

Modeling of Sustainability Knowledge: Under Perception on Entrepreneurship Students

Kartika Nuringsih^{1*} Edalmen Edalmen¹ Nuryasman M. N.¹

¹*Faculty of Economics and Business, Universitas Tarumanagara, West Jakarta - 11470, Indonesia*

^{*}*Corresponding author. Email: kartikan@fe.untar.ac.id*

Submitted: May 2022, Revised: October 2022, Accepted: February 2023

ABSTRACT

As aligning with sustainability issues, the study generates about modeling of sustainability knowledge with a factor analysis approach based on sustainable development goals (SDGs). The population involves entrepreneurial students with processing techniques using factor analysis using SPSS (n=150). The result of testing the Principal Component Analysis method provides the largest contribution of 57.817% with forming four components grouped in Component 1. However, the result is not logical so a rotation process is carried out with several methods including Equamax. After rotating, it produces four components, namely: Component 1 includes SDGs_3, SDGs_4, SDGs_7, SDGs_13, SDGs_17 with the name domain of social equity. Component 2 includes SDGs_9, SDGs_10, SDGs_11, SDGs_14, SDGs_15, SDGs_16 with domain of environmental sustainability. Component 3 includes SDGs_5, SDGs_6, SDGs_12 with the name domain of cultural responsibility. Lastly, Component 4 includes SDGs_1, SDGs_2, SDGs_8 with the domain of economic viability. Based on these results is concluded that the sustainable knowledge construct consists of four dimensions, such as social equity, environmental sustainability, cultural responsibility, and economic viability which are aligned with the pillars of sustainable development. It may be considered to enhance sustainability entrepreneurial learning at the university level.

Keywords: *Sustainability Knowledge, Sustainable Development Goals, Factor Analysis*

1. INTRODUCTION

In line with the orientation towards environmental sustainability, the current issues regarding sustainable aspects are important to be followed up in various development fields including entrepreneurship. As it is known that entrepreneurial activity is the backbone of the economy development. Without involving their role so the innovation tends to run slowly. Their contribution has been a priority in achieving national development. It should synergize to the sustainable development programs so the entrepreneurial sector needs to consider SDGs in creating values. The entrepreneurial literacy process has been carried out through universities to get educated entrepreneurs for the sustainability of the entrepreneurial sector in Indonesia. Government commits to entrepreneurship development who it is evidenced by opening of entrepreneurship courses since 2009. It motivates learning models and concentration of entrepreneurship at the higher education level in Indonesia. It foster to the achievement of 2% of educated entrepreneurs. Even it is related to the creation of 5 million educated entrepreneurs in 2025 [1].

To achieve this target, students need to be supported by sustainability knowledge. As part of an entrepreneurial university, this study appreciates entrepreneurship learning, especially related to sustainability development knowledge. This is in line with Fanea-Ivanovici & Baber that "campus sustainability" significantly shapes student interest in sustainable entrepreneurship [2]. Besides that, [3] promoted the mechanism to promote student intention in green and sustainable entrepreneurship. Further study, Nuringsih & Nuryasman highlighted the significant impact the students' perceived about green entrepreneurship in understanding sustainable development [4]. Based on these reasons, the student learning process must adapt to the knowledge aspect and involve student's design thinking

in a business model that is oriented towards a balance between economic growth, social-culture, and ecological goals with previously known as the triple bottom line by Elkington [5].

This study relates to exploring student interest in pioneering entrepreneurship with an orientation to sustainable aspects, such as green, social, or sustainable entrepreneurship so that sustainability knowledge becomes the basis for encouraging a desire to involve sustainability as part of the enterprise's value creation. In the previous moment, Bird in 1988 generally defined "intention as the state of mind directing a person's attention and action toward a specific object (goal) or a path to achieve something" [6]. Thus there is a statement about specific goal or including some stages to achieve that special goal. If it is synergized with the hope of sustainable development, these educated entrepreneurs will have specific goals align with sustainability. Therefore, to pursue the formation of this attention, literacy support about sustainability is needed so that it can stimulate the student desire for sustainable entrepreneurship.

