Environmental knowledge and behavior of employees in office building

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Abstract. The environmental problem faced by the world nowadays is getting worse. If this condition continues to occur, then the industrial and service sector will not last long. One of the factors which can succeed in the company environmental program is environmental care behavior. It needs knowledge related to the environment to have the ability to act following the environmental principles and can succeed in the implementation of an EMS system. Therefore, this research aims to analyze the correlation between employee's environmental knowledge and environmental care behavior. This research used a quantitative approach and conducted at one of the logistics companies. Data collection was conducted through a questionnaire. Then, research data analysis was conducted through correlation and regression analysis using SPSS software. The basis of deciding on hypothesis acceptance was based on the significance value (p) based on the reliability level 95%. The research results show a correlation between employees' knowledge and environmental care behavior with p-value ≤ 0.05, namely 0.000. Then, the result of the determination coefficient is based on, namely, in the amount of $R^2 = 0.359$, which means the employee's knowledge variable can explain the change of environmental care behavior in the amount of 35.9%.

1. Introduction

The world's environmental problem nowadays is getting worse because day by day, the total population increases rapidly [1]. Total population growth, which continues to increase, causes environmental capability to fix itself to becomes exceeded. This occurs because the environmental capability has limitations, and supporting space power is also getting smaller [1]. For example, humans frequently in their deeds, either awarded or not doing substance added to the environment until causing pollution [2]. Pollution is an occurrence that is not only incidental caused by pollution but the new impact that can be detected after decades lasted [3].

Environmental pollution, in turn, will cause a significant change in environmental quality. The real example occurs in one of the cities in the west part of India because the total population increases, causing high-density level at the specific area until the development area management becomes bad with well used for a drink is close to septic tank until intrusion occurs and causing pollution on the water in the well [4]. This pollution is caused by the pressure on nature is getting heavier. In contrast, the natural ability to keep the balance has its limits until it cannot prevent the disturbance from outside, and pollution occurs [2]. Moreover, in this globalization era, one of the problems is the...
environmental problem. If the environment is polluted, then the environment as the source for the industrial sector and service will not last for a long time.

Industrial sector development nowadays continues to increase following the increase of demands on goods and services. In 2018 only, Indonesia's economic growth grows in the amount of 5.17% [5], which means it has a positive impact on the economic sector. However, the growth itself also has potency in hurting the environment. Environmental degradation will occur and decrease of environmental quality. The negative impact occurs in the industrial sector, and also service requires the company to also play an active role in creating environmentally friendly products or services. Therefore, either the industrial sector and service of a small scale or big scale are required to manage the environment well.

One way to overcome environmental impact at the company is by implementing the standard of Environmental Management System (EMS) ISO 14001. The implementation of EMS ISO 14001 at a company does not mean the environmental problem has been overcome thoroughly because, in its practice, there are still some problems caused by some factors either from internal factors or external factors of the company until it needs continuous evaluation for sustainable improvement. The internal factor that can succeed in the company environmental program is the employees' environmental care problem. Environmental care behavior requires environmental knowledge to have an excellent ability to take action. This is in line with the statement by [6] stating that to raise a behavior requires knowledge. Environmental knowledge plays an essential role in daily activities because the higher someone's knowledge of the environment, their environmental care behavior also increases [7].

This research was conducted at one of the logistics and transportation companies because few researchers conducted similar research conducted at the workplace or office. Much research is related to the environmental knowledge and behavior of environmental care conducted only in household sectors. This research's exciting thing is that this company has owned three management systems, and one of them is concerning the Environmental Management System (EMS). Even though it has a guarantee of good environmental management with an EMS certificate, its environmental management still does not run maximally. Based on field observation at research location, related to garbage collection at all spots of garbage placement after work time, found garbage mixed among organic and non-organic waste, almost 90% mainly in the location of garbage bin existed in the pantry and close to the area of company work, 10% that is not mixed was only found in some spots such as the company manager room. One indicator of environmental care behavior is seen from how is the garbage disposal behavior, in line with the research by [7] stating that the indicator of environmental care behavior is through environmental rule reinforcement and preventing environmental pollution. The observation result also found many employees bought food from outside until the garbage potency produced undoubtedly will be more. This supposes to be attention for the company because the guarantee of an EMS certificate is not adequate. Still, it needs support from the employee's environmental care behavior to optimize and implement the EMS at the company. Therefore, this research aims to analyze the correlation between employees' environmental knowledge and environmental care behavior.

