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## Utilization of the Theory of Planned Behavior for Analyzing the Issue of Throwing Garbage in Public Places

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### **Abstract**

In 2015, the results of United Nations research called out Indonesia as the second-largest contributor to plastic waste in the ocean, following China. This problem was, absolutely, inseparable from improper waste disposal behavior. This recent research was intended to prove the theory of planned behavior in the issue of throwing garbage in public places. Variables included in this case were attitude, subjective norms, perceived behavioral control, and intention. Questionnaires were distributed online and offline to people who had thrown out their garbage in public places. A total of 396 respondents were obtained, and the Confirmatory Factor Analysis (CFA) method of the Structural Equation Model (SEM) was used in this research with IBM SPSS 25 and AMOS 24 tools. This research found that the good value of public place visitors' attitudes would develop their intention of throwing garbage properly. Visitors misunderstood the function of the cleaning service officers. They considering that their garbage would be taken care of by the cleaning service officers. The availability of trash cans in public places would support the visitors' behavior in managing their garbage.

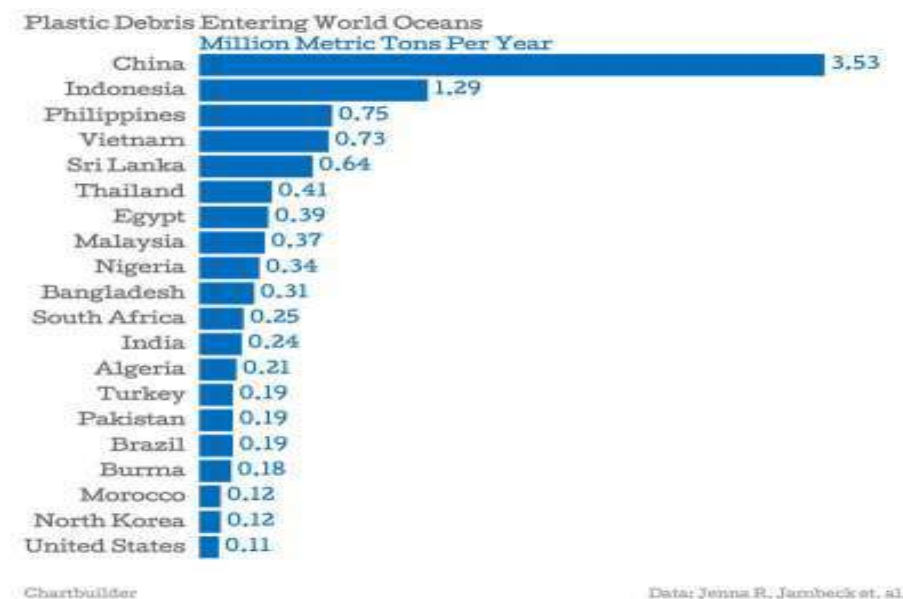
**Keywords:** *garbage, throwing-garbage behavior, and the theory of planned behavior.*

### **INTRODUCTION**

Garbage is the remains of objects having been used by humans that to be disposed of. Wastes can be categorized into three types, namely organic, inorganic, and B3. Organic waste is a type of natural waste that can decompose naturally, such as leaves, twigs, or food scraps. Inorganic waste is a type of human-made waste that is difficult to decompose naturally. It requires quite a long period to decompose and must be recycled to minimize its adverse effects. Inorganic waste includes plastics, cans, and styrofoam. B3 waste is a hazardous and toxic waste such as chemicals, electronic waste, and batteries. Inorganic and B3 wastes cannot be thrown away because it is difficult to decompose and tends to damage the environment (Zayadi, 2018).

Indonesia with its large number of residents contributes to the amount of waste produced, which, by year, can reach 64 million tons. Data released by the World Bank showed that 87 cities in the coastal areas of Indonesia contributed 1.27 million tons of

wastes to the oceans (Erric, 2019). Wastes in Indonesia were dominated by organic waste, followed by plastic waste (Databooks 2017). According to Indonesian sustainable waste (SWI)'s research, there was only 7% of waste was recycled, 69% ended up in shelters, and the remaining 24% was still not managed (CNN Indonesia, 2018).



**Figure 1. Data of Plastic Waste in the World by Country**

Source : Indonesia Green Energy (2018)

As mentioned earlier, Fig. 1 shows that Indonesia is the second-largest contributor to plastic waste in the oceans, after China. Indonesia produces plastic waste more than India and Brazil, although both countries have, respectively, a greater and a slight different in number of citizens, compared to Indonesia (Indonesia Green Energy 2018).

The problem of waste in Indonesia is significantly correlated to the behavior of Indonesian people towards waste. The Ministry of Health's research in 2013 revealed that 50.1% of the community managed their waste by burning, 10.4% threw garbage into the rivers, 9.7% threw away rubbish, 3.9% disposed of trash by dumping it into the ground (Kemenkes 2015). Therefore, littering behavior increased.

According to the Ministry of Public Works and Public Housing, public awareness of disposing of trash in the proper places was still less. It could be seen from the environment of the Gelora Bung Karno Stadium, which was full of garbage scattered after the presidential trophy event which attracted many spectators (PKPBM, 2018). Also, local governments have begun to respond seriously to improper behavior in disposing of waste. The Bekasi Regency Government, together with the police, began to

act decisively about the littering behavior by arresting the perpetrators of littering and providing them with guidance (Media Indonesia, 2019).



**Figure 2. The Gelora Bung Karno Stadium**  
Source : PKPBM (2015)

Improper behavior towards waste will harm the environment due to the non-decomposing nature of plastic waste. President of the Republic of Indonesia, Joko Widodo, said that the habit of littering also contributed to the occurrence of annual floods in Indonesia (VOA Indonesia, 2020). Throwing garbage in proper places is a healthy behavior to make it managed properly. The case at the Gelora Bung Karno Stadium also often occurs in other public areas although the managers of the places and even the government have tried to provide garbage cans there.



