2017) highlighted that SWCorp in Malaysia has continuously conducted awareness and educational programs to introduce the importance of waste management.

Social Media Usage (SM)

Furthermore, hypothesis (H5) proposes a positive correlation between SM and RB for beauty and cosmetic products. Higher social media use might lead to greater environmental awareness and, subsequently, more responsible recycling behaviour for beauty and cosmetic products. Our findings indicate that the variable SM is statistically significant and highly influences the dependent variable ($B=-0.049$, $p=0.005$). Hence, H5 is strongly supported.

This study indicates that Malaysian consumers have seen posts of links, statements, and videos regarding the recycling of beauty and cosmetics products on their social media platforms. Social media facilitate connections among individuals, promoting knowledge exchange through idea generation, cooperation, and information circulation in online groups (Sujata et al., 2019). Social networking platforms have played a crucial

Table 5 Hypothesis test

Hypothesis	Relationship	Beta Coefficient	p-value	Test Results
H1	EA → RB	0.045	0.147	Not Supported
H2	SN → RB	-0.031	0.238	Not Supported
H3	EP → RB	-0.060	0.003*	Supported
H4	EF → RB	-0.028	0.295	Not Supported
H5	SM → RB	-0.049	0.005*	Supported
R	R square	0.388		
F	(df, Residual)	(5,298)		
	F statistic			
		37.762		

Note. *p<0.05. EA: Environmental Attitudes, SN: Social Norms, EP: Environmental Knowledge & Publicity and Education, EF: Environmental Facilities, SM: Social Media Usage, RB: Consumer Recycling Behaviour.

Table 6 Items average results/ frequency

Items	Mean	Frequency				
		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
EA1	3.6086	147	29	43	32	53
EA2	4.4934	201	64	30	6	3
EA3	4.5230	207	57	34	4	2
EA4	3.6678	147	26	46	53	32
SN1	4.4276	198	58	32	12	4
SN2	4.3684	195	50	40	14	5
SN3	3.4638	142	17	38	54	53
SN4	4.4934	211	51	27	11	4
EP1	3.8289	150	31	66	35	22
EP2	3.7533	150	26	54	51	23
EF1	3.6217	151	19	48	40	46
EF2	3.6776	151	22	54	36	41
EF3	3.5987	148	27	42	33	54
EF4	3.2763	137	13	32	41	81
EF5	3.8125	146	32	66	43	17
SM1	3.6184	151	23	43	37	50
SM2	3.6316	150	21	47	43	43
SM3	3.6546	150	21	53	38	42

*Note** EA: Environmental Attitudes, SN: Social Norms, EP: Environmental Knowledge & Publicity and Education, EF: Environmental Facilities, SM: Social Media Usage.

role in enhancing the environmental consciousness of social media users. Information and images about environmental and social concerns are rapidly and cost-effectively shared among social media users. Previous research by Warren et al. (2014) and Young and Jordan (2013) has consistently shown that social media influences individuals' behaviour. Zhu et al. (2022) found social media to be the primary social network for Chinese farmers. Environmental Knowledge and online discussions fostered positive environmental practices. Hence, social media usage may encourage consumers to adopt recycling habits.

The number of hypotheses supporting the study is shown in Table 5 and the results are presented in Table 6.

CONCLUSION

This study discovered knowledge, education, and social media use most influence beauty product recycling, unlike prior research on environmental attitudes. Malaysians understand the environmental benefits but lack a positive recycling attitude. This suggests knowledge gaps and prioritizing immediate needs. The solution lies in education campaigns and accessible recycling options. Governments can create regulations for ethical waste management and support industry recycling programs. Drugstores should be also be involved. Beauty companies can offer recycling services, educate employees, and use social media influencers to promote programs with incentives. Malaysians need clear information on sorting and accessible facilities. Incentive programs and environmental education in schools can further boost participation.

