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MORALITY BEFORE KNOWLEDGE

Willingness to pay for entry to ecotourism mangrove forest

Ni Putu Diva Iswarani[1]*, Aqiqah Amalia Nasir[1], Genta Arkana Hadi[1], Syifa Ditia[1], Putu Cintya Vidyanidhi[1]
[1] *Environmental Engineering, Engineering, President University, Cikarang, 17534, Indonesia.*
*Correspondence: ni.iswarani@student.president.ac.id

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ABSTRACT

Background: Mangrove forests play a vital role in maintaining biodiversity, supporting ecosystem services, and protecting coastal areas from natural disasters. However, increasing human activities such as deforestation and pollution threaten their sustainability. Understanding the willingness to pay (WTP) for mangrove conservation and ecotourism is essential to quantify public perception of their value. This study focuses on assessing visitors' perceptions, knowledge, preferences, and WTP for ecotourism at the Mekar Beach Mangrove Forest, Muara Gembong, Indonesia. **Methods:** The study used a survey method with purposive sampling, targeting 127 respondents who had visited the Mekar Beach Mangrove Forest. Primary data were collected through a closed-ended online questionnaire distributed via Google Forms. The study examined five variables—perception, knowledge, tourism preference, facilities, and WTP—and conducted validity and reliability testing using Pearson correlation and Cronbach's Alpha (≥0.700 considered reliable). **Findings:** Most respondents agreed that mangrove forests should be preserved, as they provide tranquility, biodiversity, and economic benefits. Visitors showed strong preferences for nature-based tourism and environmentally friendly behavior. The site's facilities were perceived positively. The majority of respondents expressed a WTP below IDR 15,000 for entrance tickets. Key aspects to improve include enhancing public perception, increasing environmental knowledge, aligning tourism offerings with visitor preferences, and improving facilities. **Conclusion:** Public perception and willingness to pay for the Mekar Beach Mangrove Forest reflect strong awareness of environmental conservation and appreciation for natural tourism. The relatively low WTP suggests the need for better promotion, education, and facility development to enhance perceived value and support sustainable ecotourism. **Novelty/Originality of This Article:** This study provides empirical insight into visitors' WTP for mangrove forest conservation by integrating socio-psychological (perception, knowledge, preference) and economic (WTP) dimensions. It contributes to the understanding of how ecotourism valuation can support mangrove conservation strategies in Indonesia.

KEYWORDS: mangrove forest; ecotourism; willingness to pay; visitor preference; environmental conservation.

1. Introduction

Regardless of major advances in theoretical and practical pricing research in recent years, many organisations continue to make pricing decisions without a clear knowledge of how (potential) consumers and competitors will react to alternative price quotes. Inadequate knowledge about the customer's willingness to pay (WTP) for their goods (Breidert, 2006). The maximum amount a client is willing to pay for a good or service is known as willingness to pay (WTP). WTP fluctuates according to the situation, various demographics, the particular client, and can change over time. As a result, rather than being expressed as a single dollar amount, willingness to pay is typically shown as a price range

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(Foreit, 2003). Managers and researchers both agree on the significance of reliable WTP estimates. Valid WTP estimates are crucial, according to Balderjahn (2003) for creating the best pricing plan, WTP observations need to be held.

Mangrove forests are one of the world's most significant ecosystems, providing essential ecosystem services, maintaining biodiversity, and safeguarding coastal towns from natural calamities (Akram et al., 2023). Human activities, including deforestation, overfishing, and climate change, pose a danger to these ecosystems. It is critical to estimate the willingness to pay (WTP) for the preservation and restoration of mangrove forests in order to understand the value of these ecosystems and inform conservation efforts.

For numerous reasons, this research was selected to focus for evaluation on WTP for entrance into the Mekar Beach mangrove habitat. For starters, the Mekar Beach mangrove forest is a one of the potential ecotourism destination in Indonesia, that over several opportunities including mangrove tracks and bamboo ornaments that can be used as photo spots and there are tens of thousands of mangrove trees in the coastal area of Muara Gembong and other recreational options.

This final report intends to give an in-depth examination result of the significance of analysing WTP for mangrove forest conservation, as well as to explain the results of research conducted through a questionnaire to support the data needed to determine the level of public willingness to pay were taken from 127 respondents who met the criteria to be used as samples. Subsequently determining the WTP for entry into ecotourism mangrove forests can provide valuable insights into the economic benefits of mangrove forest conservation, which can be used to make the case for conservation and secure funding for conservation efforts.