2. Method
This research method would be explained in detail based on the case study location, and stage by stage of the data analysis started from the process of determining the samples and taking the research samples, data processing, and data analysis.

2.1. Case study location
This research was conducted at one of the global companies in the field of logistics and transportation. This company is located at Tangerang City in Soekarno-Hatta International Airport, as shown in Figure 1 below. Data collection was in cross-sectional data, meaning the data were collected from the same or different objects in a different time interval [8]. As a global company, it has owned a
management system certificate established by the International Organization for Standardization (ISO) such as ISO 9001, ISO 14001, and ISO 45001.

![Figure 1. The research location map.](image)

2.2. Data collection and analysis
The research approach used was quantitative. The quantitative approach was chosen because it is a confirmation method. Its analysis focuses more on the numbers processed using the statistical method to measure each research variable and test the hypothesis proposed. The research method used was a combination of the quantitative research method and the qualitative research method. The quantitative research method was conducted by doing the measurement until the quantitative research employed a research instrument that its data collection was through observation and obtained secondary data to support the quantitative data. The researcher conducted data collection by using a questionnaire with a measurement scale using a Likert scale, namely the variable which would be measured is elaborated to be indicator/sub-indicator variable, then arranged in the form of instrument items which can be in the form of question or statements [9]. This Likert scale was used to measure respondents' attitudes, opinions, and perceptions about the symptoms or social phenomenon [8]. The Likert scale has an extremely positive until extremely harmful gradation. Table 1 below will explain the answer criteria and score the weight of each answer criteria.

| Answer          | Disagree | Less Agree | Agree | Extremely Agree |
|-----------------|----------|------------|-------|-----------------|
| Positive        |          |            |       |                 |
| Statement Value | 1        | 2          | 3     | 4               |
| Negative        |          |            |       |                 |
| Statement Value | 4        | 3          | 2     | 1               |

Table 1. The answer criteria and score the weight of each answer.
The following is the statement used in the questionnaire to assess the variable of environmental care behavior and the knowledge of the research sample's environment. The statement in this questionnaire had been validated beforehand in each of the statement items. This validity test was used to show how far it is a measurement instrument to measure what suppose to be measured. If an instrument is valid already meaning, it can measure something correctly and following what is wanted to be measured. The research questionnaire statement can be seen in Table 2 below:

| Variable                  | Questionnaire Statements                                                                 | Answer Choices                      |
|---------------------------|------------------------------------------------------------------------------------------|-------------------------------------|
| Environmental Care Behavior| 1. I prevent the occurrence of pile up and messy garbage at work and throw away the waste into the trash can. | ● Disagree  
               2. I was taking out the trash wherever and whenever it must be in its place.  
   3. I support the waste program developed in my work environment by sorting the waste following its characteristics/type.  
   4. I will take the waste if I see it scattered in the work environment and take it out to the trash can.  
   5. I inform my co-workers if he/she takes out the waste without considering the characteristics/type.  
   6. I prevent arising garbage by reusing the used paper on another side (one-sided) for photocopy or printing.  
   7. I do preview/editing documents before printing them.  
   8. I bring my food container and tumbler to work to decrease garbage.  
   9. I always switch off the room lamp if it is not used anymore, for instance, after the meeting.  
  10. I will report to the QHSE department if environmental pollution occurs in the work area. | ● Less agree  
               ● Agree  
               ● Extremely agree |
| Environmental Knowledge   | 1. Waste sorting at the company aims to decrease the garbage volume, take care of the environment, and make the environment cleaner and healthier.  
               2. The garbage let piled up will be the den/source of disease germs.  
               3. Garbage generally is divided into two categories, namely wet waste (organics) and dry waste (non-organics).  
               4. Carrying self-food containers and tumblers can decrease garbage volume.  
               5. The procedure of emergency response is made to prevent the occurrence of environmental danger in a significant amount.  
               6. Taking out used laundry water or using mopping water directly to the water body without processing will pollute the water.  
               7. Motor vehicle smoke causes global warming. | ● Disagree  
               ● Less agree  
               ● Agree  
               ● Extremely agree |
The calculation of total samples was based on the total population in this research determined using the Slovin formula [9], as follows:

\[ n = \frac{N}{1+N\cdot e^2} \]  

