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DISSEMINATION OF SUSTAINABLE DEVELOPMENT GOALS THROUGH KNOWLEDGE MANAGEMENT SYSTEMS UTILIZATION

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Abstract. *Sustainable Development Goals (SDGs) are a world development program that aims to prosper the world community and preserve nature. Currently, program harmonization with government ministries/agencies in order to harmonize Sustainable Development Goals (SDGs) in the 2015-2019 has represented seventeen objectives which will be focused on achieving three dimensions of sustainable development, namely the dimension of human development, dimension of economic development, and the dimension of environment development. Through 17 main goals this program is related to sustainable development and its socialization to the wider community. Through the implementation of the industrial revolution 4.0 framework, a knowledge management system for sustainable development goals can be built that can be used to disseminate information to the public more effectively and efficiently. The method of developing and evaluating the system is carried out by the method of factor analysis and regression analysis. The results showed that Productive Learning Environment, Strategy Alignment, Progressive Leadership, User Friendly Orientation and Integrated IT Systems are factors that need to be considered and a model can be built to control the success of dissemination of sustainable development goals.*

Keywords: SDGs, Industrial revolution 4.0, Knowledge management, Dissemination, Performance measurement model

1. **Introduction.** The Sustainable Development Goals (SDGs) are a global 2030 agenda. The SDGs contain 17 goals and 169 targets for the 2015-2030 implementation period. Indonesia has been actively involved in various international forums in the preparation of SDGs, and in line with the formulation of SDGs at the global level, Indonesia has also compiled the 2015-2019 National Mid-Term Development Plan, so that the substance contained in the SDGs is in line and is an elaboration of the government's vision and

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mission. The SDGs concept was born at a conference on sustainable development organized by the United Nations in Rio de Jainero in 2012 [1]. The purpose of this meeting is to develop common goals to harmonize environmental, social and economic aspects. To protect people, planet, wealth, peace and partnerships, will be achieved in 3 noble goals by 2030, namely poverty alleviation, attainment of gender equality, and mitigating climate change, as seen in Figure 1.

FIGURE 1. SDG's 17 goals

By seeing the importance of the substance of knowledge about the goals of sustainable development, it is necessary to disseminate it to all people, so it is necessary to build a special knowledge management system (KMS) regarding the substance of SDGs by utilizing the industrial revolution platform 4.0 [2]. Based on the concept of knowledge management (KM), and the knowledge development system (KMS) cycle method, a knowledge management system with a special substance can be built about the objectives of sustainable development, so that later it can be used to support the process of socialization and dissemination of this knowledge to the community and can be done independently without constrained by time and place [3]. And it can increase public understanding of government programs related to sustainable development goals [4]. The purpose of this study is to develop a performance measurement model for the dissemination of sustainable development goals through the application of a knowledge management system so that it can be used to determine development strategies for implementing sustainable development goals in the future.

2. **Literature Review.** Sustainable Development Goals (SDGs) are development that maintains the improvement of the people's economic welfare in a sustainable manner, development that maintains the sustainability of the social life of the community, development that maintains the quality of the environment and development that ensures justice and implementing governance that is able to maintain an increase in the quality of life from one generation to the next. SDGs are global and national commitments in an effort to improve the welfare of society, covering 17 goals, namely:

1) No Poverty;
2) Without Hunger;
3) Healthy and Prosperous Life;
4) Quality Education;
5) Gender Equality;
6) Clean Water and Proper Sanitation;
7) Clean and Affordable Energy;
8) Decent Work and Economic Growth;
9) Industry, Innovation and Infrastructure;
10) Reducing Gap;

11) Sustainable Cities and Settlements;
12) Responsible Consumption and Production;
13) Addressing Climate Change;
14) Ocean Ecosystem;
15) Land Ecosystem;
16) Peace, Justice and Strong Institutions; and
17) Partnerships to Achieve Goals.