REFERENCES

[1] Abbott, A. J., Nandeibam, S., & O'Shea, L. (2011). Explaining the variation in household recycling rates across the UK. *Ecological Economics*, *70*(11), 2214-2223. https://doi.org/10.1016/j.ecolecon.2011.06.028

[2] Ajzen, I. (1991, December 1). The theory of planned behaviour. *Organisational Behavior and Human Decision Processes*. https://doi.org/10.1016/0749-5978(91)90020-t

[3] Ajzen, I. (1985). *From Intentions to Actions: A theory of planned behavior*. SSSP Springer Series in Social Psychology, (pp. 11-39). https://doi.org/10.1007/978-3-642-69746-3_2

[4] Bernama (2022). Can Malaysia achieve 40 percent recycling rate by 2025? *New Straits Times*. Retrieved from https://www.nst.com.my/news/nation/2022/03/778625/can-malaysia-achieve-40-cent-recycling-rate-2025

[5] Byrne, S., & O'Regan, B. (2014). Attitudes and actions towards recycling behaviours in the Limerick, Ireland region. *Resources Conservation and Recycling*. https://doi.org/10.1016/j.resconrec.2014.03.001 https://doi.org/10.1007/s42452-021-04234-y

[6] Elgaaïed, L. (2012). Exploring the role of anticipated guilt on pro-environmental behaviour – a suggested typology of residents in France based on their recycling patterns. *Journal of Consumer Marketing*, *29*(5), 369-377. https://doi.org/10.1108/07363761211247488

[7] Fishbein, M., & Ajzen, I. (1975). *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*. UMass Amherst. Retrieved from https://people.umass.edu/aizen/f&a1975.html

[8] Hair, J. F., Sarstedt, M., Ringle, & C. M., (2017). *Partial least squares structural equation modeling*. Handbook of Market Research, (pp. 1-40). https://doi.org/10.1007/978-3-319-05542-8_15-1

[9] Knickmeyer, D. (2020). Social factors influencing household waste separation: A literature review on good practices to improve the recycling performance of urban areas. *Journal of Cleaner Production*, 245. https://doi.org/10.1016/j.jclepro.2019.118605

[10] Yang, J., Chen, H., Long, R., & Cheng, X. S. (2021). Willingness to participate in take-out packaging waste recycling: Relationship among effort level, advertising effect, subsidy, and penalty. *Waste Management*, *121*, 141-152. https://doi.org/10.1016/j.wasman.2020.12.005

[11] Young, S. D., & Jordan, A. (2013). The Influence of Social Networking Photos on Social Norms and Sexual Health Behaviors. Cyberpsychology, Behavior, and Social Networking, Mary Ann Liebert, *Incorporation*. https://doi.org/10.1089/cyber.2012.0080

[12] Guagnano, G. A., Stern, P. C., & Dietz, T. (1995). Influences on Attitude-Behavior Relationships. *Environment and Behavior, 27*(5), 699-718. https://doi.org/10.1177/0013916595275005

[13] Li, J., Tam, V. W., Zuo, J., & Zhu, J. (2015). Designers' Attitude and behaviour towards construction waste minimisation by design: A study in Shenzhen, China. *Resources Conservation and Recycling*, *105*, 29-35. https://doi.org/10.1016/j.resconrec.2015.10.009

[14] Liu, Y., Sun, C., Xia, B., Cui, C., & Coffey, V. (2018). Impact of community engagement on public acceptance towards waste-to-energy incineration projects: Empirical evidence from China. *Waste Management*, *76*, 431-442. https://doi.org/10.1016/j.wasman.2018.02.028

[15] Liu, X., Wang, Z., Wei, L., Li, G., & Zhang, Y. (2019). Mechanisms of public education influencing waste classification willingness of urban residents. *Resources Conservation and Recycling*, *149*, 381-390. https://doi.org/10.1016/j.resconrec.2019.06.001

[16] Ma, H., Chen, W., Ma, H., & Yang, H. (2021). Influence of publicity and education and environmental values on the green consumption behavior of urban residents in Tibet. *International Journal of Environmental Research and Public Health*, *18*(20), 10808. https://doi.org/10.3390/ijerph182010808

[17] Matsumoto, S. (2014). The opportunity cost of pro-environmental activities: Spending time to promote the environment. *Journal of Family and Economic Issues*, *35*, 119-130. https://doi.org/10.1007/s10834-013-9354-3

