The relationship between Strategy of Circular Economy (CE) Product Fertilizer of A3N 766HI toward Sustainable Economic (SE), Sustainable Social (SS) and Legal Development (LD) through the Strengthening Awareness of Gotong Royong (GG) as the Result of the Independent' Learning and Campus (ILC) in the Landfill Waste Water Pakusari Jember

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Abstract. The aims of the study is to see the relationship between Circular Economy (CE) product fertilizer of A3N 766HI toward Sustainable Economic (SE), Sustainable Social (SS) and Legal Development (LD) through the strengthening awareness of Gotong Royong (GG) as the result of the Programs' Independent' learning and Campus (ILC) in the Pakusari Jember Landfill Waste Water. The research's questions namely: 1. Is there a relationship between circular economy product fertilizer of A3N 766HI toward strengthening awareness of gotong royong as a result of the Programs' Independent' Learning and Campus (ILC) in the landfill waste water Pakusari Jember? Is there a relationship model 1 (one) between strategy of economic circular toward strengthening awareness Gotong Royong and model 2 (two) circular economy strategy toward sustainable economic & social and legal development throughout strengthening awareness of gotong royong as the result of the Programs' Independent ' Learning and Campus (ILC) in the Landfill Waste Water Pakusari Jember? The research design is quantitative research and the data collection method by questionnaires' instrument, being distributed to 89 respondents. The results of this study are as follows: 1. The R-square value and F-Square value of Model II (two) > Model I. It shows that tehe contribution of model two namely CE and GR toward SESL = 0.669 (66.9%), and the F-square value model II (two) EC and GR toward SESL is 0.678 or 67.8%. 2. Model two, namely the circular economy towards sustainable economic & social and legal development through strengthening awareness of the value of Gotong Royong has a positive contribution.There was eleven positive contributions had been identified from seventeen goals from Sustainabale Development Goals (SDGs).The recommendation of this research is that the achievement of a circular economy must be included the strengthening the awareness of the value of gotong royong.

1   Introduction

The scavengers who live in the Final Disposal Site (FDS) in Pakusari Jember are residents who earn "rupiah" (an Indonesian currency) in order to survive and this happens because their level of education and expertise is so low that it is difficult to get a job in this era of competition. In addition, the residents who live in the FDS location Pakusari Jember use liquid fertilizer derived from waste water from the FDS to be used as fertilizer for their needs in their fields. The farmers do this because they are not aware of the content in the waste water. It is certain that the waste water from the FDS contains pathogenic bacteria and E-coli which is not good for plants, animals and humans as mentioned by Lim JY, et. al. (since pathogenic, E-coli bacteria can cause bloody diarrhea). The lack of knowledge about the effects of the two bacteria, it is necessary to kill the bacteria by using bio starter of the A3N 766HI in order to neutralize the two kinds of bacteria from the waste water. This waste water will bring environmental pollution in the surrounding area.

The portrait of the problems above shows that there are problems: 1. Education: ignorance on the fertilizer content of pond waste water, 2. Social: health and poverty issues, 3. Economic: inadequate work life and livelihoods for scavengers, 4. Legal: implementation laws for people who pollute the environment have not been acted upon.

Portraits of social, economic and legal development problems can be restored by carrying out circular economics as mentioned by Fasa, 2021:339, that "a circular economy to pursue production and economic growth and sustainable development goals" and Krchher, Julian, Denise Reike: "increasing economic prosperity followed by improving environmental quality" and strengthened by increasing awareness of the value of Gotong Royong. Actions to deal with social, educational, legal, economic problems cannot be carried out individually; collective values must be needed to run a circular economy so that it can reduce the negative impact of the problems mentioned above.

Responding to the social, economic and legal development problems above, the variables that will be included in this study are: 1. The independent variable (X) is circular economy, 2. The moderate variable (Z) is strengthening awareness of the value of mutual cooperation (Gotong Royong) and 3. The variable bound (Y) is economic and social sustainability and legal development.

Understanding the phenomenon of the problem above, each variable included in this study will be studied so that the understanding of each variable is clearer and can make assumptions before being tested and conclusions drawn.

