



RESEARCH ARTICLE

# Relationship of Knowledge about Ecological Concepts, Spiritual Intelligence and Locus of Control with Environmental Altruistic Behavior in Students

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ARTICLE INFO	ABSTRACT
Received: Oct 4, 2024	This study aims to investigate the relationship between knowledge of ecological concepts, spiritual intelligence, and locus of control with environmental altruistic behavior among university students. It seeks to determine how these variables influence altruistic actions toward environmental preservation. The research adopts a causal associative approach with a quantitative method, utilizing path analysis. A sample of 110 students from Universitas Satya Negara Indonesia was selected using probability random sampling. The instruments used measured environmental altruistic behavior, knowledge of ecological concepts, spiritual intelligence, and locus of control, with reliability coefficients of 0.93, 0.91, 0.92, and 0.91, respectively. Statistical analyses included correlation and regression to explore causal relationships among variables. The findings reveal significant positive relationships between the examined variables. Knowledge of ecological concepts ( $\beta = 0.26, p = 0.002$ ), spiritual intelligence ( $\beta = 0.24, p = 0.012$ ), and locus of control ( $\beta = 0.22, p = 0.011$ ) each significantly contribute to environmental altruistic behavior. Additionally, knowledge of ecological concepts ( $\beta = 0.27, p = 0.002$ ) and spiritual intelligence ( $\beta = 0.23, p = 0.007$ ) were found to influence locus of control. The overall results suggest that enhancing knowledge about ecology, fostering spiritual intelligence, and strengthening locus of control can significantly improve environmental altruistic behavior. The structural model demonstrates that these variables collectively explain 23% of the variance in environmental altruistic behavior and 18% of the variance in locus of control. This research underscores the importance of educational interventions in developing knowledge and psychological attributes that promote altruistic actions for environmental sustainability.
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## INTRODUCTION

Human activities that continuously exploit natural resources are degrading the environment as a whole. Excessive exploration of natural resources, both renewable resources and unrenovable resources can reduce reserves for future generations. (Tyagi et al., 2014). The ease of environmental regulations damages sustainable developmental goals, which need green instruments to conserve future capital resources globally. The lack of technological infrastructure exhausts many natural resources during their extraction process, leading to environmental degradation. (Nassani et al., 2021). The occurrence of the phenomenon of climate change is already a global issue that causes various risks to the environmental system (natural system) and humans (social system). (Zhang et al., 2014)(Handmer et al., 2012). This will be exacerbated as human activities increase. So the current climate change is due to human activities and back to humans. (Goudie, 2018)(Trenberth et al., 2002). Based on the above statement, it is necessary to increase

altruistic behavior in minimizing the damage to nature that occurs. This altruistic behavior must be instilled in students and be sustainable.

Altruistic behavior does not just appear instantly, but through a long process of one's knowledge, experience, locus of control and spiritual intelligence. Therefore, the role of educational institutions is needed in fostering altruistic behavior towards the environment. (Boz & Saylik, 2021). Organizations also contribute significantly to climate change (Berkhout, 2012)(Robertson & Barling, 2013). Thus the need for altruistic behavior in increasing student awareness to contribute significantly to minimizing environmental damage that occurs. Especially those at risk to the environmental system and human behavior that cares about the campus environment and its surroundings.

The results of previous research as a reference for research conducted by researchers include if individuals behave altruistically, the greater the level of altruism, the more individuals reduce the consumption of goods that damage the environment. (Daube & Ulph, 2016)(Capraro et al., 2019)(Alam et al., 2023). So there is a relationship between the level of altruistic behavior and the consumption of goods that damage the environment. (Hasni et al., 2024)(Mansoor & Paul, 2022). Research results that helpful behavior is related to empathy, being liked, and being popular (Portt et al., 2020)(Decety & Cowell, 2014)(Egilmez & Naylor-Tincknell, 2017). Gratitude and altruism are highly effective resources in interpersonal relationships. So when individuals express words of gratitude and altruistic behaviors, individuals have positive value (Wrench et al., 2020)(Fadillah et al., 2024). Altruistic behavior and gratitude are highly effective resources in interpersonal relationships. (SAKINAH, 2024)(Li et al., 2023).