Efforts to achieve SDGs in Indonesia can be supported by implementing ways to take advantage of the development of the 4.0 industrial revolution platform, which includes strengthening domestic resource mobilization, expanding information, communication and technology (ICT) for capacity building. Human resource development is the key for business actors to survive in the midst of the 4.0 industrial revolution. The Ministry of National Development Planning/Bappenas assesses the industrial revolution 4.0 can be used to achieve Sustainable Development Goals (SDGs).

According to the Mckinsey study, 60% of job positions in the world will be replaced by automation. In Indonesia, it is estimated that 51.8% of the potential jobs will be lost. We must be proactive in ensuring our human resources are ready to face the 4.0 industrial revolution. Even though it has the potential to become a threat, he believes, the industrial revolution 4.0 can help Indonesia achieve the goals in the SDGs, if human resources in Indonesia are well prepared to deal with them. According to [5], function or knowledge management system theory has a six-step cycle. The following is a cycle from knowledge management system, as seen in Figure 2.

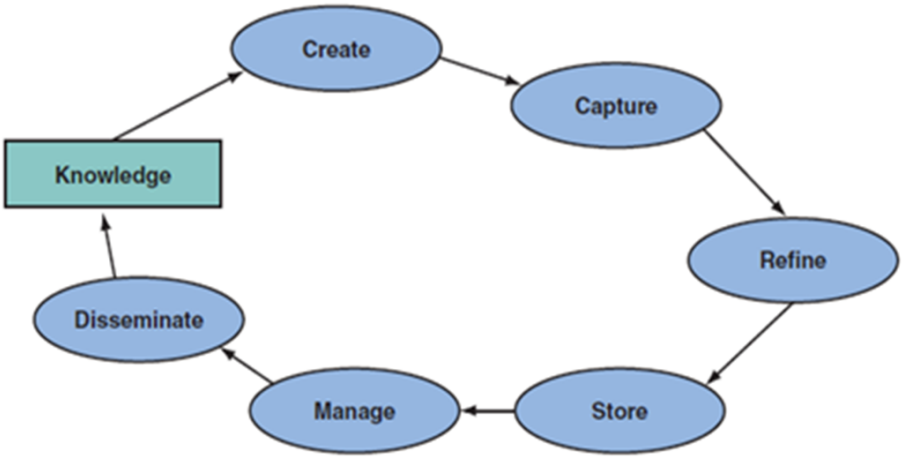

FIGURE 2. Knowledge management system cycle

Knowledge Management System (KMS).

KMS is a tool aimed at supporting and managing all knowledge in an organization as a company's intellectual assets [6], including the following.

1) Communication between various users.
2) Coordination of user activities.
3) Collaboration of various user groups in the process of knowledge transfer.
4) Controlling processing to ensure an integrity and useful in tracking project progress.

KM Framework Strategy.

According to Liu et al. in the journal *Information Sciences*, namely with the aim of the framework strategy, KM is defined in terms of the "Knowledge Hierarchy". The framework strategy focuses on managing knowledge in accordance with existing information and data [7].

KM Process.

In order to develop KM in an organization, initially it requires the selection and implementation of a group of processes that can help organizations to become better at making, searching, obtaining, arrangement, sharing and use of knowledge in order to achieve organizational goals [8]. Here are some examples of the process, namely:

1) Perform knowledge to identify needs, resources, and flows of knowledge [9].
2) Create a knowledge strategy to guide to the goal [10].
3) Connect people by sharing tacit knowledge using approaches such as community practice or event learning [11].
4) Connect people with information in sharing explicit knowledge using approaches such as creating practical data stores, using content management processes to ensure that existing explicit knowledge is easy to access, guaranteed authenticity [12].
5) Create opportunities for people to gain new knowledge [13].
6) Help people in the process of finding and using knowledge [14].
7) Help people to share knowledge in ways that can change a person's thinking using experience sharing techniques [15].

Through a number of existing variables such as leadership, organization, technology, and learning which are the main factors in the development and implementation of a knowledge management system, a research instrument construction can be constructed in the form of a questionnaire by further describing a number of indicators that support these variables, as presented in Table 1.