The moderate variable in this study is Strengthening Awareness of the Value of Mutual Cooperation (Z). The word gotong-royong comes from two words, namely "Gotong" means work, and "Royong" means a sense of togetherness, Koentjaraningrat, 1984. So gotong royong is a collective value of selfless action and as a form of calling to serve and provide benefits for the progress of humanity. The collective value of

gotong royong [16] to solve problems of economic, social and legal sustainability by implementing a circular economy. Strengthening awareness of the value of gotong royong is by means of Widodo Brontowiyono et. al, 2022 "participation and contribution": 1. The value for an influential role in every social way by creating A3N 766HI products to support sustainable economic, social and legal development 2. The value as a form of togetherness in the society by way of completing a job, both for personal and community interests to process landfill waste water into organic fertilizer A3N 766HI to help scavengers and farmers get out of poverty. 3. Helping is an action Kukuh Lukiyanto and Maranatha Wijayaningtyas, 2020, circular economy that produces or benefits others, by filling A3N 766HI fertilizer products into bottles collected by scavengers and selling them to farmers around the Pakusari TDS thereby reducing the pressure environment for now and next generation to come.

The intervening variable is strengthening the awareness value of mutual cooperation (Z). the value of gotong royong is included in this research variable because the problem of scavengers and farmers below the poverty line cannot be helped if there is no spirit of mutual cooperation. The spirit of gotong royong is created when there is: an influential role innovator, there is a spirit to form togetherness with scavengers and farmers and there is a passion to help in action to the problem of scavengers and farmers by carrying out an economic circular. This spirit of mutual cooperation can be realized from nine activities from independent learning and independent campus https://industrial.uii.ac.id/ip/academic/merdeka-belajar-kampus-merdeka/   adalah: research (activitas 7) entrepreneurship (activitas 9), rural development/tematic community service (activitas 4), humanitarian projects (activitas 6) and independent/study/projects (activitas 8).

The spirit of mutual cooperation that is carried out in solving the problems of scavengers and farmers is by doing entrepreneurship from FDS waste water with innovations. This is done because the entrepreneurial spirit starts from looking for opportunities from the problems of scavengers and farmers in the final landfill in Pakusari Jember.

The independent variable, namely Economic Circular (X), is one of the strategies for protecting the environment for future generations. The circular economic strategy is carried out [21]. …the change from a linear economy (take, make, dispose) to a circular economy (renew, remake, share) is expected to significantly support the attainment of the Sustainable Development Goals (SDGs), particularly SDG on responsible consumption and production) to reduce new raw materials and reuse products that have been used to improve environmental, social and economic quality.

The implementation circular economy to achieve the goal of the smarter product the use and manufacture by applying the inovation transforming waste water Final Disposal Site (FDS) and technology of permentation by using Bio starter A3N 766HI. The action was done in this acitivites namely refuse (the liquid waste becomes organic fertilizer) and the second action is Rethink (liquid waste water is more use as organic fertilizer for the need of the farmers. And the thid action is reducing (increase efficeincy by using the technology permentation that has less used water and electricity and raw used raw material.

The implementation of circular economy to achieve the goal the extend lifespan of product and through innovations in revenue model and Socio-institutional change by doing Reuse (the used drums for fermentation and the used mineral water as a product packaging for A3N 766HI fertilizer which will benefit by how to fill the used bottles they collect with A3N 766HI fertilizer so that their social life is getting more attention. The second action through repair, refurbish and remanufacturing is not done because waste water cannot be repaired, refurbish and remanufacturing like electronic goods. The third action is repurposed by changing the waste watter that needs to be disposed of into organic fertilizer that is used to fertilize plant growth.

Implementation of circular economy to achieve the goal of useful application of materials by changing social institutions by implementing rules and laws for all individuals and society as a whole. This is done by recycle (recycle waste water into organic fertilizer, reuse used bottles into packaging containers for A3N 766HI organic fertilizer and reuse used drums for storage.

The first dependent variable is a sustainable economy (Y1) which will examine whether production and growth activities apply circular economy [12] The main goal of the circular economy is to increase economic welfare followed by an increase in environmental quality) and strengthen the awareness of the value of mutual cooperation through innovation in the income model by strengthening (reuse activity: consumers can reuse, repair: make product improvements damaged or defective products and maintenance of products that are still usable; Refurbish: returning old products and renewing them, remanufacturing: using parts of discarded products in new products with the same function, repurpose:using discarded products or parts of them in new products with different functions) will get profit and reduce the risk of loss and survival to improve the livelihood of scavengers and farmers to reduce hunger and poverty around the FDS Pakusari Jember.