The novelty of this research is the researcher's interest in raising environmental issues regarding the influence of knowledge of ecological concepts, locus of control and spiritual intelligence on environmental altruistic behavior. The research questions are; is there a relationship between knowledge of ecological concepts on environmental altruistic behavior?; is there a relationship between spiritual intelligence on environmental altruistic behavior?; is there a relationship between locus of control on environmental altruistic behavior?; is there a relationship between knowledge of ecological concepts on locus of control? is there a relationship between spiritual intelligence on locus of control.

## LITERATURE REVIEW

### Environmental Altruistic Behavior

Altruistic describes a selfless concern for the needs of others. (Pfattheicher et al., 2022)(Wolfe, 2021)one has a moral responsibility to serve humanity to the fullest. (Gandullia et al., 2021)(Batson, 2014). The components of altruism are loving others, helping them doing their time of need, and making sure that they are appreciated. (Suriyah & Kirana, 2020)(Manela, 2022).

Altruism as an intentional and voluntary act performed to benefit another person as the primary motivation and either without a conscious expectation of reward (altruistic approach) or with the conscious or unconscious expectation of reward (pseudo-altruistic approach).(Feigin et al., 2014). Altruism as a deliberate and voluntary act done to benefit another person as the primary motivation and either without a conscious expectation of reward (altruistic approach) or with the conscious or unconscious expectation of reward (pseudo-altruistic approach), unselfishness. (Gualda, 2022).

Some theories related to environmental altruistic behavior are the attitude-behavior model developed by Hines et al, which can be explained and explained in the figure below:

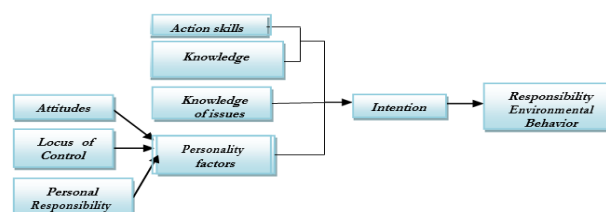


Figure 1 Behavioral Model of Environmental Responsibility (Hines et al., 1987)(Blaikie, 1993)

Knowledge of issues appears as a prerequisite for behavior (action). One must have the ability and knowledge of available and effective actions in a given situation. Another critical component is the skill to apply knowledge of action strategies on environmental issues. In addition, a person must be able to behave because they have "a desire to act", a person's willingness to act is influenced by personality factors (attitude towards the environment, locus of control, and personal responsibility for the environment). Based on the description above, the synthesis of environmental altruistic behavior is a person's activity in preserving the environment through aspects of (1) empathy, (2) interpretation, (3) social responsibility, (4) initiative, and (5) willing to sacrifice.

### **Knowledge of Ecological Concepts**

Knowledge is a source of answers to various questions that arise in life and can be used as a tool to solve various problems which include conceptual, procedural, and meta cognitive. Anderson and Krathwohl revised Bloom's Taxonomy states that, the dimension of cognitive processes has six levels, the six levels are (a) memory (remember), (b) understanding (understand), (c) application (apply), (d) analyze (analyze), (e) evaluate (evaluate) and (f) creative (create). (Anderson & Krathwohl, 2001) (Wilson, 2016). The learning process in the cognitive dimension consists of six levels in order from the lowest to the highest level, namely memory, understanding, application, analysis, evaluation and creativity. While the types of knowledge are: (1) factual (based on actual facts), (2) conceptual (related to conception or understanding), (3) procedural (related to its implementation), (4) metacognitive. Knowledge obtained from the environment can be true or false. thinking process from Think-In-Itself to Think-For-Us. This process starts from basic material to something that is useful to us. This means that

what is not understood at one stage will be explained later. (Putrawan, 2015).

Ecology is the study of the interaction of living things, including humans, with their environment. (Smith Thomas & Robert, 2009) (Begon & Townsend, 2021). There are six things that must be known in order to be competent in the field of ecology. The six things are (1) knowledge of the history of the formation of life that exists today and evolution, (2) adaptation of living things to the environment, (3) population ecology, (4) interactions that occur between species, (5) communities and ecosystems and (6) ecology on a large scale [36]. (McCann & Gellner, 2020). In ecology also studies the components that make up the ecosystem based on its nature which includes biotic factors consisting of communities of organisms and abiotic factors, such as sunlight, rocks, soil, water and air around the environment including interactions between individuals, populations, communities between biotic and abiotic components [37]. (King et al., 2021). Based on the above understanding, the synthesis of knowledge about the basic concepts of ecology is all thoughts, ideas, ideas, concepts, and understanding of a person, so that they can take the initiative to share knowledge about the interaction of living things and their environment in an ecosystem.