Description:
1) \( n \) = Sample size
2) \( N \) = Population size
3) \( e \) = Tolerated error level of sample selection

With the total respondent's population was in the amount of 212 employees spread all over Indonesia. The population that would be taken in this research are the respondents living in Jakarta and Tangerang area, in the amount of 186 employees, based on the calculation using the error level 5% (0,05) until obtained total minimum samples in the amount of 127 people and to anticipate the presence of data that cannot be used then added data 10% (0,1) of total minimum samples as back up data, namely 13 people. Data analysis of this research obtained from the questionnaire would be conducted correlation and regression analysis using Statistical Product and Service Solutions (SPSS) Software. The purpose of this analysis is to find out the correlation among tested variables. First, through correlation coefficient (R) and significance (p) or probability and to find out its effect through correlation coefficient (R) and determinant coefficient (R² square). The basic of deciding on hypothesis acceptance is by looking at the correlation coefficient (R) compared to the R table, namely:
1) If \( R \) count value > R Table, then (Ho) is rejected and (Ha) is accepted
2) If \( R \) count value < R Table, then (Ho) is accepted and (Ha) is rejected

Next, the basis of deciding on hypothesis acceptance is based on the significance value or probability (p) based on the reliability level 95% or value (\( \alpha \)) = 0,05. The basic of taking a decision based on the significance value or probability (p) is:
1) If \( p \)-value > \( \alpha \) (0,05), then (Ho) is accepted and (Ha) is rejected
2) If \( p \)-value ≤ \( \alpha \) (0,05), then (Ho) is rejected and (Ha) is accepted

Secondly, conducted advanced testing, namely regression test to find out the strength and correlation direction stated by correlation coefficient (R), which means the higher the correlation coefficient value, then the higher the strength of the relationship between the two, and vice versa, which is around +1 until -1 [9]. The relationship strength interpretation between two variables are stated [8], as follows:
1) 0,00-0,199 = Extremely low/ weak
2) 0,20-0,399 = Low/ Rather strong
3) 0,40-0,599 = Medium/ Strong enough
4) 0,60-0,799 = Strong
5) 0,80-1,000 = Extremely strong

Then, the determination coefficient (R² square) is the dependent variable's contribution level towards the independent variable. The determination coefficient is needed in this research to know how the effect occurs and there is or is no effect itself [9]. Therefore, the determination coefficient value states the overall variation proportion independent variable value that can be explained or caused by the linear correlation with the independent variable score [9].

3. Results and discussion

3.1. The Description of employees environmental knowledge
The description of employee's knowledge at the company who becomes the respondents of this research is displayed in table 3 below.
Table 3. The description of employees environmental knowledge.

| No. | Statement                                                                                                                          | Disagree | Less Agree | Agree | Extremely Agree |
|-----|-------------------------------------------------------------------------------------------------------------------------------------|----------|------------|-------|-----------------|
| 1   | Waste sorting at the company aims to decrease the garbage volume, take care of the environment, and make the environment cleaner and healthier. | 0,00%    | 1,60%      | 46,5% | 52,0%           |
| 2   | The garbage let piled up will be the den/source of disease germs.                                                                    | 2,40%    | 0,00%      | 23,6% | 74,0%           |
| 3   | Garbage generally is divided into two categories, namely wet waste (organics) and dry waste (non-organics).                          | 0,80%    | 2,40%      | 48,0% | 48,8%           |
| 4   | Carrying self-food containers and tumblers can decrease garbage volume.                                                             | 0,00%    | 2,40%      | 33,1% | 64,6%           |
| 5   | The procedure of emergency response is made to prevent the occurrence of environmental danger in a significant amount.            | 0,80%    | 0,80%      | 56,7% | 41,7%           |
| 6   | Taking out used laundry water or using mopping water directly to the water body without processing will pollute the water.        | 3,10%    | 3,90%      | 58,3% | 34,6%           |
| 7   | Motor vehicle smoke causes global warming.                                                                                           | 1,60%    | 0,80%      | 41,7% | 55,9%           |