The second dependent variable is social sustainability (Y2). This independent variable will examine whether increased production and growth have paid attention to social aspects compared to the opinion of Jacobi, 2003; Jacobi and Bensen, 2011 by strengthening the awareness of the value of gotong royong and circular economy by strengthening social institutions to make policies about recycling and recovering energy. Strengthen social institutions by making regulations regarding the repair, remanufacturing and reuse of products that have been discarded, either part or all of a product that can be used to improve the livelihood of farmers and scavengers around the FDS Pakusari Jember. This can be done by strengthening the awareness of the value of gotong royong.

The third dependent variable is legal development (Y3) which aims to strengthen social institutions by disseminating and enforcing laws regarding circular economic activities and strengthening awareness of the value of gotong royong as stipulated in laws and government regulations (PP President RI Number 59 of 2017 regarding increasing production and economic growth must pay attention to social aspects and environmental preservation, compare with studies from [9] and (Fasa. 2021). Law no. 20 of 2008 concerning doing/conserving the environment is given incentives, 3. Law no. 18 of 2008 concerning systematic, comprehensive and sustainable waste

management by implementing a circular economy) as a standard for producing and growing sustainably to support sustainable economic and social and legal development.

Based on the problems and literature review of each of the variables above, questions are followed to help make goals, hypotheses and draw conclusions. The questions raised in this research article are as follows:

a) Is there a relationship between the circular economic strategy of A3N 766HI products towards economic, social and legal development sustainability through strengthening awareness of the value of gotong royong from the results of the implementation of independent learning and an independent campus at the Final Waste Dump Pakusari Jember?

b) Is the relationship of model I (one) circular economy to strengthening awareness of the value of mutual assistance greater than model 2 (two) circular economy to economic, social and legal development sustainability from the results of the implementation of independent learning and an independent campus at the landfill Pakusari Jember?

2   Method

This study was designed with quantitative research methods by testing hypotheses and using data collection tools with questionnaires and conducting reliability and validity tests from 89 respondents and using data processing tools with SmartPLS to determine the Path Model.

The circular economy (X) constructed by: 1. Smarter product use strategy through technology-based innovation by way of refuse, rethink, and reduce; 2. Strategies to extend product life cycles by means of reuse, repair, refurbishment, remanufacturing, and repurposing; 3. Useful application of materials strategy by recycling and recovering by raising awareness of the value of mutual cooperation (Gotong Royong).

Strengthening the awareness of the value of gotong royong (Z) is constructed by: influential role innovator; 2. A form of togetherness with scavengers and farmers; 3. Helping in action to the problem of scavengers and farmers by carrying out an economic circular.

The sustainable economy (Y1) constructed by: increasing awareness of the value of mutual cooperation in production and growth by carrying out efficiency and risk management to preserve the environment through circular economic activities.

The sustainable social (Y2) constructed by: increasing awareness of the value of mutual cooperation to extend the product life cycle (from the aspect of scavengers: the collected bottles are filled with organic fertilizer from the results of FDS waste water treatment which are accommodated in holding ponds and from the farmer's aspect: increasing productivity farmers) in circular economic activities so that farmers get income to get a decent life and reduce poverty.

The legal development net (Y3) constructed by: increasing awareness of the Republic of Indonesia Presidential Regulation No. 59 of 2017 and law no. 20 of 2018 to be complied with in carrying out a circular economy so as to create public order, justice and peace.

3 Result and Discussion

3.1 Results

Table 1. Construct Reliability

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
CE	0.765	0.765	0.865	0.680
gr	0.793	0.810	0.879	0.708
SESL	0.806	0.820	0.885	0.720

Source of Data: Output data from SmartPLS.