**Figure 3. Improper Behavior: Throwing Garbage**  
Source : Urban Cikarang (2020)

Based on researchers' observations, public behavior in disposing of garbage has become a concern in several regions in Indonesia, not only in Jakarta. Improper behavior of throwing garbage also occurs in Cikarang, Bekasi Regency. As can be seen in Figure 3, there are still many residents without feeling hesitant throwing garbage in any place such as a river, etc. The Cikarang City Government policy has started to act decisively with the perpetrators of littering in response to the spread of the littering behavior.



**Figure 4. Cikarang Station Area**

Source : Republika (2019)

Similar to those in Jakarta, public places in Cikarang also face the problem of visitors' behavior in throwing garbage. Figure 4 shows that although the managers of the public places have provided trash cans, trash is still scattered in areas around public places in Cikarang, such as stations and food courts.

Therefore, this study aimed to apply the theory of planned behavior into the actual public behavior in terms of throwing garbage in public places and to determine the one having the most significant correlation between attitude, subjective norms, perceived behavioral control towards behavioral intention, and perceived behavioral control and behavioral intention toward actual behavior of throwing garbage. This research used the theory of planned behavior by Ajzen (1991) with three independent variables (Attitude, Subjective Norm, and Perceived Behavioral Control), a mediating variable (Behavioral Intention), and a dependent variable (Actual Behavior). This theory was chosen because it was often used for research in the field of pro-environmental behavior, such as waste-separating or recycling behavior.

### **Theory of Planned Behavior**

The theory of planned behavior (TPB) is a theoretical idea proposed by Icek Ajzen in 1985 in his study entitled "From Intention to Action: Theory of Planned Behavior." It is the development of a theory of reasoned action (TRA), which provides an essential analytical framework that aims to understand and predict the social behavior of individuals. Previously, the theory of reasoned action was a model that provides a concept about the relationship between attitudes, subjective norms, intentions, and behavior. The theory of planned behavior is expected to overcome the limitations of the previous one. In it, perceived behavioral control (PBC) is included to contribute to the definition of the situation or non-motivational factors on performing a behavior (Okumah *et al.*, 2019).

The theory of planned behavior (TPB) has been used for many years in many research topics such as pro-environmental behavior, social behavior, health-related, and many more. Many analytical pieces of research ensure that behavioral intention and

behavior of someone can be clarified and predicted with the theory of planned behavior (TPB) (Shen *et al.*, 2019). The theory of planned behavior (TPB) is still applicable in current research, especially in examining specific environmental concern behavior (for example, recycling, green behavior, sustainable management, etc.). According to Bamberg (2007), a favorable attitude against the environment has a corresponding favorable against the behavioral intention to proper sanitation. Still, the intention to do appropriate sanitation also depends on income status, which refers to their ability to access sanitation facilities (Okumah *et al.* 2019).

### **Behavioral intention**

Ajzen (2012) defined intention as a desire to perform a particular behavior (Sumaryono 2016). Intention is a desire or a plan to perform a particular actual behavior (Yudantara 2014). It is also considered as a driving force that determines whether someone does a certain behavior or not, involving indicators that show how much and how hard someone is willing to do a certain behavior (Okumah *et al.*, 2019). Dharmesta (1998) believed that intention is the main concern in the theory of planned behavior because intention is an intermediate variable that causes behavior to occur from attitudes and other variables (Anggraini 2018). Behavioral intention can be measured by generalized intention questionnaire format according to Armitage and Conner (2010), such as intend, will, expect, and want. Concerning the behavior of throwing out the trash, it can be concluded that someone will dispose of an object after having the intention to dispose of it.

### **Attitude**

According to Strydom (2018) attitude is an individual factor that alludes to his/her assessment of a specific behavior. It alludes to personal recognitions and tendencies toward a certain behavior (Shen *et al.* 2019). According to Greaves *et al.* in Ayob *et al.*, (2017), attitude can be described as the determinant that represents a general evaluation of people towards a certain behavior. According to (Anggraini, 2018), attitude is a way to respond to a stimulus. In this particular case, attitude is measured by questionnaire statements from indicators that have been adopted and adjusted from Greaves & Zibarras (2013), namely reducing the use of natural resources, increasing the reuse, reducing landfill, and thinking about natural resources. From all the definitions stated above, it can be concluded that attitude can be illustrated as an individual thought, tendencies, and feelings to recognize surroundings, all of which tend to be permanent.

### **Perceived Behavioral Control**

According to Ajzen (1987), Perceived Behavioral control can be defined as an individual's perception of the ease or difficulty of performing a particular behavior. Greaves *et al.* explained that perceived behavioral control is a perception perceived by individuals affected by the difficulties of performing a certain behavior and having control over the behavior itself. The higher the confidence of performing a certain behavior, the higher intention to perform the behavior would be (Ayob *et al.*, 2017).

According to Shen *et al.* (2019), in his research about waste management in big cities, the control belief of individuals mostly comes from factors perceived to restrain or support them in taking part in garbage classification. Examples of the factors mentioned above are time, energy, and other related constraints.

### Theoretical Framework

Based on this background, it was found that improper behavior of throwing garbage was often or even tended to be more prevalent, even though the trash cans have been provided. For this reason, this research tried to find out factors driving a person's throwing garbage behavior. As can be seen in the theoretical framework below, this research used the theory of planned behavior by (Ajzen 1991). This research focused on attitudes in throwing garbage, subjective norms, individual control behavior of throwing garbage, and individual intentions in throwing garbage. The objectives of this research were to know whether the attitude towards throwing garbage behavior significantly correlates with throwing garbage behavioral intention (represented by H1 = Hypothesis 1), to know whether subjective norms significantly correlate with throwing garbage behavioral intention (H2), to know whether perceived behavioral control significantly correlate with throwing garbage behavioral intention (H3), to know whether behavioral intention significantly correlates with actual throwing garbage behavior (H4), to know whether perceived behavioral control significantly correlates with actual throwing garbage behavior through behavioral intention as a mediator (H5), and to know whether perceived behavioral control directly significantly correlates with actual throwing garbage behavior (H6).