This mechanism applies to efforts to encourage the growth of student interest in sustainable entrepreneurship so that it is certain that sustainable knowledge also has a significant effect on sustainable entrepreneurial intention. Under the initial study, it indicated that there were students' limitations in understanding some domains of sustainability [7],[8]. Although in subsequent studies, perceptions began to form significantly [9] so that in line with efforts to build entrepreneurial passion on students [10], an understanding of sustainability must go hand in hand with this learning.

Considering with this case, this study designs modeling on sustainability knowledge to classify what dimensions are formed in the construct to make it easier for students to adjust their passion when building startups. Priorly, Elkington defined the triple bottom line (TBL) or 3P with an orientation on people, profit, and the planet which then forms the socio-cultural, economic, and environmental domains [5]. Otherwise, the literation progress forms various statements e.g., double bottom lines, four bottom lines, and five bottom lines. These targets are very likely to be formed in line with the problems faced by the world community.

The issue of sustainability aligns with the hope of creating sustainable prosperity. The United Nations has announced some goal achievements for various countries in the world through the Millennium Development Goals (MDGs) in 2000-2015, followed by the SDGs with the achievement of 17 sustainable development targets until 2030. To bring entrepreneurship learning closer to sustainable development SDGs-based sustainability knowledge modeling is carried out. Through this modeling, it is understood which domains are known, less known, or unknown to students so that the role of education becomes important in strengthening student knowledge in these domains.

Students as educated millennials are expected to be able to develop insight and knowledge about sustainability issues to form a mindset on sustainability. Knowledge as part of entrepreneurship learning so that students have sufficient information. It is time for students to be interested in implementing the SDGs in business activities. Through this knowledge, it gives students a sense of self-confidence to encourage an attitude and perceived behavior control towards students' intentions on sustainable entrepreneurship. This is in line with the theory of planned behavior [11]. Moreover, in the program "Merdeka Belajar Kampus Merdeka" abbreviated as MBKM, entrepreneurship is one area of learning that is of concern to the government so that as an effort to encourage students in these activities it must be in line with these expectations. Therefore, creativity in building a model on sustainable knowledge is something new in this research stage.

The purpose of the formation of a sustainability knowledge construct is to map students' understanding of sustainable development targets and to manage this knowledge for the benefit of decision making, including in the development of entrepreneurship. If it is understood through the opinion of Kollmuss & Agyeman [12] that it is mentioned the linking environmental knowledge and pro-environmental behavior so that the mechanism is aligned as a relationship between sustainable knowledge and sustainable entrepreneurial intention so that through intention it will shape green behavior in supporting sustainability.

Furthermore, aligning with Nakyejwe, Kasimu, & Sabi [13] stated "sustainable entrepreneurship involves entrepreneurs pursuing profits while making a positive, sustainable impact on the environment and society" This is in line with entrepreneurship learning so that students are selected as respondents to represent the educated millennial generation.

It is hoped that in the future students' design thinking will be strengthened by knowledge so that they can seize opportunities and innovate in line with the SDGs. Hence millennial can gradually

develop a sustainability-oriented business model. Therefore, the hypothesis built in this study is the formation of several domains in sustainability knowledge. Through the factor analysis approach, domain grouping is formed which is a mixture of economic, socio-cultural, and ecological aspects.

2. METHODS

The stages of the research are as follows. First: This study builds second-order modeling covering indicators, dimensions, and constructs of sustainability knowledge. The sustainability knowledge indicator was adopted from 17 SDGs indicators at UNDP with a reflective approach. The factor analysis technique used in this study was similar to that used in the prior study [13] with using the Principal Component Analysis method to analyze the indicators in the sustainable entrepreneurial intention modelling. Basically, the factor analysis was used to determine various factors that could explain the relationship between the various independent indicators being observed. This analysis identifies some factors that can explain a large number of interrelated variables so that the variables in one factor have a high correlation while the correlation with variables in other factors is relatively low. Each group of variables represents a basic construct called a factor. To increase the interpretive power of factors, a transformation is carried out on the loading matrix. The transformation is done by rotating the matrix with a certain method.