1.1 Literature review

Environmental valuation is the process of assigning a monetary value to environmental resources and services, such as mangroves, that aren't frequently required by customers. Mangroves provide a variety of ecosystem services, including carbon storage, coastline protection, nutrient cycling, and the provision of habitat for a wide variety of wildlife species (Himes-Cornell et al., 2018). High economic value is placed on these services by both the locals who depend on them for their livelihoods and the global community as a whole because of the benefits they provide for managing the climate and preserving biodiversity (Christensen et al., 2021). A range of valuation methods, including non-market ones like contingent valuation and choice experiments as well as market-based ones like hedonic pricing and travel cost analysis, have been used to evaluate the economic worth of mangrove ecosystem services. This approach uses surveys and interviews with stakeholders to learn more about their preferences and willingness to pay for particular environmental benefits, including tourists, locals, and legislators (Salem et al., 2012).

Mangroves are woody plants that thrive in muddy, anaerobic soils that are characterised by high salinity, extreme tides, strong winds, and high temperatures at the land-ocean transition in tropical and subtropical latitudes (Kuenzer et al., 2011). The highly developed morphological and physiological adaptations to harsh circumstances may not be found in any other group of plants. Mangroves are of great ecological importance. They enhance coastal waterways, stabilise coastlines, produce commercial forest products, and sustain coastal fisheries (Kathiresan et al., 2001; Bhowmik et al., 2022). Mangrove forests are among the most prolific ecosystems in the world, producing far more organic carbon than is needed for the ecosystem and making a large contribution to the global carbon cycle. Mangrove extracts and species that rely on them have demonstrated antimicrobial effectiveness against diseases that affect people, animals, and plants. Mangroves might be further exploited as a source of high-end commercial goods, fisheries resources, and destinations for the rapidly growing ecotourism sector (Kathiresan, 2012; Waleed et al., 2025).

The economic worth of natural resources or environmental amenities, such as mangrove forests in the context of ecotourism, is estimated using valuation methodologies.

Various valuation techniques can be employed, depending on the particular research question and the data that are available. In mangrove ecotourism, a few of the standard appraisal techniques (Cameron et al., 1987). Travel cost method: Based on the expenses tourists experience to get to the area, this method calculates the worth of a mangrove forest. Researchers can determine the entire economic value of the mangrove forest for tourism by examining statistics on the number of visitors, the distance travelled, and the cost of transportation (Matthew et al., 2019). Contingent valuation method: This approach asks visitors directly how much they are ready to pay to enter the mangrove forest or to keep the area protected. Based on the willingness of tourists to pay, researchers can gauge the economic value of the mangrove forest using surveys or interviews (Matthew et al., 2019).

Hedonic pricing method: By examining the costs of surrounding homes or the costs of tourist attractions that are influenced by the presence or quality of the forest, this method calculates the economic value of the mangrove forest. Researchers can calculate the mangrove forest's economic value for tourism and property values by examining data on real estate transactions or tourism prices (Vo et al., 2012).

The economic valuation method known as contingent valuation is frequently used to calculate the economic value of non-market commodities and services, including mangrove forests (Sinsin et al., 2023). The contingent valuation method can be used in mangrove ecotourism to determine the financial worth of the woods for recreational and aesthetic purposes as well as to guide management and conservation decisions (Marzuki & Managi, 2014). Asking individuals their willingness to pay (WTP) for a hypothetical policy or program that would offer or preserve a particular environmental amenity, such as access to a mangrove forest, is a part of the contingent valuation technique. The contingent valuation approach surveys would question tourists or other visitors how much they would be willing to pay to access or protect the mangrove forest in the context of mangrove ecotourism. The survey will pose a fictitious situation and ask participants how much they would be ready to spend to have the choice of visiting the mangrove forest or contributing to conservation efforts to preserve it (Amiri & Limaei, 2021).

A contingent valuation technique survey's findings can be used to calculate the mangrove forest's overall economic value for conservation or tourism, as well as to pinpoint the variables that affect tourists' WTP. Making decisions for the management and preservation of the mangrove forest can be informed by this information (Laili et al., 2023). Surveys using the contingent valuation method must be carefully designed and implemented to guarantee that respondents comprehend the fictitious scenario and provide honest answers. The survey population must be properly chosen, the survey questions and response options must be created, and the results must be analysed using the proper statistical techniques (Villanueva et al., 2017).