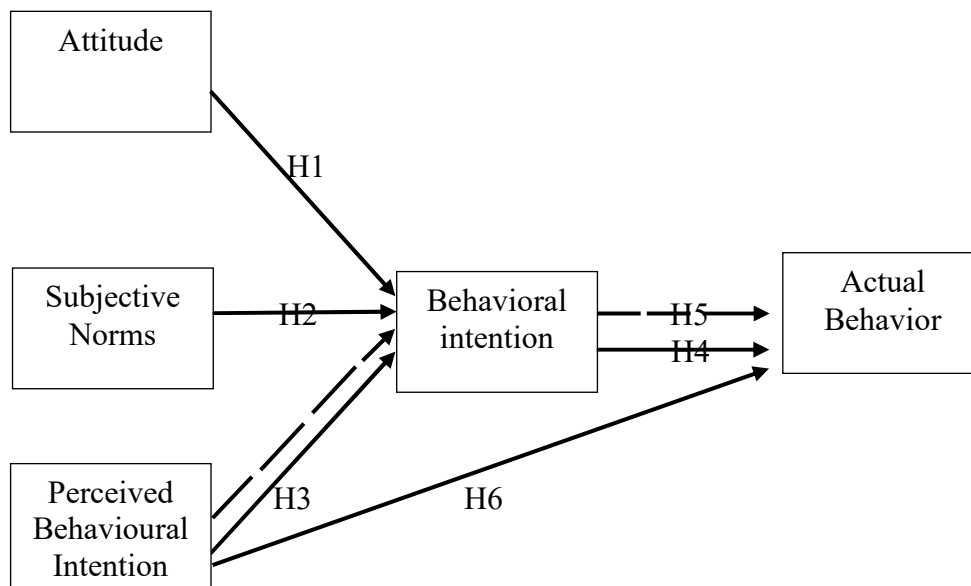


Figure 5. Theoretical Framework Source: Adapted from Ajzen (1991)

## RESEARCH METHODOLOGY

Quantitative method was applied for this research, using structural equation modelling (SEM). Data was collected by using online and offline questionnaires. Data collected were calculated using SPSS 25.0 and AMOS 24.0.

### *Research Design*

The structural equation model (SEM) was used in this research to verify the causality and relationship between all designated variables. Meanwhile, Confirmatory factor analysis (CFA) was used to measure variables, followed by the implementation of Covariance based (CB-SEM). Basically, this process accommodated the involvement of the maximum likelihood procedure to minimize the difference between the observed and estimated covariance matrices, as opposed to maximizing the variance described (Hair, Gabriel, and Patel 2014). The obtained data has been calculated through SPSS and AMOS statistical tools.

### **Population**

The population of this study was those who had ever thrown garbage or had had an issue about garbage while visiting public places (i.e., station, terminal, park, food court) in Cikarang-Bekasi. It was not a requirement that they are natives of Cikarang because visitors of public places could be originated from other cities intentionally visiting Cikarang public places. Online questionnaires were distributed to designated person purposively, in correlation with the objective of this research. Meanwhile, offline questionnaires were distributed directly in public places in Cikarang (i.e., station, terminal, park, food court). Cikarang was chosen to be the area of this research because, according to Bekasi Regency Government, littering behavior in Bekasi Regency, especially in North Cikarang, was increasingly prevalent (Rajagukguk 2019).

### **Sample size**

According to Ferdinand (2002), sample size is at least four or five times of total questions of variables or items that can be used in research. Therefore,  $N = 5 \times Q$  (Ferdinand, 2002), where N represents sample size and Q stands for Questions.

Wolf, Harrington, Clark, & Miller (2013) stated that the range from 100 to 460 cases in the structural equation model (SEM) can be categorized as suitable. In this research, 434 responses were obtained. However, only 396 responses were considered valid.

### **Sampling technique and Instrument**

Purposive sampling was applied in this research, in which researchers determined respondents by establishing specific characteristics that suitable for the objectives of the research. Purposive sampling is often used for field research (Showkat and Parveen 2017). Questionnaires were used to collect data, in the form of the 5-point Likert scales to measure the agreement toward a given statement (Sekaran and Bougie 2016). The scales were 1) Strongly disagree, 2) Disagree, 3) Neutral, 4) Agree, and 5) Strongly agree.

### ***Data Analysis Design***

IBM SPSS 25.0 and AMOS Graphic 24 were applied to process and analyze the obtained data.

### **Pre-test and Validity test**

The pre-test aims to evaluate how well the questionnaires made by the researchers can be understood and interpreted by the respondents. The questionnaires constructed by the researchers have to pass the validity test, before being distributed to research sample. The validity test is measuring how well the questionnaires are (Neuman 2014).

Questionnaires can be considered as valid if the correlation is higher than the r-value. Validity testing was done by IBM SPSS version 25.0 with Pearson Product Moment approach. The researchers decided to use 15 respondents in the pretest, then df was 13, and the r-value was 0.514 with  $\alpha$ : 0.05. Hence, in this research, a statement with a correlation higher than 0.514 is considered valid and a statement with a correlation lower than 0.514 is considered as invalid and would be eliminated.