Based on the result of data processed of employees' knowledge variables related to the environment in table 3, following the research method conducted distribution based on category determined by the researcher, namely less good, good enough, and good. This category's division is to know the level of employees' knowledge related to the environment based on the research instrument processed. The category division was conducted based on the standard deviation (SD) formula. In general, predominantly, in amount of 94,5% or 120 respondents have the right employee understanding level, and the rest 5,5 % or seven respondents have a good enough understanding level.

3.2. Description of environmental care behavior
The description of environmental care behavior on the employees at the company, which becomes the respondents in this research, is displayed in Table 4.
Table 4. The description of environmental care behavior.

| No. | Statements                                                                                                                                  | Disagree | Less Agree | Agree | Extremely Agree |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------|----------|------------|-------|-----------------|
| 1   | I prevent the occurrence of pile up and messy garbage at work and throw away the waste into the trash can.                                 | 0,80 %   | 0,00%      | 36,2% | 63,0%           |
| 2   | I was taking out the trash wherever and whenever it must be in its place.                                                                     | 0,80%    | 0,80%      | 35,4% | 63,0%           |
| 3   | I support the waste program developed in my work environment by sorting the waste following its characteristics/type.                         | 0,00%    | 0,00%      | 47,2% | 52,8%           |
| 4   | I will take the waste if I see it scattered in the work environment and take it out to the trashcan.                                          | 0,00%    | 3,10%      | 59,8% | 37,0%           |
| 5   | I inform my co-workers if he/she takes out the waste without considering the characteristics/type.                                            | 0,00%    | 7,10%      | 76,64%| 16,5%           |
| 6   | I prevent arising garbage by reusing the used paper on another side (one-sided) for photocopy or printing.                                     | 0,00%    | 2,40%      | 49,6% | 48,0%           |
| 7   | I do preview/editing documents before printing them.                                                                                         | 0,00%    | 1,60%      | 59,1% | 39,4%           |
| 8   | I bring my food container and tumbler to work to decrease garbage.                                                                          | 0,00%    | 3,10%      | 50,4% | 46,5%           |
| 9   | I always switch off the room lamp if it is not used anymore, for instance, after the meeting.                                                | 0,00%    | 4,70%      | 58,3% | 37,0%           |
| 10  | I will report to the QHSE department if environmental pollution occurs in the work area.                                                     | 0,00%    | 3,90%      | 70,9% | 25,2%           |

Based on the result of data processing of the environmental care behavior variable in table 4, then in line with the research method conducted division based on the category which had been determined by the researcher, namely less good, good enough, and good. This category division is to determine the level of environmental care behavior based on the research instrument that had been processed. The category division is conducted based on the Standard Deviation (SD). In general, predominantly in the amount of 95,3% or 121 respondents have good enough environmental care behavior, and the rest 4,7% or six respondents have less good environmental care behavior.
3.3. The correlation test of employees knowledge variable and environmental care behavior

Based on the questionnaire's calculation, 127 people obtained data on employees' environmental knowledge, namely 94.5% or 120 respondents having good employees' environmental knowledge. The rest 5.5% or seven respondents have good enough employee's environmental knowledge. The result of data-processed environmental care behavior, namely in the amount of 95.3% or 121 respondents, has good enough environmental care behavior. The rest 4.7% or six respondents have less good environmental care behavior. The result of data processed of employees environmental knowledge variable and data of environmental care behavior variable were conducted correlation test following table 5, in which the size of correlation coefficient (R) of employees knowledge as the independent variable and environmental care behavior as the dependent variable in the amount of 0.617 with significance (p) 0.000. This can be concluded that there significant correlation with correlation coefficient value (R) count (0.617) > R table (0.143) and significance value (p) count ≤ 0.05, namely 0.000 until there is a correlation between employees knowledge and environmental care behavior (Ha is accepted).