[18] Mak, T. M., Yu, I. K.M, Wang, L., Hsu, S. C., Tsang, D. C.W, Li, C.N., Yeung, T. L.Y., Zhang, R., & Poon, C. S. (2019). An extended theory of planned behaviour for promoting construction waste recycling in Hong Kong. *Waste Management*, *83*, 161-170. https://doi.org/10.1016/j.wasman.2018.11.016

[19] Mcleod, S. (2023, April 14). Social Roles and Social Norms. *SimplyPsychology*. Retrieved from https://www.simplypsychology.org/social-roles.html

[20] Meng, X., Tan, X., Wang, Y., Wen, Z., Tao, Y., & Qian, Y. (2019). Investigation on decision-making mechanism of residents' household solid waste classification and recycling behaviors. *Resources Conservation and Recycling*, *140*, 224-234. https://doi.org/10.1016/j.resconrec.2018.09.021.

[21] Meng, X., Wen, Z., & Qian, Y. (2018). Multi-agent-based simulation for household solid waste recycling behavior. *Resources Conservation and Recycling*, *128*, 535-545. https://doi.org/10.1016/j.resconrec.2016.09.033

[22] Moh, Y. C., & Manaf, L. A. (2014). Overview of household solid waste recycling policy status and challenges in Malaysia. *Resources Conservation and Recycling*, *82*, 50-61. https://doi.org/10.1016/j.resconrec.2013.11.004

[23] Jamaluddin, A. N. (2021, November 30). Recycling your beauty products is a lot easier than you think, here's how. *Beauty Insider*. Retrieved from https://beautyinsider.my/recycling-your-beauty-products-is-a-lot-easier-than-you-think-heres-how/

[24] Noehammer, H., & Byer, H. P. (1997). Effect of design variables on participation in residential curbside recycling programs. *Waste Management & Research*, *15*(4), 407-427. https://doi.org/10.1006/wmre.1996.0096

[25] Nguyen, T. T. P., Zhu, D., & Le, N. P. (2015). Factors influencing waste separation intention of residential households in a developing country: Evidence from Hanoi, Vietnam. *Habitat International*, *48*, 169-176. https://doi.org/10.1016/j.habitatint.2015.03.013

[26] Oakley, R. L., & Salam, A. F. (2014). Examining the impact of computer-mediated social networks on individual consumerism environmental behaviours. *Computers in Human Behavior*, *35*, 516-526. https://doi.org/10.1016/j.chb.2014.02.033

[27] Online, S. (2021, September 22). Malaysia has 28 million social media users as of January 2021, says The Commission and Multimedia Ministry secretary-general. *The Star.* Retrieved from https://www.thestar.com.

[28] Park, J., & Ha, S. (2014). Understanding consumer recycling behaviour: Combining the theory of planned behavior and the norm activation model. *Family and Consumer Sciences Research Journal*, *42*(3), 278-291. https://doi.org/10.1111/fcsr.12061

[29] Ramayah, T., Lee, C., W., J., & Lim., S. (2012). Sustaining the environment through recycling: An empirical study. *Journal of Environmental Management*, *102*, 141-147. Retrieved from https://doi.org/10.1016/j.jenvman.2012.02.025

[30] Razali, F., Daud, D., Choong, W. W., & Jiram, W. R. A. (2020). Waste separation at source behaviour among Malaysian households: The Theory of Planned Behaviour with moral norm. *Journal of Cleaner Production*, *271*. https://doi.org/10.1016/j.jclepro.2020.122025

[31] Reddi, K. R., Li, W., Wang, B., & Moon, Y. (2013). System dynamics modelling of hybrid renewable energy systems and combined heating and power generator. *International Journal of Sustainable Engineering*, *6*(1), 31-47. https://doi.org/10.1080/19397038.2012.689781

[32] Roslan, M., B., & Mohd Said, S. (2022, October 3). Question mark over Malaysia's hope of achieving 40 percent recycling rate by 2025. *Bernama.com*. Retrieved from https://bernama.com/en/b_focus/news.php?id=2060298