### **Spiritual Intelligence**

Spiritual Intelligence is a concept separate from spirituality; a unifying and integrative intelligence that can be trained, developed, and allows people to utilize spirituality to improve daily interactions and problem solving in the form of spirituality into action. Spiritual intelligence is the intelligence to face and solve issues of meaning and value, which is the intelligence that determines behavior and life in the context of broader meaning. The intelligence to judge that one's actions or way of life are more meaningful than others. (Cristina Teixeira Pinto Lúcia Guedes & Nunes, 2024). A person who is spiritually intelligent has foresight and breadth with a strong belief that everything has meaning and value that can be used as a guide in making a decision on a choice of action.

Spiritual intelligence has a higher dimension of intelligence that activates the qualities and abilities of the true self (soul), in the form of wisdom, compassion, integrity, joy, love, creativity and peace. Spiritual intelligence generates deeper meaning and purpose, combined with improvements in various life skills and work skills. (Raheja et al., 2024).

The results showed that spiritual intelligence can be a predictor of academic achievement and psychological well-being. That is, the higher the spiritual intelligence of an adolescent, such as when applying spiritual values when facing problems and adapting to new environments, the higher the academic achievement and psychological well-being of a student. The findings of this study allow us to reflect that, apart from intellectual intelligence, spiritual intelligence is important for adolescents'

academic success and psychological well-being. Inculcating spiritual intelligence in adolescents can give them strength and confidence when facing the challenges of today's world. (Midi et al., 2019).

Spiritual intelligence and mental health were significantly related among science students, and male and female science students separately had a significant relationship between spiritual intelligence and mental health. No significant difference was found between male and female students in terms of spiritual intelligence. No significant difference was found between arts and science students in terms of spiritual intelligence. No significant difference was found between male and female students in terms of mental health. No significant difference was found between arts and science students in terms of mental health. (Pant & Srivastava, 2019).

Based on the explanation above, the synthesis of spiritual intelligence is intelligence related to a person's ability to deal with issues of meaning and value that his behavior and way of life are more meaningful than others and are able to foster the spirit to achieve high morals contribute to awareness, integration, and adaptive application of protecting the environment.

### **Locus of Control**

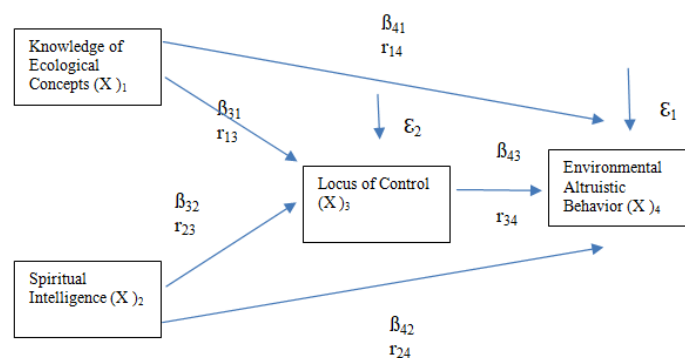
Locus of control is a belief that a person has regarding the results obtained in his life, if he believes that factors such as their motivation and self-competence affect their lives, it means that he has an internal locus of control, if they believe in fate, luck, and their external environment, it means external locus of control (McShane & Von Glinow, 2021). Locus of control reflects whether an event is caused by the person themselves or their external environment. People who tend to have an external locus of control, mean that they believe that every event that happens around them is driven by luck, chance, and even by fate. Whereas people who have a tendency to internal locus of control mean that they believe everything that happens is caused by their own behavior. (Colquitt et al., 2015). Every success achieved by internal locus of control is considered to come from one's own activities. As for individuals with external locus of control, they believe that any success achieved is controlled by the surrounding circumstances or external factors [44]. (Kreitner et al., 2001) (Jia & Wang, 2024).

Locus of control of one's personality in relation to the environment, emphasized on cognitive factors, especially perception as a director of behavior. (Schunk et al., 2014). The theory explains how behavior is controlled and directed through cognitive functions. (Sanchez-Santamaria et al., 2021). Specifically, environmental concern and behavior can be encouraged by two approaches, (1) increasing individuals' dispositional sympathy for emotional attachments with others that allow them to take action to protect the environment. Second, helping individuals to have locus of control, especially in terms of solving environmental problems. Therefore, it seems that focusing on individual personality factors may encourage higher levels of environmental responsibility. (Allen & Ferrand, 1999).