Table 5. The correlation test result between employees environmental knowledge and environmental care behavior.

| No. | Independent Variable     | The correlation coefficient (R) | Significance (p) |
|-----|--------------------------|--------------------------------|-----------------|
| 1   | Employees knowledge      | 0.617                          | 0.000           |

3.4. The regression test of employees knowledge variable and environmental care behavior

Then a simple regression test was conducted as seen in table 6 to measure the effect size of 1 (one) independent variable, namely employees' environmental knowledge, on 1 (one) dependent variable, namely environmental care behavior.

Table 6. The regression result between employees knowledge and environmental care behavior.

| No. | Correlation Coefficient (R) | Determination Coefficient (R²) | Adjusted R² | Error Standard Estimation | Significance (p) |
|-----|----------------------------|------------------------------|-------------|---------------------------|-----------------|
| 1   | 0.599                      | 0.359                        | 0.354       | 2.496                     | 0.000           |

Based on the output obtained, the calculation results in table 6 in which the size of multiple correlation coefficient of employees knowledge as independent variable towards environmental care behavior as a dependent variable in the amount of (R) = 0.599, which means the correlation coefficient is positive until among both independent variable and one dependent variable altogether have strong enough correlation and same direction, namely at interval 0.40-0.599. If the independent variable being investigated increases, then its dependent variable being investigated will increase too. The result of the determination coefficient based on (table 6) is in the amount of (R square) = 0.359 or 35.9%, which means the employee's knowledge variable can explain the change of environmental care behavior in the amount of 35.9%. In comparison, 64.1% is defined by the error or the effect of other variables that are not investigated in this research besides the employee's knowledge variable. This determination coefficient is the contribution level or the ability of all independent variables being investigated in explaining its dependent variable being investigated.

3.5. The discussion of the correlation between employees knowledge and environmental care behavior

The interaction concept makes a specific environment worse or far better because the interaction is the process of influencing each other, or usually called the life network [10]. Good employee's knowledge
of the environment will make them increase environmental care behavior. This result is strengthened by the research result obtained by [11], stating a correlation between employees' environmental knowledge and environmental care behavior. Another research conducted at one of the universities shows that the higher someone's environmental knowledge, the higher their involvement in caring about the environment [7].

Another research conducted at the company also shows a positive result between employee knowledge related to environment and environmental care behavior [12]. This is because the effect of employees' environmental knowledge and environmental care behavior affects 35.9%, which means sufficient effect even though 64.1% others are influenced by other variables. This fact strengthens the previous research findings conducted at one of the universities where high environmental knowledge will influence environmental care behavior [7][13]. The aspect of employees' knowledge is too required to keep the environment. Employees' knowledge will determine their behavior [14].

If an employee has high environmental knowledge, then their environmental care behavior will increase too. This good employee's knowledge is obtained from education conducted formally or informally. The company program usually can be done by giving information to the department head, who will then socialize it to the employees and give them examples until indirectly the employees obtain new information related to the environmental program that needs to be supported and organized. This is in line with the research conducted by [13], stating that behavior can be formed through the leaders' examples until unconsciously, the employees will follow this behavior [15].

Environmental care behavior, which employees usually do, is switching off the computer during the break time, carrying self food containers and tumblers, switching off the lamp in the room if it is not used, and taking out the garbage to its place has been provided by the company. These environmental care behaviors will make other co-workers motivated until based on the results of research processed data of environmental care behavior variable, namely, in the amount of 95.3% or 121 respondents have good enough environmental care behavior level. This occurs because behavior is all human activities observed directly by the outside party [16]. For the employees, taking care of the environment is an unseparated part of their daily lives and will impact themselves and their surrounding environment [17].

4. Conclusion
The research results show that there is a significant correlation between environmental knowledge and environmental care behavior. Employees' knowledge can help the company in managing the environment. The employee's environmental knowledge needs to be increased through visual media until they can be motivated to have excellent environmental care behavior.

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