Table 1. Research instrument development

Factor	**Indicator**	**Reference**
Leadership	Clarity of Policy (LED1)	[16]
	Strategy Fit (LED2)	[17]
	Budget Availability (LED3)	[18]
	Application Systems Appreciation (LED4)	[19]
	Organization Knowledge Identification (LED5)	[20]
Organization	Cost Efficiency (ORG1)	[21]
	Inovation Space (ORG2)	[22]
	Learning Culture (ORG3)	[23]
	Organization Alignment (ORG4)	[24]
	Intellectual Property Value (ORG5)	[25]
	Productivity Increasement (ORG6)	[26]
	Business Process Alignment (ORG7)	[27]
	Supporting Organization (ORG8)	[28]
	Easy to Edit (ORG9)	[29]
	Trust Implementation of KM (ORG10)	[30]
Technology	Easy Application to Use (TEC1)	[31]
	Participants Interaction (TEC2)	[32]
	Systems Security (TEC3)	[33]
	Internet Network Quality (TEC4)	[34]
	Access of Information (TEC5)	[35]
	Systems Integration (TEC6)	[36]
	Collaboration Links (TEC7)	[37]
Learning	Positive Experiences (LEN1)	[38]
	User Motivation (LEN2)	[39]
	Qualification of Facilitator (LEN3)	[40]

3. **Methodology.** This research begins by conducting a literature study, and studying several previous studies related to this research, then looking for references from various sources such as journals and books and articles that are closely related to natural gas management problems. This literature study serves to strengthen the theoretical basis and information to be used as well as the development of the construction of research instruments. The method used in this study is a descriptive method with a convenience sampling approach and a survey technique. In data collection, this research will do the following.

1) Observation
   To determine the deviation in gas consumption that is currently happening, the observation method can be used.
2) Questionnaire
   A number of samples were taken from several organizations where the samples were asked to answer several questions and statements and were closed. Respondents were asked to choose one of the available answers. The questions in the questionnaire were made referring to the research instrument made up of 4 factors. This study uses a 5 Likert Scale Indicator technique.

The stages of the factor analysis method in this study can be presented.

1) In the first stage, a reliability test is carried out from the data from the distribution of questionnaires to selected respondents which aims to determine whether the questionnaire results are appropriate or not for further processing as research data.
2) Through the existing variables, the correlation matrix setting is carried out to determine the significant or insignificant correlation between variables using Meyers Oklin's Keizer validity test.
3) In a set of variables that are formed, factor extraction techniques can be carried out to produce one or more factors.
4) Rotate the factors using the varimax rotation method so that the factor matrix becomes a matrix that is simpler and easier to interpret.
5) Form the name of the new factors based on the variables that have been determined.
6) For further analysis, a factor score is required.

4. **Result and Discussion.** The questionnaire was filled in by 115 respondents, who had tried SDG's knowledge management system as users of KMS implementation.

Reliability Test

Reliability test is used to determine the consistency of measuring instruments, meaning that the questionnaire used will remain consistent if a repeat survey is carried out. The method used to test the reliability is Cronbach's Alpha, obtaining a value of 0.910 for 25 statements in the questionnaire with a sample size of 115. This value is greater than the value required to pass the reliability test, namely 0.7. Thus it can be concluded that the questionnaire has a good level of reliability and can be trusted.

Validity Test

Based on the results of the SPSS calculation, the KMO value obtained in this study was 0.850. This value exceeds 0.5 as the minimum threshold required to pass the KMO test. Whereas for Bartlett's test, the value of 0.000 obtained in this study was smaller than 0.001. Therefore, the factors forming factors in this study and the sample are sufficient for further analysis.

Based on the results of the Varimax factor rotation method, there are 21 valid indicators that can be represented by 5 new factors that affect the level of understanding of SDG's through the implementation of SDG's knowledge management system. The twenty one new indicators are independent variables which can be represented as follows.