Second: The data processing technique uses SPSS with the first test method using Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity with a significance level of 5%. The next test uses Principal Component Analysis (PCA) by comparing other methods such as unweighted least square, generalized least-squares, maximum likelihood, principal axis factoring, alpha factoring, and image factoring. Among these approaches, one method was identified, namely PCA which produced the largest contribution of 57.817%, and formed four components of sustainability so that further analysis was referenced.

However, because of the 17 SDGs indicators collected in only one component, a rotation process is carried out using several rotation methods such as "Varimax, Direct Oblimin, Quartimax, Equamax, and Promax" to map indicators on the four dimensions of the sustainable knowledge construct as generated in the method. PAC is a factor analysis technique in which several factors will be formed in the form of latent variables that cannot be determined before the analysis is carried out or as an exploratory analysis. To properly support the mapping results, literature study and judgmental interpretation are used to determine these components.

Third: The population in this study is entrepreneurship students with a sample of 150 respondents from students of the Management study program, Faculty of Economics & Business at Universitas Tarumanagara. The preparation process of instruments until data collection has been carried out since November 2020 while the finishing process can be in November 2021. The determination of the population is adjusted to the holding of entrepreneurship learning programs at this university.

Fourth: Sustainability knowledge indicators based on SDGs include: SDGs_1, SDG_2, SDGs_3, SDGs_4, SDG_5, SDGs_6, SDGs_7, SDG_8, SDGs_9, SDGs_10, SDG_12, SDGs_13, SDGs_14, SDG_15, SDGs_17, and SDGs_17. The entire SDGs agenda is symbolized as follows:



Figure 1 Sustainable Development Goals

The agenda includes 17 goals to realize the welfare of the global community in the following order "No poverty, zero hunger, good health. and well-being, quality education, gender equality, clean

water, and sanitation, efficient and clean energy, decent work and economic growth, industry, innovation, and infrastructure, reduced inequalities, sustainable cities and communities, responsible consumption and production, climate changes, life below water, life on land, peace, justice, and strong institutions, and partnership for the goals". The seventeen instruments were developed into a questionnaire with an ordinal scale including 1 (really don't know), 2 (have known), 3 (know a little), and 4 (know very much) about the SDGs. The questionnaire was distributed as a pilot study to 40 students using microsoft teams. After language validation, it is disseminated to respondents widely via Google Forms.

Fifth: Study results serve as information in entrepreneurship learning and provide literacy-related to sustainability issues. Students can develop creativity and innovation in line with sustainable development so that they can develop design thinking in line with these sustainability aspects. Educational institutions can contribute to the MBKM program to disseminate the SDGs to increase public awareness or attitude towards sustainability. The formation of this attitude is important because one day it can shape student interest and behavior in sustainability in the entrepreneurial sector.

3. FINDINGS AND DISCUSSIONS

The results show the Kaiser-Meyer-Olkin (KMO) value of 0.855 (over 0.50) with a p-value of Bartlett's Test of Sphericity (sig.) of 0.000 so the results prove that the 17 SDGs indicators can be continued in the factor analysis process. **Table 1** shows the Measure of Sampling Adequacy (MSA) score for all indicators above 0.50. This value is categorized as relatively high so that all indicators can be included in the test. The highest score was 0.922 in SDGs_2 regarding zero hunger, while the lowest MSA score was 0.762 in SDGs_6 regarding clean water and sanitation. In line with the test results, the data was continued for factor analysis testing with various test methods to classify SDGs indicators in some dimensions of sustainability knowledge including four domains such as economic, social, cultural, and environmental.

Table 1 Score of Measure of Sampling Adequacy

Indicator	MSA	Indicator	MSA
SDGs_1	0.841	SDGs_10	0.902
SDGs_2	0.833	SDGs_11	0.922
SDGs_3	0.899	SDGs_12	0.885
SDGs_4	0.898	SDGs_13	0.754
SDGs_5	0.871	SDGs_14	0.884
SDGs_6	0.762	SDGs_15	0.828
SDGs_7	0.846	SDGs_16	0.841
SDGs_8	0.902	SDGs_17	0.804
SDGs_9	0.866	-	-

Then, the factor analysis was tested using the extraction method of Principal Component Analysis (PCA). This method produces an Eigenvalue above 1 and forms four components of 17 indicators of sustainability knowledge. **Table 2** shows that the contribution to the factor variance in the PCA method is 57.817%. The cut-off provisions on the Eigenvalue as a measure determine the number of components produced. The results indicate that the Eigenvalues form 4 components with a total value above 1, for example, component 1 produces a value of 6,102 with the ability to explain variations of 35,892. Thus the display in **Table 2** meets the criteria for factor analysis.