[33] Roth, C., E. (1992, September). Environmental Literacy: Its roots, evolution, and directions in the 1990s. *Educational Resources Information Center (ERIC) Clearinghouse Products*. Retrieved from https://eric.ed.gov/?id=ED348235

[34] Shamuganathan, S., & Karpudewan, M. (2015). Modeling Environmental Literacy of Malaysian Pre-University Students. *International Journal of Environmental & Science Education*, *10*(5), 757-771. https://doi.org/10.12973/ijese.2015.264a

[35] Shahril. (2020, December 8). Sustainable waste management in Malaysia: Opportunities and challenges. *MIDA | Malaysian Investment Development Authority.* Retrieved from https://www.mida.gov.my/sustainable-waste-management-in-malaysia-opportunities-and-challenges/

[36] Sidique, S. F., Lupi, F., & Loveridge, S. (2010). The effects of behavior and attitudes on drop-off recycling activities. *Resources Conservation and Recycling*, *54*(3), 163-170. https://doi.org/10.1016/j.resconrec.2009.07.012

[37] Singh, M., Chakraborty, A., & Roy, M. (2018). Developing an extended theory of planned behaviour model to explore circular economy readiness in manufacturing MSMEs, India. *Resources Conservation and Recycling*, *135*, 313-322. https://doi.org/10.1016/j.resconrec.2017.07.015

[38] Sujata, M., Ramayah, T., Khor., K., & Teoh., P., A. (2019). The role of social media on recycling behaviour. *Sustainable Production and Consumption*, *20*, 365-374. https://doi.org/10.1016/j.spc.2019.08.005

[39] Taber, K. S. (2017). The use of cronbach's Alpha when developing and reporting research instruments in science education. *Research in Science Education*, *48*, 1273-1296. https://doi.org/10.1007/s11165-016-9602-2

[40] Tonglet, M., Phillips, P. S., & Read, A. D. (2004). Using the Theory of Planned Behaviour to investigate the determinants of recycling behaviour: a case study from Brixworth, UK. *Resources Conservation and Recycling*, *41*(3), 191-214. https://doi.org/10.1016/j.resconrec.2003.11.001

[41] Vargas-Sánchez, A., Plaza-Mejia, M. A., & Porras-Bueno, N. (2016). *Attitude, tourism*. Encyclopedia of Tourism, 1-4. Retrieved from https://www.academia.edu/22645946/Attitude_tourism

[42] Wan, C., Shen, G. Q., & Yu, A. T. (2014). The role of perceived effectiveness of policy measures in predicting recycling behaviour in Hong Kong. *Resources Conservation and Recycling*, *83*, 141-151. https://doi.org/10.1016/j.resconrec.2013.12.009

[43] Wan, C., Shen, G. Q., & Yu, A. T. (2015). Key determinants of willingness to support policy measures on recycling: A case study in Hong Kong. *Environmental Science & Policy*, *54*, 409-418. https://doi.org/10.1016/j.envsci.2015.06.023

[44] Warren, A. M., Sulaiman, A., & Jaafar, N. I. (2014). Understanding civic engagement behaviour on Facebook from a social capital theory perspective. *Behaviour & Information Technology*, *34*(2), 163-175. https://doi.org/10.1080/0144929x.2014.934290

[45] Wang, H., Xiao, L., Wang, N., Zhang, K., Wang, F., Zhang, S., Wang, R., Zheng, P., & Matsushita, M. (2020). Key factors influencing public awareness of household solid waste recycling in urban areas of China: A case study. *Resources Conservation and Recycling*, *158*, 104813. https://doi.org/10.1016/j.resconrec.2020.104813

[46] Zain, I. N. M., & Rahman, H. A. (2021). Food waste management and green purchasing behaviour among youths in Malaysia. *International Journal of Academic Research in Business & Social Sciences*, *11*(15), 61-76. https://doi.org/10.6007/ijarbss/v11-i15/10635

[47] Zhu, J., Zheng, S., Kaabar, M. K. A., & Yue, X. (2022). Online or offline? The impact of environmental knowledge acquisition on the environmental behavior of Chinese farmers based on social capital perspective. *Frontiers in Environmental Science*, *10*. https://doi.org/10.3389/fenvs.2022.1052797