2. Methods

2.1 Population and sampling

Population refers to the set or group of all the units on which the findings of the research are to be applied. The population in research refers to groups or collections of individuals, objects or events that have the same characteristics and are relevant to the research question being asked. The population can be humans, animals, plants, objects or events, depending on the type of research being conducted. The population used in this research is people who have visited the Mekar Beach Mangrove Forest ecotourism.

A part of the population that represents it completely is known as a sample. It means, the units, selected from the population as a sample, must represent all kinds of characteristics of different types of units of population. In this case the researcher managed to collect a total of 127 respondents or samples from a population. While the sampling technique used by researchers is purposive sampling. Purposive sampling is a sampling technique used by determining specific criteria for the sample (Priyono, 2016). The specific criteria for this sample are visitors to Mekar Beach Mangrove Forest ecotourism.

2.2 Data collection and questionnaire

Data collection techniques are an important step in research because the main purpose of research is to get data. Data collection can be done in various settings, various sources, and various ways. In this study, researchers used primary data collection techniques. Based on the data source, primary sources are data sources that directly provide data to data collectors (Sugiyono, 2013). Primary data collection by distributing questionnaires distributed through electronic media, namely Google Form. This study used a closed questionnaire, namely a questionnaire with answers that had been determined by the researcher with the aim that the respondents' answers were in accordance with the needs of the researcher (Marar et al., 2023).

This study examines five variables, namely perception (variable X1), knowledge (variable X2), tourism preference (variable X3), facilities (variable X4), and willingness to pay (variable Y). The validity and reliability test for the questionnaire is measured by using excel. The validity of the item is shown by the correlation or support for the total item (total score), the calculation is done by correlating the item score with the total item score. If we use more than one factor, it means testing the validity of the item by correlating the item score with the factor score, then continuing to correlate the item score with the total factor score (the sum of several factors). The testing technique used to test the validity of this study is using Bivariate Pearson correlation (Pearson Moment Product). This analysis is done by correlating each item's score with the total score. The total score is the sum of all items. Question items that are significantly correlated with the total score indicate that these items are able to provide support in uncovering what you want to reveal à Valid. If r count ≥ r table (2-tailed test with sig. 0.05) then the instrument or question items have a significant correlation with the total score (declared valid).

In research, reliability is the extent to which the measurement of a test remains consistent after being performed repeatedly on subjects and under the same conditions (Olmsted, 2024). Research is considered reliable when it provides consistent results for the same measurements. It is unreliable if repeated measurements give different results. High and low reliability, empirically indicated by a number called the value of the reliability coefficient. High reliability is indicated by an rxx value close to 1. Generally agreed that reliability is considered satisfactory if ≥ 0.700. Testing the reliability of the instrument using the Alpha Cronbach formula because this research instrument is in the form of a questionnaire and a multilevel scale.

3. Results and Discussion

Validity test is a method used to assess whether a research instrument, such as a questionnaire or survey, is measuring what it is intended to measure. The validity of a research instrument is important because it determines the accuracy and reliability of the data collected. The validity test for the research instrument is conducted with a small number of respondents. The first 20 respondents are used to test the validity of this research instrument. The validity test is measured using Microsoft excel. Based on the Appendix 1 the item that is valid is only 17 statements out of 25 statements. The statement that can be used for analysis is only 17 statements.

3.1 Reliability test

Ghozali (2009) states that reliability is a tool for measuring a questionnaire which is an indicator of a variable or construct. A questionnaire is said to be reliable or reliable if one's answers to statements are consistent or stable from time to time. If alpha > 0.90 then the reliability is perfect. If the alpha value > 0.7 means sufficient reliability, while if alpha > 0.80 this suggests that all items are reliable, and all tests consistently have strong reliability. Or, there are those who interpret it as if the alpha is between 0.70 – 0.90 then the reliability is high. If alpha 0.50 - 0.70 then the reliability is moderate. If alpha < 0.50 then low reliability.

If alpha is low, it is likely that one or more items are unreliable. The reliability test is measured using the Microsoft Excel software. Based on the table the reliability of the research instrument is 0.795 that means reliability is sufficient reliability or has high reliability.

Table 1. Reliability test

Variants Total	Total Variants	Reliability
19.70	83.31	795

3.2 Respondent identity

In the questionnaire distributed there are several questions related to the identity of the respondent that must be filled in by all respondents before proceeding to the question page. The following is a presentation of the respondent's identity that has been obtained in this study. First respondent identity based on gender. There were 125 respondents who met the criteria, there were 45 males with a percentage of 35% and 82 female respondents with a percentage of 65%. So, it can be concluded that the respondent's level of dominance is women, namely 82 people with a percentage of 65%.