From the results of calculations using SmartPLS obtained r 11 ≥ r table, and the reliability of a variable construct is said to be strong if it has a value of r 11 > 0.60 (in Riduwan, 2009:136). So it can be concluded that all the questions are reliable questions. The data reliability on the model above can be seen in the three indicators in circular economy (x) 0.811 – 0.841 > 0.60, the three indicators in strengthening awareness the value of Gotong Royong (z) 0.804-0.903 > 0.60 and sustainable economic, social and legal development (Y 1-3) 0.797-0.893 > 0.60.

The picture from the model of Conformity Factor Analysis and Relibality shows the results of the reliability test with Cronbach's alpha. The test was within acceptable limits (Cronbach's alpha p > 0.70). Moreover, the average variance extracted had to be grater than 0.5. The picture from the model shows that the results of the analysis of reliability are high.

Table 2. The Discriminate Validity

Variables	CE	gr	SESL
CE	0.825		
gr	0.581	0.841	
SESL	0.667	0.773	0.849

Source of Data: Output data from SmartPLS.

The Discriminate Validity test was performed as shown in the table above. This test revealed that there was discriminant validity between the combinations of the hypothesis model and the sub- dimensions. This showed the reliability of the entire study scale to test the hypotheses. Moreover, the correlation matrix shows the existence of a positive and significant correlation (p < 0.01) between the studies.
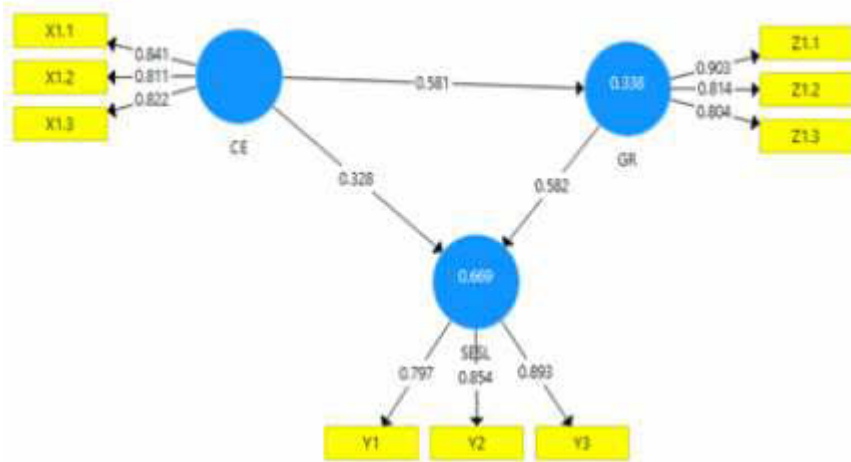
Fig. 1. Overview of the Research Model in this Article

The description of this research model is closely related to the construct reliability & validity data in tables 1 & 2, R Square & F Square in tables 3 & 4.

Table 3. R Square

Model	R Square	R Square Adjusted
CE (X) Toward GR (Z): Model 1	0.338	0.330
CE (X) Toward GR (Z) Throughout SESL (Y): Model 2	0.669	0.661

Source of Data: Output data from SmartPLS.

Table 3 describes the R-Square value for model 1 (one) is 0.338 or 33.8% and the R-Square value for model 2 (two) is 0.66.9 or 66.9%. The values for model 1 (one) and the values for model 2 (two) can also be seen in Figure 1 above.

Table 4. F Square

	CE	GR	SESL
CE		0.510	0.215
GR			0.678
SESL			

Source of Data: Output data from SmartPLS.

The table 4 shows that the value F-Square result for CE toward GR is 0.307 > F-table is 3.10 and the value F-square of CE toward SESL is 0.215 < from F-table is 3.10 and the value of F-square from the GR toward SESL variable is 0.678 < F table is 3.10.

3.2   Discussion

The contribution of the R-Square value to the circular economic model towards strengthening awareness of the value of gotong royong in model 1 (one) is 0.338 or 33.8% and the contribution of the value of the R-Square value circular economic model through strengthening awareness of the value of mutual cooperation towards sustainability, economics, social and legal development in model 2 (two) is 0.66.9 or 66.9%. If you look at table 4 above, the contribution of the circular economy to economic, social and legal development sustainability is 0.215 < the value of f-table is 3.10 which is not significant because f count > f-table. This confirms that achieving sustainable economic and social and legal development requires strengthening awareness of the value of gotong royong.