Based on the above study, it can be synthesized that locus of control is a person's assessment of the nature he has, related to the success or failure faced. If a person believes that every success and failure that occurs is caused by self-control, it means that he has an internal locus of control, on the other hand, if a person believes that every success and failure that occurs outside of his own control means that he has an external locus of control.

### **RESEARCH METHODS**

This research is categorized as causal associative research using a quantitative approach. Survey research method, data analysis using path analysis involving 110 samples. There are four instruments measured, namely environmental altruistic behavior (rel. 0.93), knowledge of ecological concepts (rel. 0.91), spiritual intelligence (rel. 0.92) and locus of control (rel. 0.91). The research design, as shown below:



**Figure 2. Research Design of Causal Relationship between Knowledge of Basic Ecological Concepts (X<sub>1</sub>), Spiritual Intelligence (X<sub>2</sub>), and Locus of control (X<sub>3</sub>) to Environmental Altruistic Behavior (X<sub>4</sub>)**

According to the figure showing the path diagram above, five path coefficients are obtained, namely  $\beta_{41}$ ,  $\beta_{42}$ ,  $\beta_{43}$ ,  $\beta_{31}$ , and  $\beta_{32}$ , and five correlation coefficients, namely  $r_{14}$ ,  $r_{24}$ ,  $r_{34}$ ,  $r_{13}$ , and  $r_{23}$ . In path analysis, the path coefficient value is calculated and tested for significance using the t-test statistic.

The study population was 110 students of Universitas Satya Negara Indonesia. The sample in this study was taken with probability random sampling technique ... The determination of this sample refers to the opinion of the Slovin formula with an error rate of 1%. (Maxwell et al., 2008). Thus the total number of samples was 110 students of Universitas Satya Negara Indonesia.

**RESEARCH RESULTS AND DISCUSSION**

The correlation between these variables is calculated by the correlation coefficient. Testing the structural model is a requirement that must be met, namely the existence of a significant correlation between related variables. The results of the correlation calculation between variables are as follows:

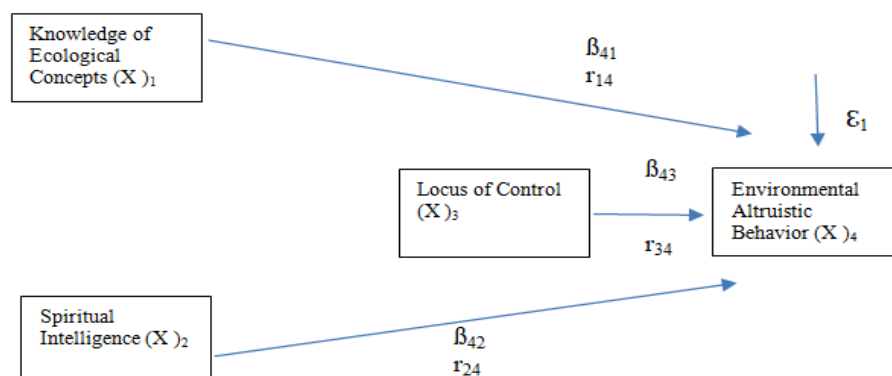
The correlation coefficient of knowledge about ecological concepts (X<sub>1</sub>) on environmental altruistic behavior (X<sub>4</sub>) is  $r_{14} = 0.28$ . The correlation coefficient of spiritual intelligence (X<sub>1</sub>) on environmental altruistic behavior (X<sub>4</sub>) is  $r_{24} = 0.37$ . The correlation coefficient of locus of control (X<sub>3</sub>) on environmental altruistic behavior (X<sub>4</sub>) is  $r_{34} = 0.39$ .

The correlation coefficient of knowledge of basic ecological concepts (X<sub>1</sub>) to locus of control (X<sub>3</sub>) is  $r_{13} = 0.19$ ; while the correlation coefficient of spiritual intelligence (X<sub>2</sub>) to locus of control is  $r_{23} = 0,32$ .