Table 2. Distribution of the number of respondents by gender

Gender	Number of Respondents (people)	Percentage (%)
Man	45	35%
Woman	82	65%
Total Respondents	127	100%

In terms of age, there were 11 respondents aged under 17 years with a percentage of 9%, 57 respondents aged 17-24 years with a percentage of 45%, 55 respondents aged 25-30 years with a percentage of 43%, 3 respondents aged 41-50 years with a percentage of 2%, and 1 respondent aged over 50 years with a percentage of 1%.

Table 3. Distribution of the number of respondents by age

Age	Number of Respondents (people)	Percentage (%)
Under 17th	11	9%
17-24	57	45%
25-30	55	43%
41-50	3	2%
Above 50th	1	1%
Total Respondent	127	100%

So, it can be concluded that the respondent's level of dominance is aged 17-24, namely 57 people with a percentage of 45%. In terms of work, there were 43 respondents who worked as private employees with a percentage of 34%, 19 respondents worked as civil servants with a percentage of 15%, 52 respondents were students with a percentage of 41%, and 13 respondents worked as entrepreneurs with a percentage of 10%.

Tabel 4. Distribution of the number of respondents by job

Job	Number of Respondents (people)	Percentage (%)
Private sector	43	34%
Civil servant	19	15%
Entrepreneurs	13	10%
Student	52	41%
Total Respondent	127	100%

So, it can be concluded that the respondent's level of dominance is work as student, namely 52 people with a percentage of 41%. Meanwhile, the monthly income also varies greatly, as many as 31 respondents have a monthly income below IDR 1,000,000 with a percentage of 24%, 23 respondents who have income in the range of IDR 1,000,000-

2,000,000 with a percentage of 18%, 25 respondents who have income in the range of IDR 2,000,000-3,000,000 with a percentage of 20%, 23 respondents who have income in the range of IDR 3,000,000-4,000,000 with a percentage of 18%, 14 respondents who have income in the range of IDR 4,000,000-5,000,000 with a percentage of 11%, and 11 respondents who have income above IDR 5,000,000 with a percentage of 9%. So, it can be concluded that the respondent's level of dominance is own monthly income in the range of IDR 2,000,000-3,000,000, namely 25 people with a percentage of 20%.

Tabel 5. Distribution of the number of respondents by monthly income

Monthly Income	Number of Respondents (people)	Percentage (%)
< 1,000,000	31	24%
1,000,000 - 2,000,000	23	18%
2,000,000 - 3,000,000	25	20%
3,000,000 - 4,000,000	23	18%
4,000,000 - 5,000,000	14	11%
> 5,000,000	11	9%
Total Respondent	127	100%

3.3 Variables property

In the variable of perceptions, most respondents agree that mangrove forests need to be preserved, providing a sense of calm and serenity that is often difficult to find in urban areas in addition to offering opportunities for nature photography.

Tabel 6. Variable perception

	Response counted		
Score	The existence of Mangrove Forests needs to be maintained and preserved	Mangrove forests provide a sense of calm and serenity that is hard to find in urban areas.	Mangrove Forests offer great opportunities for photography and capturing the beauty of nature.
1	0	2	2
2	4	7	5
3	30	32	37
4	62	53	57
5	31	33	26

A sizable part of the respondents feels neutral about the matter while a small minority simply disagrees. Although it is notable that none of the respondents strongly disagree that Mangrove forests need to be maintained and preserved. The response is very similar to the knowledge variable, most of the respondents either agree or strongly agree that Mangrove forests host various types of animals and plants and influence the economy of its surroundings.

Table 7. Variable knowledge

	Response counted	
Score	Mangrove forests can provide shelter for various types of animals and plants	Mangrove forests can have an impact on the economy of the surrounding community
1	1	1
2	11	7
3	32	33
4	55	54
5	28	32

Then, in terms of preferences, the respondents who have visited Mekar Beach's Mangrove Forest seem to have a preference towards natural tourism and also prefer to minimise their impact on the environment.