Furthermore, to determine the indicators that are members of each component, it can be seen from the loading factor of each indicator. An indicator can be declared as a member of a component if it has the largest loading factor compared to other components. These result in **Table 3** shows that majority indicators have the largest loading factor in Component 1 while the correlation score in the other components are lower. It means the SDG_1 until SDGs_17 are members of Component 1.

Table 2 Total Variance Explained

Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.102	35.892	35.892	6.102	35.892	35.892
2	1.397	8.220	44.112	1.397	8.220	44.112
3	1.194	7.024	51.136	1.194	7.024	51.136
4	1.136	6.680	57.817	1.136	6.680	57.817

Extraction Method: Principal Component Analysis

Table 3 Component Transformation Matrix

Indicator	Component 1	Component 2	Component 3	Component 4
SDGs_1	.580	.110	.467	.048
SDGs_2	.498	.389	.481	.136
SDGs_3	.608	-.358	.126	.034
SDGs_4	.633	-.011	.006	-.035
SDGs_5	.486	.465	-.010	-.236
SDGs_6	.576	.253	.180	-.566
SDGs_7	.584	-.488	-.045	.015
SDGs_8	.532	.020	.414	.336
SDGs_9	.575	.048	-.154	.522
SDGs_10	.622	.067	-.325	.249
SDGs_11	.687	-.098	.021	.261
SDGs_12	.657	-.058	.090	-.262
SDGs_13	.564	-.480	-.081	-.311
SDGs_14	.674	.124	-.371	-.150
SDGs_15	.598	.289	-.392	.137
SDGs_16	.662	.258	-.282	-.097
SDGs_17	.605	-.414	.084	-.073

Comparative testing was conducted using other approaches, namely Unweighted Least Square, Generalized Least-Squares, Maximum Likelihood, Principal Axis Factoring, Alpha Factoring, and Image Factoring. The amount of contribution to the factor variance formed in this method is smaller than PCA (57.817%), such as Unweighted Least Square (46.111%), Generalized Least Square (48.753%), Maximum Likelihood (46.702%), Principal Axis Factoring (45.998%), Alpha Factoring (45.488%), and Image Factoring (36,037%). Therefore, the process maintains the PCA in factor analysis testing. However, when referring to the first method, sustainability knowledge is only formed in the Component 1, whereas according to previous studies it has been stated that the SDGs form a triple bottom line, so a rotation process is carried out to produce a mapping that is in line with the assumptions of TBL.

Furthermore, the rotation process is carried out using five rotation methods e.g., Varimax, Direct Oblimin, Quartimax, Equamax, and Promax with the results of forming four components so that 4 dimensions are formed on SDGs which are proxies in building sustainability knowledge. However, there are variations in the mapping results among the four components in the five rotation methods. To get the mapping results correctly, a judgmental analysis was carried out by considering the theory to examine the results of grouping the components in the five methods with the SDGs. After rotating is depicted in the table below.

Table 4 Component Transformation Matrix

Item	Component			
	1	2	3	4
SDGs_1	.219	.054	.291	.659
SDGs_2	-.072	.106	.324	.726
SDGs_3	.615	.182	.083	.312
SDGs_4	.357	.315	.317	.273
SDGs_5	-.071	.255	.629	.206
SDGs_6	.221	-.029	.809	.208
SDGs_7	.710	.242	.022	.137
SDGs_8	.206	.184	.012	.700
SDGs_9	.161	.674	-.091	.374
SDGs_10	.225	.682	.141	.153
SDGs_11	.397	.460	.082	.417
SDGs_12	.456	.153	.471	.242
SDGs_13	.759	.097	.257	-.036
SDGs_14	.287	.557	.486	-.016
SDGs_15	.053	.707	.321	.090
SDGs_16	.162	.549	.508	.096
SDGs_17	.680	.143	.133	.222