**Calculation of Path Coefficient on Sub-Structure 1**

The causal relationship between variables in Sub-Structure 1, shown in Figure 3, consists of one endogenous variable X<sub>4</sub> and three exogenous variables X<sub>1</sub>, X<sub>2</sub> and X<sub>3</sub>. The structural equation for Sub-Structure 1 is as follows:

$$X_4 = \beta_{41} X_1 + \beta_{42} X_2 + \beta_{43} X_3 + \epsilon_1.$$



**Figure 3. Causal relationship of Sub Structure 1 (X X, X<sub>1</sub>, 23 to X)<sub>4</sub>**

**Table 1 Path Coefficient of Sub-Structure-1 Model**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	45.649	11.362		3.12	.001
	Knowledge of ecological concepts (X1)	.25	.075	.26	3.15	.002
	Spiritual intelligence (X2)	.24	.124	.24	2.42	.012
	Locus of Control (X3)	.21	.088	.22	2.49	.011

The results of the path analysis of Sub-Structure 1 (X1, X2, X3 and X4) obtained a value:

$\beta_{41} = \text{Beta} = 0.26$  [tcount = 3.15 and probability (sig) = 0.002]

$\beta_{42} = \text{Beta} = 0.24$  [tcount = 2.42 and probability (sig) = 0.012]

$\beta_{43} = \text{Beta} = 0.22$  [tcount = 2.49 and probability (sig) = 0.011]

It is evident that all path coefficients are significant

The multiple regression F test of Sub-structure Model 1 with ANOVA is presented in table 2 below:

**Table 2 ANOVA Model Sub-Structure 1**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17357.215	3	5785.738	14.23	.000
	Residuals	43514.533	107	406.678		
	Total	60871.748	110			

Multiple regression F test on the sub-structure 1 model,  $F_{\text{count}} = 14.23 > F_{\text{tabel}} = 2.69$  for  $\alpha 0.05$ ; therefore it can be continued with the t test.

**Table 3. Path t test of Sub Structure Model 1**

Path	Path Coefficient	thitung	table $\alpha = 0.05$	Description
$\beta_{41}$	0,26	2,98	1,65	significant
$\beta_{42}$	0,24	2,78		significant
$\beta_{43}$	0,22	2.58		significant

Based on the results of table 3, the t test at  $\alpha 0.05$   $t_{\text{count}} > t_{\text{tabel}}$  indicates all path coefficients are significant.

The coefficient of determination or contribution of X1, X2, and X3 to X4 is shown in table 4 below:

**Table 4 Summary Model Sub-Structure-1**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.48	.23	.21	11.776

Table 4 above shows, the coefficient of determination or the contribution of variables  $X_1, X_2, X_3$  of 0.23 means that 23% of the variation of  $X_4$  can be explained by the variation of  $X_1, X_2, X_3$ .

The magnitude of the residual coefficient  $\beta_{4\epsilon 1} = 0.88$  is the influence outside the variables  $X_1, X_2, X_3$ . The structural equation for sub-structure model 1 is  $X_4 = 0.26 X_1 + 0.24 X_2 + 0.22 X_3 + 0.88 \epsilon_1$ .

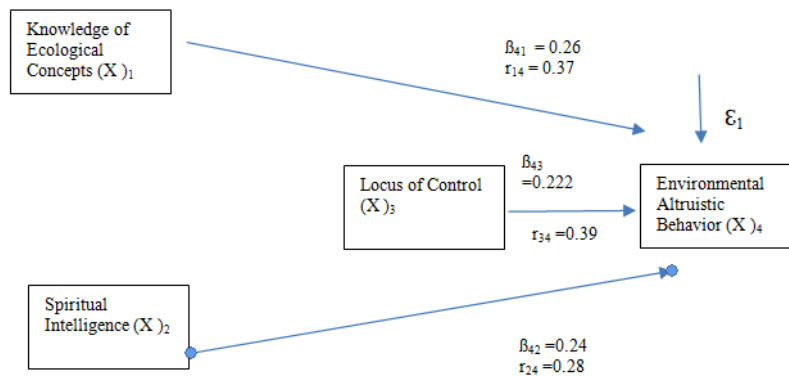


Figure 5 Calculation results of Sub-Structure 1 Causal Relationship (X1, X2, and X3 to X4)

Calculation of Path Coefficient on Sub-Structure Model 2

The causal relationship between variables in Sub-Structure Model 2, consists of one endogenous variable, namely X3 and two exogenous variables, namely X1, and X2. The structural equation for Sub-Structure Model 2 is as follows:  $X_3 = \beta_{31} X_1 + \beta_{32} X_2 + \epsilon_2$ .