Table 8. Variable preference

	Response counted			
Score	I prefer to visit natural tourist Destinations rather than ordinary tourist destinations	I plan to visit natural attractions in the next 12 months.	I am willing to participate in ecotourism activities that promote environmental conservation and preservation.	I think it's important to minimise my impact on the environment when I travel.
1	0	2	1	0
2	7	23	5	4
3	50	38	29	29
4	48	42	54	52
5	22	22	38	42

In terms of facility, many of the respondents seem to have a positive image of the site's facility. Based on Table 9 regarding facilities, most respondents showed a positive perception of the completeness of facilities at tourist sites. Most rated the availability of prayer rooms, suitability for family tourists, availability of trekking trails, and boat-based tourist attractions as very good. The highest scores were concentrated in the 'Good' and 'Very Good' categories, indicating that the existing facilities have met visitors' expectations.

Table 9. Variable facility

	Response counted			
Score	Mekar Beach Mangrove Forest Ecotourism has a prayer room	Mekar Beach Mangrove Forest Ecotourism is a friendly place for families with children	Mekar Beach Mangrove Forest Ecotourism has a tracking path to go around the destination	Mekar Beach Mangrove Forest Ecotourism has a tourist object in the form of a boat
	1	2	0	0
	4	10	10	9
	32	32	21	34
	71	47	64	51
	19	36	32	33

3.4 Willingness to pay data

The respondent's willingness to pay varies but are generally clustered around Agree. Though it is also worth pointing out that a small amount is also present on disagreement and totally disagreement.

Table 10. Respondent willingness to pay

	Response counted			
Score	The quality of the facilities affects the level of willingness to pay fees.	The willingness of visitors to pay facility fees affects the management of ecotourism.	I am willing to pay an additional fee to improve the mangrove forest facilities.	I am willing to continue visiting if the entrance fee increases.
1	0	0	1	1
2	5	6	11	10
3	34	39	36	31
4	61	53	52	58
5	27	29	27	27

The most common suggestions fell within the range of IDR 10,000 to IDR 20,000, with 30 and 15 responses, respectively and a big majority of the responses also in between. However, it is important to note that these suggestions are based solely on the provided dataset and may not represent the optimal or recommended entrance fee.

Table 11. Suggested entry fee

How much do you suggest paying for the entrance fee? (IDR)	Sponse counted
4000	1
5000	14
7000	1
10000	30
12000	3
13000	1
15000	21
18000	1
20000	15
25000	7
30000	16
35000	6
36000	1
40000	1
45000	2
49000	1
50000	6
Grand Total	127

3.5 Discussion

After reviewing the data collected via survey, it can be concluded that visitors to Mekar Beach's Mangrove Forest are for the most part willing to pay for entry to the Ecotourism Site. Some among them are also notably very willing while some few exceptions are not willing to pay for entrance.

Table 13. Pearson correlation

Pearson Correlation	Amount
Perception-Willingness to Pay	0.5767101424
Knowledge-Willingness to Pay	0.3568113473
Preference-Willingness to Pay	0.559163185

As shown in the table below, after employing the Pearson correlation function it is apparent that the other variables such as Perception, Knowledge, Preferences and Facility are all somewhat correlated. This means that an individual's level of knowledge about the mangrove forest affects their willingness to pay, albeit to a lesser extent compared to perception. The correlation coefficient between preference and willingness to pay is 0.5592, highlighting a moderately positive association (Pei & Chen, 2024; Li et al., 2025). This indicates that an individual's preference for visiting the mangrove forest plays a role in determining their willingness to pay.

The correlation coefficient between facility and willingness to pay is 0.406, signifying a moderate positive relationship. This suggests that the facilities provided at Mekar Beach's Mangrove Forest also influence an individual's willingness to pay for entry. Finally, the correlation coefficient between willingness to pay and the suggested paid amount is 0.604, denoting a relatively strong positive relationship. This means that an individual's stated willingness to pay aligns well with the amount they suggest paying. Overall, these correlation coefficients provide insights into the varying levels of influence that different factors have on an individual's decision-making process regarding their willingness to pay for entry to Mekar Beach's Mangrove Forest (Sindermann et al., 2022).

In addition to understanding the relationships between different factors and willingness to pay for entry to Mekar Beach's Mangrove Forest, it is also essential to consider the calculation of the willingness to pay levels (Hamuna et al., 2018; Sasmita et al., 2024). By combining the correlation coefficients mentioned earlier with relevant pricing data, it becomes possible to estimate the different levels of willingness to pay among

visitors. These levels can be used to inform pricing strategies and optimise revenue generation for Mekar Beach's Mangrove Forest.