1) The first factor is **Productive Learning Environment** (X_1), which is the organization's ability to create a productive learning climate. This factor represents the level of community confidence in
   a) Trust Implementation of KM (ORG10).
   b) Suitability of Business Process (ORG7).
   c) Motivation to users (LEN2).
   d) Positive experiences gained (LEN1).
   e) Conformity with the objectives of dissemination which allows the effective implementation of SDG's KMS (ORG4).
2) The second factor obtained from the results of this study is **Strategy Alignment** (X_2), that the existence of SDG's KMS must be integrated with government policy strategies. This factor represents aspects of
   a) The cost efficiency of socialization (ORG1).
   b) The existence of space for innovation for the community (ORG2).
   c) The fit of strategy to achieve the objectives of SDG's dissemination (LED2).
   d) The culture of interaction between users of the SDG's KMS application (ORG3).
   e) Productivity Increasement (ORG6).
3) The third factor obtained is **Progressive Leadership** (X_3), which is the management's ability to sponsor the implementation of the SDG's KMS implementation in a progressive and visionary manner. This factor represents some indicators:
   a) The application of a reward system (LED4).
   b) Support for budget availability (LED3).
   c) Management skills in identifying types of SDG's knowledge (LED5).
   d) Support for knowledge sharing activities (ORG8).
   e) Clear policies on SDG's Knowledge Management Systems (LED1).
4) The fourth factor resulting from this research is the **Integrated IT System** (X_4), which is to minimize the unintegrated sources of knowledge and information needed by the organization. This factor represents some indicators:
   a) A link to a source of knowledge or other information related to SDG's learning materials (TEC7).
   b) Access to information of SDG's knowledge management systems (TEC5).
   c) An integrated SDG's knowledge management systems (TEC6).
   d) Allow for interaction between SDG's KMS users (TEC2).
5) The fifth factor is **User Friendly Orientation** (X_5), which is building SDG's KMS based on the comfort level of stake holders. This factor represents some indicators which are
   a) The ease of use of SDG's knowledge management systems (TEC1).
   b) Performance optimization of information technology security system (TEC3).

We discover 5 new factors that affect the implementation of SDG's knowledge management systems obtained after going through the process with the factor analysis method, and the five new factors are Productive Learning Environment (X_1), Strategy Alignment (X_2), Progressive Leadership (X_3), Integrated IT System (X_4), and User Friendly Orientation (X_5). An overview of the new factors can be seen in Figure 3, which shows that the implementation of a knowledge management system in the community related to the SDG's program is influenced by the several factors above, meaning that in implementing the SDG's program it is very necessary to pay attention to the above factors in all conditions in order to achieve optimum results and measurable performance.

Furthermore, it can be seen that there is a model formed from the correlation of the five factors that can describe the current condition, related to people's understanding of the SDG's program and contribution of each factor, as seen in Figure 3.