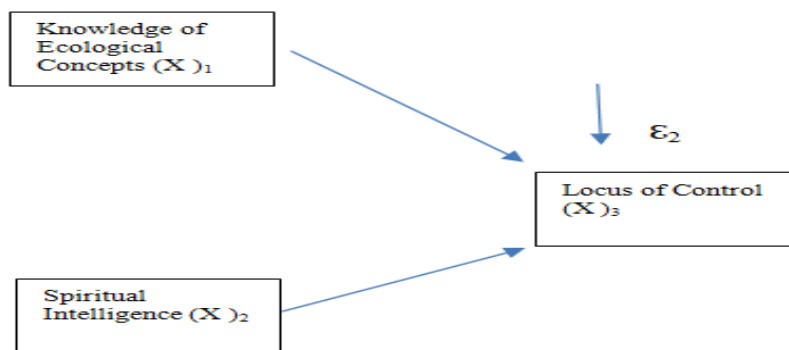


Figure 6 Causal Relationship in Sub-Structure 2 Model (X1 and X2 to X3)

Table 5 Path Coefficient of Sub-Structure-2 Model X1 and X2 on X3

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	59.679	10.167		5.12	.000
	Knowledge of ecological concepts (X1)	.28	.085	.27	3.13	.002
	Spiritual intelligence (X2)	.25	.117	.23	2.12	.007

The results of the path analysis of Sub-Structure Model 2 (X1, X2, and X3) obtained a value:

$B_{31} = \text{Beta} = 0.27$  [tcount = 3.13 and probability (sig) = 0.002]

$B_{32} = \text{Beta} = 0.23$  [titung = 2.12 and probability (sig) = 0.007]

It is evident that all path coefficients are significant

The overall test or F test on Sub-Structure 2 in the ANOVA table X1, X2, and X3 is shown in table 6 below:

Table 6 ANOVA Model Sub-Structure 1

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7947.616	2	3973.808	9.58	.000
	Residuals	44819.587	108	414.992		
	Total	52767.203	110			

Multiple regression F test on the sub-structure 1 model,  $F_{count} = 9.58 > F_{tabel} = 3.69$  for  $\alpha 0.05$ ; therefore it can be continued with the t test.

**Table 7. Path t test of Sub Structure Model 1**

Path	Path Coefficient	thitung	table $\alpha = 0.05$	Description
$\beta_{31}$	0,27	3.13	1,65	significant
$\beta_{32}$	0,23	2,12		significant

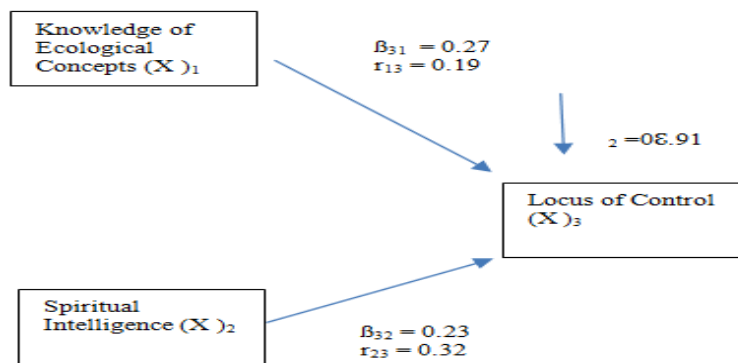
Based on the results of table 7, the t test at  $\alpha 0.05$   $t_{count} > t_{tabel}$  indicates all path coefficients are significant. The coefficient of determination or contribution of  $X_1, X_2$ , and  $X_3$  to  $X_4$  is shown in table 8 below:

**Table 8 Summary Model Sub-Structure-2**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.43	.18	.11	12.249

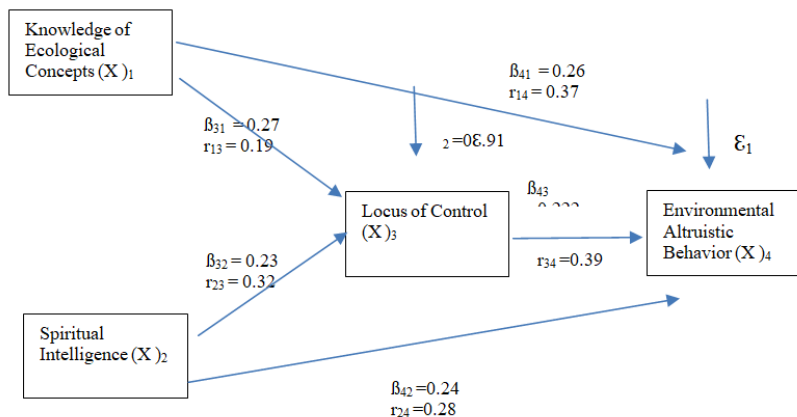
Table 8 above shows, the coefficient of determination or the contribution of the variables  $X_1, X_2$ , and  $X_3$  of 0.18 means that 18% of the variation of  $X_3$  can be explained by the variation of  $X_1, X_2$