From the various rotation methods, it can be concluded that the Equamax with Kaiser Normalization method is more relevant when it is adjusted to the SDGs indicators (see Table 4). Furthermore, the indicator formation for each component is described as follows:

1. **Component 1** consists of 5 indicators including SDGs_3, SDGs_4, SDGs_7, SDGs_13, SDGs_17 with the domain of social equity. However, SDGs_4 has the weakest correlation value because $0.357 < 0.50$ while other factors produce a correlation value above 0.50.
2. **Component 2** consists of 6 indicators including SDGs_9, SDGs_10, SDGs_11, SDGs_14, SDGs_15, SDGs_16 with environmental sustainability domain. However, SDGs_11 has the weakest correlation because it is $0.460 < 0.50$ while other factors produce a correlation value above 0.50.
3. **Component 3** consists of 3 indicators including SDGs_5, SDGs_6, SDGs_12 with the domain of cultural responsibility. However, SDGs_12 has the weakest correlation because it is $0.471 < 0.50$ while other factors produce a correlation value above 0.50.
4. **Component 4** consists of 3 indicators including SDGs_1, SDGs_2, SDGs_8 with the domain of economic viability. All three produce a high correlation above 0.50 with the highest correlation on SDGs_2.

It is concluded that the sustainable knowledge construct is divided into 4 dimensions consisting of (1) social equity (5 items), (2) environmental sustainability (6 items), (3) cultural responsibility (3 items), and (4) economy viability (3 items). All four are aligned with the pillars of sustainable development. Overall it produces the highest indicator on SDGs_6 (clean water, and sanitation) although three indicators have low correlation values, namely: SDGs_4 (quality education), SDGs_11 (sustainable cities and communities), and SDGs_12 (responsible consumption and production). All three are encouraged through strengthening education programs with the ministry of education and culture, alleviating slum areas through the ministry of public works and public housing, and recycling intention to involve the ministry of the environment.

Meanwhile, the highest score provides an overview of the understanding of water awareness so that socialization and practice in this aspect have been going well. Then the second highest is the understanding of zero hunger so that implementation can be encouraged through sustainable entrepreneurial agriculture to the millennial farmers. The mechanism aligns with the result study of [14]. However, it needs to be supported by all parties, including entrepreneurs. These results are expected to support entrepreneurial learning so that they can synergize in the "MBKM" program so that they can contribute to sustainably promoting community welfare.

Regarding the domain developed in this study, the results of previous studies show the following: Elkington in the 2000s introduced the triple bottom line domain. In its development, entrepreneurship has adopted this aspect to become sustainable entrepreneurship. As the definition of Thompson et al., [8] states "sustainable entrepreneurship examines opportunities to transition to a socially, economically, and environmentally sustainable society. These opportunities may be sought through organizations that create economic profit, or through non-profit organizations but the organizations must be economically self-sustaining". It means organizations balance the TBL e.g., people, planet, and profit. It also aligns with [15].

This definition establishes criteria relevant to sustainability through the TBL concept. Furthermore, Koe & Majid revised sustainable entrepreneurship as a harmony of four domains including cultural diversity, social equity, environmental responsibility, and economic viability [16] so that it can be analogized as the four bottom lines. The study of Racelis introduces the Quintuple Bottom Lines (QBL) consisting of economic, social, ecological, cultural, and ethical [17]. Romanowski & Gnusowski [18] through the Quintuple Helix Model (QHM) by considering five domains that are relatively in line with the previous model.

However, the study of Belz & Binder [19] focused on three domains with gradual implementation from the double bottom line to the triple bottom line.

Referring to the study, it can be concluded that there are at least three basic pillars in its implementation with stages on two pillars such as the economy and society or economy and ecology, then only proceeds to become a balance between the three. Therefore, the combination of domains varies among 3-5 domains in constructing sustainable entrepreneurship so that it is also applied in developing the domain of sustainability knowledge based on SDGs.