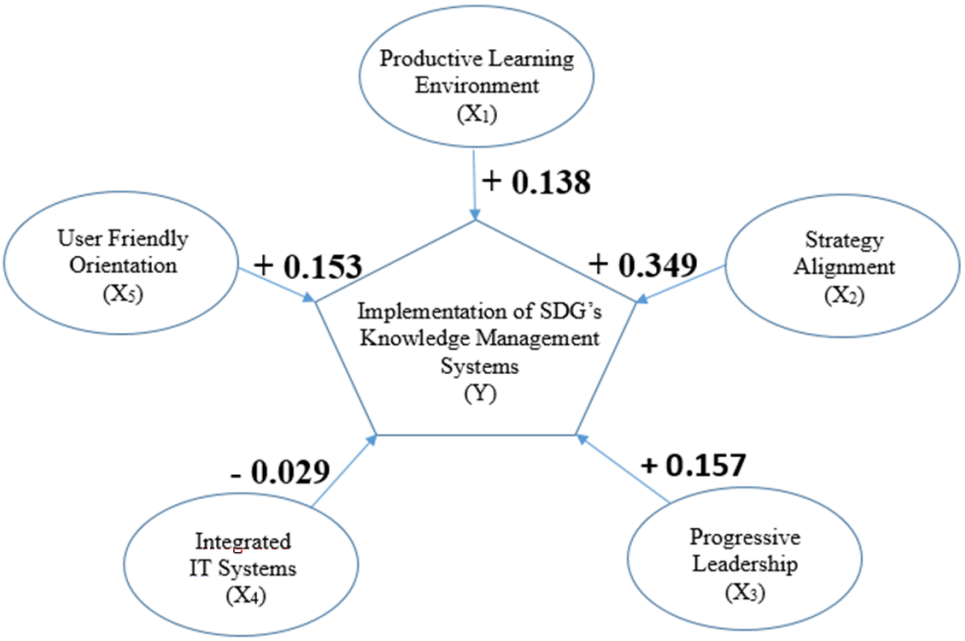

FIGURE 3. The new factors contribution to affecting SDG's KMS implementation

From the regression coefficient value, the SDG's understanding model through the implementation of SDG's KMS in the community can be expressed by the following mathematical model:

$$Y = 7.487 + 0.138X_1 + 0.349X_2 + 0.157X_3 - 0.029X_4 + 0.153X_5$$

with the constraint as

$$-2.68 \leq X_1 \leq 2.00$$
$$-3.27 \leq X_2 \leq 2.79$$
$$-2.50 \leq X_3 \leq 2.26$$
$$-5.63 \leq X_4 \leq 2.08$$
$$-2.22 \leq X_5 \leq 2.58$$

The next step is to simulate a model to obtain an overview of the current state of understanding SDGs, and how to achieve an optimal understanding value in the dissemination of SDG's program through SDG's knowledge management systems, the value of which is 9.591 on a scale between 1.000 and 10.000. However, if the conditions of dissemination on the SDG's program are not considered, the level of understanding will decrease to a value of 5.183 as shown in Table 2.

TABLE 2. Simulation model result

Variable / Condition	Y	C	X_1	X_2	X_3	X_4	X_5
Normal	7.487	7.487	0	0	0	0	0
Un-Expected	5.183	7.487	−2.68	−3.27	−2.5	2.08	−2.22
Ideal	9.591	7.487	2.00	2.79	2.26	−5.63	2.58

By looking at the SDG's knowledge management system implementation model, it can be predicted to determine future strategies for more optimal implementation related to a number of new variables that are formed by increasing the Learning Environment (X_1), Strategy Alignment (X_2), and Progressive Leadership (X_3), User Friendly Orientation (X_5) and reduce un-Integrated IT System (X_4) variable.

5. **Conclusion.** Based on the research that has been distributed to a number of users KMS in this community, it can take some conclusions as follows.

Sustainable Development Goals – SDGs are a world development program which has the aim to prosper the world community and preserve nature, SDGs need to be disseminated to the wider community in order to form a common understanding, role and increased involvement so that welfare goals are achieved for the world community. Knowledge management systems can be developed to build a model of socialization and dissemination of SDGs based on community participation in increasing public understanding of SDGs. Factors that may influence the understanding of SDG's KMS in organization include Productive Learning Environment, Strategy Alignment, Progressive Leadership, Unintegrated IT System, and User Friendly Orentation.

Through the evaluation model that is formed, the performance of efforts to improve understanding of SDGs can be measured and can be simulated to build a dissemination strategy for understanding SDGs in the future.

REFERENCES

[1] S. D. S. Navarrete, F. M. Borini and I. Avrichir, Environmental upgrading and the United Nations Sustainable Development Goals, *Journal of Cleaner Production*, vol.264, 2020.

[2] J. Abbas and M. Sağsan, Impact of knowledge management practices on green innovation and corporate sustainable development: A structural analysis, *Journal of Cleaner Production*, vol.229, pp.611-620, 2019.

[3] Z. Wei, B. Yang and G. N. Mclean, Linking organization culture, structure, strategy, and organization effectiveness: Mediating role of knowledge management, *Journal of Business Research*, vol.63, no.7, pp.763-771, 2010.