### **Reliability test**

The reliability test aims to test consistency and stability. Cronbach's alpha represents a reliability coefficient. A number less than 0,6 is considered as poor, while 0,7 is considered as acceptable, and a number over 0,8 is considered as good (Sekaran and Bougie, 2016). The equation of reliability test is as follows:

$$\alpha = \frac{N \cdot \rho}{1 + \rho (N - 1)}$$

Source: Rochaety (2007)

where,  $\alpha$ : instrument's reliability coefficient,  $\rho$ : average inter-item correlation, and N: number of items.

### **Descriptive Analysis**

The researchers summarized all the results of the research using descriptive analysis, with IBM SPSS and Microsoft excel. Through this way, researchers tended to be more focusing on analyzing the process of each statement in the questionnaire.

### **Causal Analysis: Structural Equation Model (SEM)**

The researchers used AMOS for data processing. The structural equation model (SEM) was used to verify the causality and relationship between all variables stated in this research (Hair, Gabriel, and Patel 2014). The structural equation model consists of measurement and structural models. Measurement model is used to measure latent variables, while structural model examines all the hypothetical dependencies based on path analysis (Fan *et al.* 2016).

### Measurement Model

Confirmatory factor analysis (CFA) is used for measuring latent variables. Confirmatory factor analysis (CFA) of CB-SEM allows all latent constructs to be covariance, thus, allowing a quantitative assessment of convergent and discriminant validity for each construct (Hair, Gabriel, and Patel 2014). Measuring the variables, researchers have to check the model fit, validity, and reliability. CR (construct reliability) is considered as adequate if it is on the level of above 0.6, while AVE (average variance extracted) above 0.4 is still regarded as adequate (Fornell and Larcker 1981; Lam, 2012).

There are some criteria of Goodness of Fit which the model recommends to fulfill.

**Table 1. Goodness of Fit**

| Goodness of fit measure | Threshold                  |
|-------------------------|----------------------------|
| CMIN                    | $P \geq 0.5$ ( $N < 250$ ) |
| CMIN/df                 | $\leq 3$                   |
| GFI                     | $\geq 0.90$                |
| AGFI                    | $\geq 0.80$                |
| RMR                     | $\leq 0.1$                 |
| RMSEA                   | $\leq 0.08$                |
| NFI                     | $\geq 0.90$                |
| CFI                     | $\geq 0.90$                |
| TLI                     | $\geq 0.90$                |
| PGFI                    | $\geq 0.50$                |
| PCFI                    | $\geq 0.50$                |
| PNFI                    | $\geq 0.50$                |

Source: Hair *et al.* (2010)

- Absolute fit index (AFI) assesses whether there are variants that cannot be explained in the model, involving p-value, the goodness of fit index (GFI), adjusted GFI (AGFI), and root mean square error of approximation (RMSEA).
- Incremental fit index (IFI) compares a certain model to conceivable standard or invalid models assessed utilizing similar information, involving Tucker-Lewis index (TLI), Comparative Fit index (CFI), and the IFI.
- Parsimonious fit index (PFI) called as adjusted measure concerns on how well the model measure is fit and parsimony, involving the normed fit index (CMIN/df) (Muala, 2010).

### Structural Model

Path analysis aims to determine the relationship among variables. Researchers used the function of mediation, assuming that variables are capable to influence the output direct or indirectly through another variable. Hypothesis testing is assessed through three points, namely the values of CR, significance (*p*-value), and R-square correlation. CR should be more than 1.96 and *p*-value should less than 0.05. The values of R-square of 0.25, 0.50, 0.75 are considered as weak, moderate, and substantial, respectively (Fan *et al.* 2016).

## RESULTS AND DISCUSSION

The discussion related to the research results would begin with the pre-test calculation as follows

### *Pre-Test*

#### 1. Validity Test

The researchers decided to take a sample of 15 for pre-test with 0.05 as the significance level. Statement can be stated as valid if Pearson correlation is higher than 0.514. Invalid statement would be eliminated.

**Table 2. Validity Test**

| Attitude                     |         |                 |        |
|------------------------------|---------|-----------------|--------|
| Items                        | R-table | R compute value | Result |
| ATT1                         | 0.514   | 0.551           | VALID  |
| ATT2                         | 0.514   | 0.732           | VALID  |
| ATT3                         | 0.514   | 0.854           | VALID  |
| ATT4                         | 0.514   | 0.532           | VALID  |
| ATT5                         | 0.514   | 0.532           | VALID  |
| Subjective Norm              |         |                 |        |
| Items                        | R-table | R compute value | Result |
| SN1                          | 0.514   | 0.717           | VALID  |
| SN2                          | 0.514   | 0.647           | VALID  |
| SN3                          | 0.514   | 0.671           | VALID  |
| SN4                          | 0.514   | 0.604           | VALID  |
| Perceived Behavioral control |         |                 |        |
| Items                        | R-table | R compute value | Result |
| PBC1                         | 0.514   | 0.711           | VALID  |
| PBC2                         | 0.514   | 0.704           | VALID  |
| PBC3                         | 0.514   | 0.560           | VALID  |
| Behavioral intention         |         |                 |        |
| Items                        | R-table | R compute value | Result |
| INT1                         | 0.514   | 0.719           | VALID  |
| INT2                         | 0.514   | 0.748           | VALID  |
| INT3                         | 0.514   | 0.668           | VALID  |
| INT4                         | 0.514   | 0.877           | VALID  |
| INT5                         | 0.514   | 0.729           | VALID  |
| INT6                         | 0.514   | 0.652           | VALID  |
| Actual Behavior              |         |                 |        |
| Items                        | R-table | R compute value | Result |
| BEH1                         | 0.514   | 0.540           | VALID  |
| BEH2                         | 0.514   | 0.749           | VALID  |
| BEH3                         | 0.514   | 0.725           | VALID  |
| BEH4                         | 0.514   | 0.527           | VALID  |

Source: IBM SPSS 25.