The magnitude of the residual coefficient  $\beta_{3\epsilon_2} = 0.91$  is the influence outside the variable  $X_1, X_2$ . The structural equation for sub-structure model 2 is  $X_3 = 0.27 X_1 + 0.23 X_2 + 0.91\epsilon_2$



**Figure 7 Calculation Results of Causal Relationships in Sub-Structure Model 2 (X<sub>1</sub> and X<sub>2</sub> to X<sub>3</sub>)**

From the results of the calculation of the path coefficient on the sub-structure model 1 and sub-structure 2, as a whole describes the causal relationship between the variables  $X_1, X_2, X_3$  to  $X_4$ .



**Figure 8 Calculation Results of Causal Relationship Structure Model X<sub>1</sub>, X<sub>2</sub>, and X<sub>3</sub> to X<sub>4</sub>** The structural equation from the above calculation results is as follows:



$$X_4 = \beta_{41} X_1 + \beta_{42} X_2 + \beta_{43} X_3 + \beta_4 \varepsilon_1 \text{ and } R^2 = 0.4321$$

$$X_4 = 0.26 X_1 + 0.24 X_2 + 0.22 X_3 + 0.88 \varepsilon_1 \text{ and } R^2 = 0.23 \quad X_3 = \beta_{31} X_1 + \beta_{32} X_2 + \beta_3 \varepsilon_2 \text{ and } R^2 = 0.321$$

$$X_3 = 0.27 X_1 + 0.23 X_2 + 0.91 \varepsilon_2 \text{ and } R^2 = 0.18$$

The results of the study are in accordance with several studies conducted previously, that altruistic behavior (prosocial behavior and/or donations) is positively related to pro-environmental behavior. Awareness of the ecological crisis and altruism can stimulate pro-environmental behavior. (Xu et al., 2021) If individuals behave altruistically towards the environment, the greater the level of altruism and the more individuals reduce the consumption of goods that damage the environment [50]. (Daube & Ulph, 2016). Partially and simultaneously spiritual intelligence and motivation have a positive and significant effect on individuals and the environment that supports performance [51]. (Madina, 2022) as well as increasing concern for environmental conditions (Alshebami et al., 2023) and helps to fulfill the potential of individual abilities through non-cognitive virtues, to prepare to solve daily problems creatively and constructively in new socio-psycho-physical environmental situations [53]. (Srivastava, 2016).

Other studies suggest that spiritual intelligence can have a major influence on the economic system by encouraging ethical decision-making, altruistic behavior in conflict resolution, and a long-term perspective. This influence may not be immediately apparent, but it can still have a major impact. These characteristics lead to a more sustainable and balanced approach to promoting environmental stewardship while simultaneously promoting economic development. (Asthana & Srivastava, 2023). Organizational leaders who possess spiritual intelligence have a strong and significant impact on pro-environmental behaviour (Gull et al., 2024). Education and awareness are at the forefront of shaping sustainable attitudes. (Cuzdriorean et al., 2020). Students who have sufficient ecological knowledge, have high altruism, behave to buy environmentally friendly products. (Minhas & Furqan, 2023).

The strong relationship between internality and support for conservation policies and ecocentric attitudes can be explained by human responsibility for nature and its well-being. People believe that they have control over their lives and are therefore also responsible for the protection of nature. They have the belief that power is in their hands so they can support and implement local strategies to contribute to solving environmental problems. (Pavalache-Ilie & Unianu, 2012).

## CONCLUSION

There is a positive and significant relationship between knowledge of ecological concepts, spiritual intelligence and locus of control with environmental altruistic behavior. The more complete and complex the knowledge of ecological concepts and the more capable a person is to foster enthusiasm, increase awareness, self-confidence and strong self-control to protect the environment, the better the altruistic behavior on the environment. From these findings, to improve environmental altruistic behavior, it is necessary to further optimize the increase in knowledge about ecological concepts, spiritual intelligence and locus of control over the environment.

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