Strengthening awareness of the value of gotong royong will increase the value contribution of the circular economic variable (please compare the opinions of Jacobi, 2003; Jacobi and Bensen, 2011) and Moktadir et.al 2018) and the opinions of Saenz et al. 2022 and This can happen because of the collective role that drives innovation to strengthen togetherness through real action to turn waste water Pakusari Jember into organic fertilizer which can increase the income of scavengers because waste in the form of aqua bottles will increase in value if the bottles are filled with A3N organic fertilizer 766HI which has been fermented from the raw material for waste water from FDS Pakusari Jember. Likewise strengthening awareness of the values of mutual cooperation will have an impact on farmers around the FDS.

The production of A3N 766HI organic fertilizer is a form of circular economy because it uses FDS waste water as a raw material and is processed using fermentation technology using the A3N 766HI bio starter. The fermentation technology will reduce the use of water and electricity to produce organic fertilizer so that production costs will save costs and generate income. Revenue is obtained from reducing raw materials and fertilizer making equipment that do not use electricity and the fermentation technology makes the product life cycle even longer.

Fulfilling the need for fertilizer for farmers by adjusting the standards of their purchasing power and product costs will lead them to live a more prosperous life and reduce the poverty rate of farmers and scavengers around the landfill site. The scavengers' standard of living will also increase because they can sell A3N 766HI fertilizer products at 5 to 10 times the proceeds from selling used bottles. WHO Regional Office for Europe 2018. The concept of a circular economy offers an avenue for sustainable growth, good health and decent jobs, while saving the environment and its natural resources. Further, the change from a linear economy (take, make, dispose) to a circular economy (renew, remake, share) is expected to significantly support the attainment of the Sustainable Development Goals (SDGs),

To increase the income of farmers and scavengers, efforts should be made to increase sales of A3N 766HI fertilizer products by turning the FDS into a tourist location in order to increase the awareness of visitors and actors of independent learning and independent campuses (Directorate General of Higher Education Kemdikbud RI. 2020) about the value of mutual cooperation to buy products fertilizer A3N 766HI as a circular economic product that improves environmental quality (WHO Regional Office for

Europe 2018. .. implementing circular processes that can be the source of key direct and indirect benefits for both public and occupational health (eg by reducing air and water pollutant and GHG emissions in extraction, manufacturing and consumption processes) and embedding characters of social care such as scavengers and farmers who have so far needed a helping hand from others to break the chain of their poverty.

4   Conclusion

4.1   Conclusion

The conclusion of the research namely:

1. There is a relationship between circular economy toward increasing awareness of the value of gotong royong marked by the value R-square CE (x) toward GR (z) = 0.338 (33.8%) and the value R-Square CE and GR toward SESL = 0.669 (66.9%),
2. The F-square value model 1 (one) CE toward GR = 0.510 (51%) > f table 3.10 and the F-square value model 2 (two) EC and GR toward SESL is 0.678 or 67.8 % > f table 3.10,
3. Circular economic strategies that have less than optimal impact on economic and social sustainability and legal development are indicated by the calculated f value of CE toward SESL of 0.215 <f table of 3.10. Therefore, by including increasing awareness of the value of gotong royong as an intervening variable (moderate), the circular economy towards sustainable economic and social development will be maximized to 66.9%,
4. The second research model is CE on SESL. Through increasing awareness of the value of gotong royong, it contributes positively to sustainable development goals, such as: 1. Social Aspects: goal 1: no hunger, goal 2. no poverty, goal 3: good health and well being; 2. Environmental aspects: Goal 12: responsible consumption and production, Goal 13: climate action, goal 14: life below water, Goal 15: life on land; 3. Economic aspects: goal 8: decent work and economic growth, Goal 10: reduce inequalities, goal 17: partnership for the goal; and 4. Aspects of the Pillar of legal development and governance: goal 16: peace, justice and strong institutions.

4.2   Suggestions for Future Research

The suggestions for further research are:

1. It is good if the strengthening awareness of the value of gotong royong should be included as moderating variables in order to increase the value of sustainable economic, social and legal development;
2. It is good to also add the FDS tourist location variable to increase awareness about the importance of the environment and increase the role of creativity and innovation of students and lecturers to carry out independent learning and an independent campus as a form of higher education's tridharma activities.

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