As can be seen, there are 5 attitudes (ATT) in the questionnaire, with R compute values above 0.514. Therefore, researchers continued with 5-statement questionnaires for the variable attitude towards throwing garbage behavior.

There are 4 subjective norms (SN) in the questionnaire, with R compute values above 0.514. Therefore, researchers continue with 4 statement questionnaire for the variable subjective norms.

There are 3 perceived behavioral controls (PBC) in the questionnaire, with R compute value above 0.514. Therefore, researchers decided to continue with 3-statement questionnaire for the variable perceived behavioral control.

There are 6 behavioral intentions (INT) in the questionnaire, with R compute value above 0.514. Therefore, researchers decided continue with 6-statement questionnaire for the variable behavioral intention.

There are 4 actual behaviors (BEH) in the questionnaire with, R compute value above 0.514. Therefore, researchers decided to continue with 4-statement questionnaires for the variable actual behavior.

### Reliability Test

The questionnaire is considered reliable if Cronbach's alpha coefficient is above 0.8. Table 3 shows that Cronbach's alpha coefficient values for almost all variables are above 0.8, except just one variable that has an alpha coefficient close to 0.8. It means that the questionnaire is considered as reliable. Therefore, the questionnaire is suitable for research.

**Table 3. Reliability Test**

| Variables                         | Cronbach's alpha | Description      |
|-----------------------------------|------------------|------------------|
| Attitude (X1)                     | 0.795            | Acceptable       |
| Subjective Norm (X2)              | 0.855            | Good Reliability |
| Perceived Behavioral Control (X3) | 0.856            | Good Reliability |
| Behavioral Intention (Y)          | 0.925            | Good Reliability |
| Actual Behavior (Z)               | 0.902            | Good Reliability |

Source: IBM SPSS 25.

### Descriptive Analysis

Descriptive analysis in this section would present an overview of the responses from the respondents, related to the distributed questionnaire. The proportion of responses from these respondents would later complement the results of the SEM analysis that would be carried out.

**Table 4. Descriptive Analysis**

| Items                                                                                                                  | Attitude |      |       |       |       |
|------------------------------------------------------------------------------------------------------------------------|----------|------|-------|-------|-------|
|                                                                                                                        | 1        | 2    | 3     | 4     | 5     |
| The use of tumbler drinking bottles tends to reduce plastic bottle waste.                                              | 2%       | 3.2% | 8%    | 28.1% | 58.7% |
| Disposing of trash in its place tends to help increase waste recycling efforts.                                        | 1.8%     | 2.9% | 12.9% | 32.4% | 50%   |
| Donating used items that are still suitable for use (clothing, books, plastic bottles, shoes) to those in need to help | 2.2%     | 3.6% | 9.6%  | 29.4% | 55.2% |

|                                                                                                                                                                                                  |      |      |       |       |       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|-------|-------|-------|
| me reduce the amount of items I waste.                                                                                                                                                           |      |      |       |       |       |
| Disposing of trash in its place, helps reduce soil pollution.                                                                                                                                    | 1.6% | 2.3% | 6.2%  | 26.4% | 63.3% |
| Disposing of trash in its place, helps reduce water pollution.                                                                                                                                   | 3.5% | 0.6% | 6.9%  | 23%   | 66%   |
| Subjective Norm                                                                                                                                                                                  |      |      |       |       |       |
| Items                                                                                                                                                                                            | 1    | 2    | 3     | 4     | 5     |
| Management of public place (for example: stations, terminals, parks, food courts) always keep public places free from scattered rubbish.                                                         | 1.6% | 4.6% | 19.5% | 42.3% | 32%   |
| When in a public place (for example: a station, a terminal, a park, a food court), every member of my family always urges me to throw garbage in its place.                                      | 1.1% | 5.2% | 15.2% | 32.9% | 45,6% |
| When in public places (for example: stations, terminals, parks, food courts), every member of my family always throws garbage in its place.                                                      | 1.5% | 3.9% | 18.4% | 34.3% | 41,9% |
| When in public places (for example: stations, terminals, parks, food courts), every member of my friends always throws garbage in its place.                                                     | 2.5% | 8%   | 35.7% | 29.4% | 24.4% |
| Perceived Behavioral control                                                                                                                                                                     |      |      |       |       |       |
| Items                                                                                                                                                                                            | 1    | 2    | 3     | 4     | 5     |
| The spread of trash cans in every public place (for example: stations, terminals, parks, food courts) tends to be evenly distributed, making it easy to reach.                                   | 1.3% | 4.6% | 11.2% | 52.3% | 30.6% |
| Even though I am in a hurry when in a public place (for example: a station, a terminal, a park, a food court), I always take the time to dispose of trash in its place.                          | 1.1% | 4.8% | 13.1% | 35.7% | 45.3% |
| Even though I am in a hurry when I am in a public place (for example: a station, a terminal, a park, a food court), I always keep my trash first if I have not found a trash can yet.            | 1.4% | 3.4% | 10.3% | 33.1% | 51.8% |
| Behavioral intention                                                                                                                                                                             |      |      |       |       |       |
| Items                                                                                                                                                                                            | 1    | 2    | 3     | 4     | 5     |
| When in a public place (for example: stations, terminals, parks, food courts), I intend to always throw garbage in its place.                                                                    | 2.5% | 0.2% | 8.7%  | 29.9% | 58.5% |
| When throwing trash in public places (stations, terminals, parks, food courts), I will look for trash cans first.                                                                                | 0.8% | 3.9% | 13.8% | 31.5% | 50%   |
| When disposing of trash in public places (for example: stations, terminals, parks, food courts), I will make sure that the garbage that I have already thrown, actually goes into the trash can. | 1.3% | 0.6% | 11.5% | 37.3% | 49.3% |
| When I am in a public place (for                                                                                                                                                                 | 1.3% | 2.5% | 16.5% | 34.1% | 45.6% |