This shows that sustainable entrepreneurship involves entrepreneurs who pursue profits through economic viability while making a positive impact on environmental sustainability, promoting social equity, and preserving cultural responsibility. This result aligns with a prior study of [16] which described sustainable entrepreneurship as a harmony of four domains including "cultural diversity, social equity, environmental responsibility, and economic viability." Basically, an important role of entrepreneurial education is needed to support nascent or candidate entrepreneurs. It improves student engagement and intention in entrepreneurship [20],[21]. Even, one-day environmental values may appeal in line with the growing intention of sustainable entrepreneurship among young people [22]. Lastly, growing these intentions can enrich the orientation of the green market so it will improve environmental performance [23]. It can support growing of pro-environmental behavior in the prior study of [12]. This achievement is hope in realizing prosperity for current and future generations which was initiated in 2000 in the MDGs with the target of achieving the SDGs in 2030.

4. CONCLUSIONS

This modeling indicates the results of the second-order modeling reflective test on the sustainable knowledge construct. The four domains formed in line with the pillars of sustainable development consist of social equity (5 items), environmental sustainability (6 items), cultural responsibility (3 items), and economic viability (3 items). Therefore, a total of 17 items are the SDGs called the four bottom lines (FBL). These results can be retested by involving a larger number of samples in future studies. Testing sustainable knowledge to prove the mapping indicators in the four domains. Aligning with the study, entrepreneurship education programs can collaborate with the MBKM program in studying the theory and practice of implementing the SDGs, especially in entrepreneurship development. Further study can be developed by involving campus sustainability to foster sustainable knowledge in order to encourage student intentions on sustainable entrepreneurship.

ACKNOWLEDGMENT

This study was supported by the "Lembaga Penelitian dan Pengabdian Masyarakat" (LPPM) of Tarumanagara University, by the contract of SPK No: 1938-Int-KLPPM/UNTAR/XII/2021.

Moreover, thank students to collaborate as respondents in the pilot study of instruments and data gathering along with preliminary study from 2020 until 2021.

REFERENCES

- [1] Y. Kaijun, P.I. Sholihah. "A comparative study of the Indonesia and Chinese educative system concerning the dominant incentive to entrepreneurial spirit (desire for a new venturing) of business school students". *Journal of Innovation and Entrepreneurship*, 2015, pp. 1-16. DOI: 10.1186/s13731-014-0014-0.
- [2] M. Fanea-Ivanovici, H. Baber. "Sustainability at Universities as a Determinant of Entrepreneurship for Sustainability". *Sustainability*, 14, 454, 2022, 1-13. <https://doi.org/10.3390/su14010454>.
- [3] I. Hussain, M. Nazir, S.B. Hashmi, A. Di Vaio, I. Shaheen, M.A. Waseem, A. Arshad. "Green and sustainable entrepreneurial intentions: A mediation-moderation perspective". *Sustainability*, 13, 8627, 2021, 1-13. <https://doi.org/10.3390/su13158627>.
- [4] K. Nuringsih, M.N. Nuryasman. "The Role of green entrepreneurship in understanding Indonesia economy development sustainability among young adults". *Estudios de Economia Aplicada*, vol. 39, issue 12, 2021. <https://ojs.ual.es/ojs/index.php/eea/article/view/6021>.
- [5] J. Elkington. Chapter 1: Enter the Triple Bottom Line, 1-17, 2004
- [6] B. Bird. "Implementing entrepreneurial ideas: The case for intention". *Academy of Management Review*, 13 (3), 1988, 442-453.
- [7] K. Nuringsih, I. Puspitowati. "Determinants of eco entrepreneurial intention among students: Study in the entrepreneurial education practices". *Advanced Science Letters*, 23(8), 2017, 7281–7284. DOI: 10.1166/asl.2017.9351.
- [8] K. Nuringsih, M.N. Nuryasman, I. Prasodjo, R. Amelinda. "Sustainable entrepreneurial intention: the perceived of triple bottom line among female students". *Jurnal Manajemen*, Vol. XXIII(02), June, 2019, 168-190. DOI: <http://dx.doi.org/10.24912/jm.v23i2.472>.
- [9] V. Valenrie, K. Nuringsih. "Fostering eco-entrepreneurial intention among students". *Proc. Int. Conf. Econ. Business, Soc. Humanit. (ICEBSH 2021)*, vol. 570, 985–992, 2021, doi: 10.2991/assehr.k.210805.155.
- [10] B. Mayoshe, K. Nuringsih. "Understanding entrepreneurial passion among new entrepreneurs". *Proc. Int. Conf. Econ. Business, Soc. Humanit. (ICEBSH 2021)*, vol. 570, 251–257, 2021, doi: 10.2991/assehr.k.210805.040.
- [11] I. Ajzen. "The Theory of Planned Behavior". *Organizational Behavior and Human Decision Processes*, 50(2), 1991, 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T).
- [12] A. Kollmuss, J. Agyeman. "Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behavior?". *Environmental Education Research*, 8 (3), 2002, 239-260. DOI: 10.1080/13504620220145401.
- [13] K.S. Nakyejwe, K. Sendawula, M. Humphrey, H.M, Sabi. "Sustainable entrepreneurship of small businesses in Uganda: A confirmatory factor analysis". *African Journal of Business Management*, vol. 15(5), 2021, 139-151, DOI: 10.5897/AJBM2021.9207.