Based on the provided data, there are several steps that can be taken to increase willingness to pay for entry to Mekar Beach's Mangrove Forest. Enhance Perception: Improve visitors' perception of the forest through effective marketing, highlighting its unique features and ecological significance. Positive reviews and testimonials can also boost perception and the perceived value of the experience. Increase Knowledge: Provide visitors with more information about the mangrove forest through educational materials, guided tours, and interpretive signage (Moussa et al., 2024). Create awareness about conservation efforts and sustainability practices to enhance visitors' knowledge and perceived value. Cater to Preferences: Tailor the experience to visitors' preferences by offering a variety of activities, such as nature walks, bird watching, and boat tours showcasing more of the natural attractions. Improve Facilities: Invest in infrastructure and amenities, such as visitor centres, trails, resting areas, and sanitation facilities as suggested by the respondents as well. Convenient access, parking, and accessibility for all can enhance the overall visitor experience and perceived value. By implementing these steps, especially step 1 and 3; Mekar Beach's Mangrove Forest can work towards increasing visitors' willingness to pay for entry and maximise its revenue potential and thus its sustainability.

4. Conclusions

In the variable of perception, most respondents agree that mangrove forests need to be preserved, providing a sense of calm and serenity that is often difficult to find in urban areas and offering opportunities for nature photography. Most of the respondents either agree or strongly agree that Mangrove forests host various types of animals and plants and influence the economy of its surrounding. In terms of preferences, the respondents who have visited Mekar Beach’s Mangrove Forest seem to have a preference towards natural tourism, and also prefers to minimise their impact on the environment. In terms of facility, the majority of the respondents seem to have a positive image of the site’s facility. Things that can be developed are Enhance Perception, Increase Knowledge, catering to preference, and improve facilities. The level of people's willingness to pay for entrance tickets to Ecotourism Mangrove Forest Mekar Beach is mostly under IDR 15,000.

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Biographies of Authors

Ni Putu Diva Iswarani, Environmental Engineering, Engineering, President University, Cikarang, 17534, Indonesia.
- Email: ni.iswarani@student.president.ac.id
- ORCID: N/A
- Web of Science ResearcherID: N/A
- Scopus Author ID: N/A
- Homepage: N/A

Aqiqah Amalia Nasir, Environmental Engineering, Engineering, President University, Cikarang, 17534, Indonesia.
- Email: aqiqaha0@gmail.com
- ORCID: N/A
- Web of Science ResearcherID: N/A
- Scopus Author ID: N/A
- Homepage: N/A

Genta Arkana Hadi, Environmental Engineering, Engineering, President University, Cikarang, 17534, Indonesia.
- Email: genta.hadi@student.president.ac.id
- ORCID: N/A
- Web of Science ResearcherID: N/A
- Scopus Author ID: N/A
- Homepage: N/A

Syifa Ditia, Environmental Engineering, Engineering, President University, Cikarang, 17534, Indonesia.
- Email: syifa.ditia@student.president.ac.id
- ORCID: N/A
- Web of Science ResearcherID: N/A
- Scopus Author ID: N/A
- Homepage: N/A

Putu Cintya Vidyanidhi, Environmental Engineering, Engineering, President University, Cikarang, 17534, Indonesia.
- Email: putu.vidyanidhi@student.president.ac.id
- ORCID: N/A
- Web of Science ResearcherID: N/A
- Scopus Author ID: N/A
- Homepage: N/A

Appendix 1. Validity test

Variable	1					2					3					4					5				
Item	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
rxy	0.41	0.30	0.62	0.62	0.23	0.15	0.26	0.39	0.22	0.46	0.28	0.39	0.63	0.44	0.50	0.04	0.42	0.69	0.70	0.51	0.26	0.43	0.46	0.43	0.48
t count	1.88	1.33	3.37	3.34	0.99	0.65	1.13	1.82	0.96	2.18	1.26	1.78	3,43	2.08	2.44	0.19	1.94	4.03	4.12	2.51	1.13	2.04	2.17	2.02	2.35
t table	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72
Information	Valid	Not valid	Valid	Valid	Not valid	Not valid	Not valid	Valid	Not valid	Valid	Not valid	Valid	Valid	Valid	Valid	Not valid	Valid	Valid	Valid	Valid	Not valid	Valid	Valid	Valid	Valid
varians	0.45	0.83	1.56	0.56	0.78	0.88	0.997	0.779	0.37	0.47	0.89	0.57	1.01	0.84	0.80	0.74	0.67	1.41	0.51	0.66	0.76	1.01	0.46	0.99	0.62

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