|                                                                                                                                                       |          |          |          |          |          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|----------|----------|----------|
| example: a station, a terminal, a park, a food court), I will quote the garbage that I have already thrown away if it does not go into the trash can. |          |          |          |          |          |
| When leaving public places (stations, terminals, parks, food courts), I tend to expect, I do not pollute the public place.                            | 1.3%     | 2.5%     | 12.2%    | 33.8%    | 50.2%    |
| I always want to be fully responsible for my own trash.                                                                                               | 0.3%     | 1.1%     | 10%      | 30.4%    | 58.2%    |
| <b>Actual Behavior</b>                                                                                                                                |          |          |          |          |          |
| <b>Items</b>                                                                                                                                          | <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> |
| When in a public place (for example: stations, terminals, parks, food courts), I often take out the trash.                                            | 4.6%     | 8.2%     | 35%      | 28.3%    | 23.9%    |
| I tend to need a short time to find trash cans in public places (for example: stations, terminals, parks, food courts).                               | 1.8%     | 10.8%    | 29%      | 38.2%    | 20.2%    |
| When in a public place (for example: stations, terminals, parks, food courts), taking out the trash in its place does not require a long time.        | 1.8%     | 5,5%     | 23.7%    | 39.8%    | 29.2%    |
| Trash scattered in public places (stations, terminals, parks, food courts) is the responsibility of all visitors, including me.                       | 3%       | 5%       | 22.3%    | 32.7     | 37%      |

Source: Developed by the Researchers (2020)

Table 4 represents the answers of the respondents. Most of them agreed with the attitude towards reducing waste. Also, they agreed that a good attitude toward throwing garbage would contribute to making a cleaner environment.

They also agreed that most of the important individuals in their life expect them to have good throwing garbage behavior. Most of them believed that it is important for individuals to apply good throwing garbage behavior on a daily basis.

Most of the respondents also agreed that trash cans in a public place had been evenly distributed, making it easier for them to dispose of waste. However, they disagreed that trash cans in several public places were well-maintained. They agreed that every individual has to be responsible for their waste. The majority of respondents agree that they have a good intention towards garbage. Most of them were willing to be reprimanded if they misbehave towards garbage.

Most of the respondents agreed that they are already accustomed to throwing garbage in its place since childhood, and felt guilty if leaving trash everywhere. Most of them agreed that they often did throwing garbage in public places and tended to need a short time to find trash cans.

### **Causal Analysis**

The researchers constructed Structural Equation Modeling using 5 variables, namely Attitude (ATT), Subjective Norm (SN), Perceived Behavioral Control (PBC), Behavioral Intention (BI), and Actual Behavior (BEH). The model had to be tested and analyzed using statistical tool SPSS AMOS 24.

### Measurement Model

Basically there are two approaches that can be taken to assess the reliability of the measurement model, namely the Construct Reliability (CR) and Average Variance Extracted (AVE) tests, as follows.

**Table 5. Validity and Reliability Model**

| Variables | CR    | AVE   |
|-----------|-------|-------|
| ATT       | 0.803 | 0.451 |
| SN        | 0.746 | 0.442 |
| PBC       | 0.740 | 0.493 |
| INT       | 0.859 | 0.507 |
| BEH       | 0.719 | 0.405 |

Source: AMOS 24 output

Table 5 presents the results of the validity and reliability of 396 samples. The results of CR are above 0.6, which means reliable. AVE over 0.4 still can be accepted when the CR is above 0.6 (Fornell and Larcker 1981; Lam 2012). So, the reliability and validity test model requirements have been fulfilled. Then the factor correlation calculation is carried out to ensure that no correlation can interfere with discriminant validity. The results can be seen below:

**Table 6. Factor Correlation Matrix**

| Factor Correlation Matrix                                                                    |       |       |       |       |       |
|----------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|
| Factor                                                                                       | 1     | 2     | 3     | 4     | 5     |
| 1                                                                                            | 1.000 | 0.609 | 0.283 | 0.567 | 0.445 |
| 2                                                                                            | 0.609 | 1.000 | 0.250 | 0.423 | 0.364 |
| 3                                                                                            | 0.283 | 0.250 | 1.000 | 0.308 | 0.370 |
| 4                                                                                            | 0.567 | 0.423 | 0.308 | 1.000 | 0.391 |
| 5                                                                                            | 0.445 | 0.364 | 0.370 | 0.391 | 1.000 |
| Extraction Method: Maximum Likelihood.<br>Rotation Method: Promax with Kaiser Normalization. |       |       |       |       |       |

Source: IBM SPSS 25

Table 6 shows the factor correlation matrix. As a result, there are no correlations above 0.7 between variables in this research. Therefore, discriminant validity in this model is established.

### The Goodness of Fit Test

The model fit of SEM needs to be fulfilled the value requirement of model fit. Several points need to be passed, or, at least, can be considered as acceptable.