- [14] G.R. Sargani, D. Zhou, H.M. Raza, Y. Wei. “Sustainable entrepreneurship in the agriculture sector: The nexus of the triple bottom line measurement approach”. *Sustainability*, 12(8), 2020, 3275–3300. <https://doi.org/10.3390/su12083275>.
- [15] S. Schaltegger, M. Wagner. “Sustainable entrepreneurship and sustainability innovation: Categories and interactions”. *Business Strategy and the Environment Bus. Strat. Env.* 20. 2011, 222–237.
- [16] I.A. Majid, W-L. Koe. “Sustainable entrepreneurship (SE): A Revised model based on triple bottom line (TBL). *International Journal of Academic Research in Business and Social Sciences*, June, vol. 2 No. 6, 2012, 293-310.
- [17] A.D. Racelis. “Sustainable entrepreneurship in Asia: a proposed theoretical framework based on literature review”. *Journal of Management for Global Sustainability*, vol.2, issue 1, 2014, 49–72.
- [18] R. Romanowski, M. Gnusowski. “Green Entrepreneurship in The Quintuple Helix Model”. In R. Romanowski (Ed.), *Managing Economic Innovations – Ideas and Institutions*, 2019, 103–118. Bogucki Wydawnictwo Naukowe. <https://doi.org/10.12657/9788379862764-7>.
- [19] F.M. Belz, J.K. Binder. “Sustainable entrepreneurship: A convergent process model”. *Business Strategy and the Environment*, 26(1), 2017, 1–17. <https://doi.org/10.1002/bse.1887>.
- [20] N.H. Othman, N. Othman. “A Systematic review on entrepreneurship education in higher learning institutions in Southeast Asia”. *Universal Journal of Educational Research*, 7(11), 2019, 2406–2416. <https://doi.org/10.13189/ujer.2019.071118>.
- [21] N. Masri, A. Abdullah, S. Asimiran, Z. Zaremohzzabieh. “Relationship between engagement in learning entrepreneurship education and entrepreneurial intention among vocational college students”. *Pertanika Journal of Science and Technology*, 29(S1), 2021, 19–38. <https://doi.org/10.47836/pjssh.29.s1.02>.
- [22] H. Peng, B. Li, C. Zhou, B.M. Sadowski. “How does the appeal of environmental values influence sustainable entrepreneurial intention?”. *International Journal of Environmental Research and Public Health*, 18(3), 2021, 1070–1095. <https://doi.org/10.3390/ijerph18031070>.
- [23] S.F. Peris, K. Supian, M.W. Hasanat, M.N. Hossain. “A Mediating effect of green market orientation on the environmental performance: From a literature review to a conceptual framework”. *Journal of Management Info.* vol. 7, No. 2, 2020, 92-118. Doi: 10.31580/jmi.v7i2.1421.