**Table 7. The Goodness of Fit Test**

Source:  
SPSS  
AMOS  
24

Table 7  
shows  
the  
SEM  
Model  
Fit  
results.  
It could

| Goodness of fit measure | Criteria             | Value | Value modified | Remarks  |
|-------------------------|----------------------|-------|----------------|----------|
| CMIN                    | $P \geq 0.5$ (N<250) | 0.000 | 0.000          | Good fit |
| CMIN/df                 | $\leq 3$             | 3.396 | 2.072          | Good fit |
| GFI                     | $\geq 0.90$          | 0.732 | 0.915          | Good fit |
| AGFI                    | $\geq 0.80$          | 0.699 | 0.892          | Good fit |
| RMR                     | $\leq 0.1$           | 0.060 | 0.043          | Good fit |
| RMSEA                   | $\leq 0.08$          | 0.078 | 0.054          | Good fit |
| NFI                     | $\geq 0.90$          | 0.656 | 0.888          | Not fit  |
| CFI                     | $\geq 0.90$          | 0.727 | 0.936          | Good fit |
| TLI                     | $\geq 0.90$          | 0.709 | 0.926          | Good fit |
| PGFI                    | $\geq 0.50$          | 0.652 | 0.716          | Good fit |
| PCFI                    | $\geq 0.50$          | 0.681 | 0.803          | Good fit |
| PNFI                    | $\geq 0.50$          | 0.614 | 0.761          | Good fit |

be concluded that the model was acceptable since already passed almost all the thresholds.

### Structural Model

After passing the Goodness of fit test, a structural model equation was built as can be seen below:

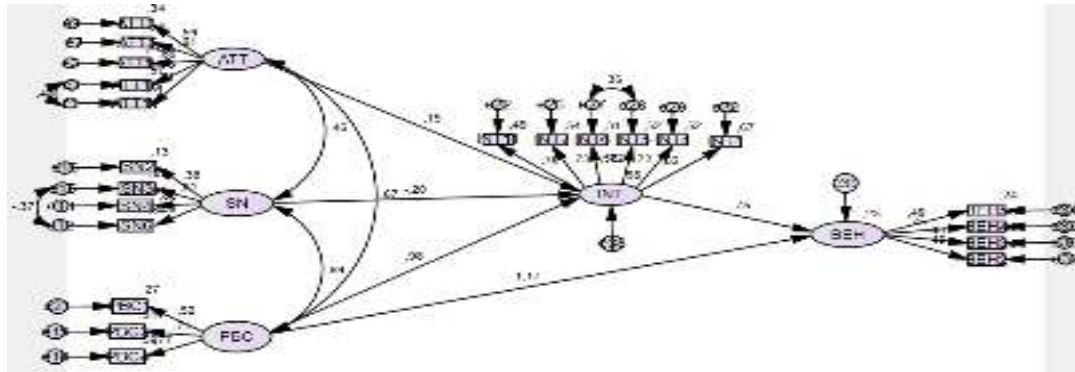


Figure 6. Structural Model Equation , Source: SPSS AMOS 24.

### Hypothesis testing

From the structural model established, hypothesis testing was carried out in the context of answering research questions as follows:

**Table 8. Regression Weight**

|     |     |     | Estimation | S.E.  | C.R.   | P     | Label   |
|-----|-----|-----|------------|-------|--------|-------|---------|
| INT | <-- | ATT | 0.186      | 0.061 | 3.036  | 0.002 | ATT_INT |
| INT | <-- | SN  | -0.169     | 0.054 | -3.123 | 0.002 | SN_INT  |
| INT | <-- | PBC | 0.789      | 0.082 | 9.65   | ***   | PBC_INT |
| BEH | <-- | INT | -0.71      | 0.354 | -2.005 | 0.045 | INT_BEH |
| BEH | <-- | PBC | 0.886      | 0.293 | 3.025  | 0.002 | PBC_BEH |

Source: SPSS AMOS 24

Based on the standards, the  $t$ -value required was above 1.96 and  $p$ -value was below 0.05. Table 8 shows that the results indicated that every variable already reach the required value. However, the  $p$ -value of indirect effect was above 0.05.

**Table 9. Mediation Estimates on PBC and BEH**

| Parameter | Estimate | Lower  | Upper | P     |
|-----------|----------|--------|-------|-------|
| A x B     | -0,56    | -4,338 | 0,274 | 0,551 |

Source: SPSS AMOS 24

Then, the standardized regression weight calculations were performed, with the following results. Standardized regression weight allowed the researchers to explore the tendency of impact from indicating variable to another

**Table 10. Standardized Regression Weight.**

|     |      |     | Estimate |
|-----|------|-----|----------|
| INT | <--- | ATT | 0.186    |
| INT | <--- | SN  | -0.202   |
| INT | <--- | PBC | 0.985    |
| BEH | <--- | INT | -0.749   |
| BEH | <--- | PBC | 1.166    |

Source: SPSS AMOS 24

. Table 10 shows that Attitude (ATT) and Perceived Behavioral Control (PBC) gave positive correlations towards Behavioral Intention (INT) of, respectively, 0.186 and 0.985. Perceived Behavioral Control (PBC) gave a positive correlation towards Actual Behavior (1.166).

**Table 11. Mediation Estimate**

|       | Estimate |
|-------|----------|
| A x B | -0,56    |

Source: SPSS AMOS 24.

However, Subjective Norms gave a negative correlation towards behavioral intention (INT) (-0.202). Behavioral Intention gave correlation impact towards actual behavior (-0.749). Also, as a mediating variable, intention gave negative correlation in perceived behavioral control to actual behavior indirectly (-0.56).

Table 12 presents the reliability of the endogenous variable. Mediating variable was considered reliable with Squared Multiple Correlations greater than 0.07 (INT=0.982). However, dependent variable was considered as poor with Squared Multiple Correlations below 0.07 (BEH=0.226).

**Table 12. Squared Multiple Correlations**

|     | Estimate |
|-----|----------|
| INT | 0,982    |
| BEH | 0,226    |

Source: SPSS AMOS 24.

### Discussion

Based on hypothesis testing, H1, H3, H6 were accepted, while H2, H4, and H5 were rejected. The R-square of behavioral intention in this model was 0.982, meaning that attitude, subjective norms, and perceived behavioral control, explained the intention of throwing garbage in public places as much as 98.2%. Meanwhile, the R-square of actual behavior was 0.226, meaning that behavioral intention and perceived behavioral control explained the actual behavior of throwing garbage in public places of 22.6%. This indicated that there were other factor not explained in this research, which determined the actual behavior of throwing garbage in public places of 77.4%.

Furthermore, observations were made to the results of the calculation of the hypothesis test of Behavioral intention, as can be seen in Table 13 below, and it shows that all variables had a significance value below 0.05, indicating that the contribution of these variables were significant, but there was one hypothesis that had a negative estimate, meaning significant but had the opposite direction.

**Table 13. Hypothesis Results of Behavioral intention**

| Hypothesis |                                                                                                                 | Estimates | Significance (P) | Remarks     |          |
|------------|-----------------------------------------------------------------------------------------------------------------|-----------|------------------|-------------|----------|
|            |                                                                                                                 |           |                  | Statistic   | Research |
| H1         | Attitude towards throwing garbage behavior significantly correlates with throwing garbage behavioral intention. | 0.186     | 0.002            | Significant | Accepted |
| H2         | Subjective norm significantly correlates with throwing garbage behavioral intention.                            | -0.169    | 0.002            | Significant | Rejected |
| H3         | Perceived behavioral control significantly correlates with throwing garbage behavioral intention.               | 0.789     | ***              | Significant | Accepted |

Source: Developed by the Researchers (2020)

### Attitude towards behavioral intention of throwing garbage

Attitude has a significant correlation directly proportional to throwing garbage behavioral intention. Based on Table 13, H1 is accepted. It indicates that the good value of public places visitor's attitude will develop a proper intention of throwing garbage in the right way. This finding is similar to what Hu *et al.* (2018) found, namely factors influencing visitors' littering intention, where attitude significantly affects behavioral intention.

### **Subjective Norm towards behavioral intention of throwing garbage**

Subjective norm has a significant correlation on throwing garbage behavioral intention but in negative beta coefficient. It means an inverse relationship. Therefore, H2 is rejected and this finding is related to the findings of Leijdekkers *et al.*, (2015) So, the presence of cleaning service officers in public places lowers the visitors' intention of throwing garbage in the right way since they believe that their garbage will be taken care of by cleaning service officers.

### **Perceived Behavioral control towards behavioral intention of throwing garbage**

Perceived behavioral control has a significant correlation directly proportional to throwing garbage behavioral intention. Therefore, H2 is accepted. It indicates that availability of trash cans facilities adequately in public places will develop a proper intention of throwing garbage into the trash cans by the visitors. This finding is similar to the findings of Hu *et al.* (2018) in terms of factors influencing visitors littering intention, in which perceived behavioral control significantly affected behavioral intention.

Then, observations were made to the results of the calculation of the hypothesis test of Actual Behavior, as can be seen in Table 14 below.

**Table 14. Hypothesis Results of Actual Behavior**

| Hypothesis |                                                                                                                                               | Estimates | Significance (P) | Remarks         |          |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------|-----------------|----------|
|            |                                                                                                                                               |           |                  | Statistic       | Research |
| H4         | Throwing garbage behavioral intention significantly correlate with actual throwing garbage behavior.                                          | -0.71     | 0.045            | Significant     | Rejected |
| H5         | Throwing garbage behavioral intention mediates perceived behavioral control to significantly correlate with actual throwing garbage behavior. | -0.56     | 0.551            | Not Significant | Rejected |
| H6         | Perceived behavioral control significantly correlates with actual throwing garbage behavior.                                                  | 0.886     | 0.002            | Significant     | Accepted |

Source: Developed by the Researchers (2020)

### **Behavioral intention towards actual behavior of throwing garbage in public places**

Table 14 shows that throwing garbage behavioral intention has a significant correlation with actual throwing garbage behavior but in negative beta coefficient, which indicates an inverse relationship. On the other hand, the  $p$ -value of the indirect effect of perceived behavioral control to actual throwing garbage behavior with throwing garbage behavioral intention as mediating variable is above 0.05. Therefore, H4 and H5 are rejected because there are complex relationships between behavioral intention and behavior. So, the visitors' intention to throwing garbage in the right way does not always mean that they will perform the actual behavior of throwing garbage in the right way.

### **Perceived Behavioral control towards behavioral intention of throwing garbage**

However, perceived behavioral control has significant correlation directly proportional to actual throwing garbage behavior. Therefore, H6 is accepted. These findings are similar to the results of research by Kerner *et al.*, (2001), expressing that behavior cannot always be judged by existing intentions. Behavior can occur due to behavioral control perceived by individuals. Majority of people in Bima, NTB, behavior in managing waste is based on behavioral control on them (Darmawan 2014).

## **CONCLUSION**

This research is expected to have academic contribution to several theoretical applications. The researchers tried to analyze the actual throwing garbage behavior in public places, based on attitudes towards throwing garbage, subjective norms, behavioral control as an independent variable and throwing garbage behavioral intention as a mediating variable, according to theory of planned behavior. The theory of planned behavior is fit for the actual behavior of throwing garbage in public places.

This research found that good value of public places visitor's attitude will develop a proper intention of throwing garbage in the right way. In terms of subjective norms, there is a misunderstanding of a cleaning service officers' function. The visitors believe that their garbage will be taken to the trash cans or taken care by the cleaning service officers. An adequate availability of trash cans facilities in public places will develop the proper actual behavior of the visitors to throw garbage into the trash cans.

### **Recommendations for Administering Educational Institutions and Public Places**

The results of this study provide several recommendations for several managers of public places, especially educational institutions. It is hoped that an intensive campaign aims to raise awareness as the next generation.

Including public place managers are obliged to carry out various campaigns on visitors to be responsible for their own waste when visiting public places. In addition, managers are also expected to provide better, more accessible, waste disposal facilities and maintenance of waste disposal facilities.

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