[4] P. B. Maurseth and R. Svensson, The importance of tacit knowledge: Dynamic inventor activity in the commercialization phase, *Research Policy*, vol.49, no.7, 2020.

[5] W. Sardjono and F. Firdaus, Readiness model of knowledge management systems implementation at the higher education, *ICIC Express Letters*, vol.14, no.5, pp.477-487, 2020.

[6] K. Dalkir, *Knowledge Management in Theory and Practice*, Elsevier Butterworth-Heinemann, United States, 2005.

[7] X. Liu, Y. Zhou and H. Zhao, Robust hierarchical feature selection driven by data and knowledge, *Information Sciences*, vol.551, pp.341-357, 2020.

[8] T. M. Nisar, G. P. Prabhakar and L. Strakova, Social media information benefits, knowledge management and smart organizations, *Journal of Business Research*, vol.94, pp.264-272, 2019.

[9] H. de J. G. Antunes and P. G. Pinheiro, Linking knowledge management, organizational learning and memory, *Journal of Innovation & Knowledge*, vol.5, no.2, pp.140-149, 2020.

[10] Salinas, C. Pain, H. Osman, C. Jacquemyn and M. Jackson, Vanishing artificial diffusion as a mechanism to accelerate convergence for multiphase porousmedia flow, *Computer Methods in Applied Mechanics and Engineering*, vol.359, 2020.

[11] R. Miković, D. Petrović, M. Mihić, V. Obradović and M. Todorović, The integration of social capital and knowledge management – The key challenge for international development and cooperation projects of nonprofit organization, *International Journal of Project Management*, vol.38, no.8, pp.515-533, 2020.

[12] G. F. Schneider, G. Peßler and W. Terkaj, Knowledge-based conversion of finite state machines in manufacturing automation, *Procedia Manufacturing*, vols.189-194, 2019.

[13] W. Sardjono, B. S. Laksmono and E. Yuniastuti, The social welfare factors of public transportation drivers with online application as a result of the 4.0 industrial revolution in transportation, *ICIC Express Letters*, vol.14, no.4, pp.361-368, 2020.

[14] W. Sardjono, S. Erna and W. Gia Perdana, The application of the factor analysis method to determine the performance of IT implementation in companies based on the IT balanced scorecard measurement method, *Journal of Physics: Conference Series*, vol.1538, 2020.

[15] W. Sardjono, E. Selviyanti, W. G. Perdana and Maryani, Modeling of development of performance evaluation on health information systems implementation, *Journal of Physics: Conference Series*, vol.1465, 2020.

[16] N. Kastrinos and M. Weber, Sustainable development goals in the research and innovation policy of the European Union, *Technological Forecasting and Social Change*, vol.157, 2020.

[17] C. Parkes, M. Kolb, L. Schlange, M. Gudić and R. Schmidpeter, Looking forward: Leadership development & responsible management education for advancing the implementation of the Sustainable Development Goals (SDGs), *The International Journal of Management Education*, vol.18, no.2, 2020.
[18] M. Odagiri, Achieving the Sustainable Development Goals for water and sanitation in Indonesia – Results from a five-year (2013-2017) large-scale effectiveness evaluation, *International Journal of Hygiene and Environmental Health*, vol.230, 2020.
[19] J. K. Musango, P. K. Currie, S. Smit and Z. Kovacic, Urban metabolism of the informal city: Probing and measuring the 'unmeasurable' to monitor Sustainable Development Goal 11 indicators, *Ecological Indicators*, vol.119, 2020.
[20] G. Abid, B. Arya and S. Farooqi, Positive personality traits and self-leadership in sustainable organization: Mediating influence of thriving and moderating role of proactive personality, *Sustainable Production and Consumption*, vol.25, pp.299-311, 2020.
[21] A. D. Vaio and L. Varriale, SDGs and airport sustainable performance: Evidence from Italy on organisational, accounting and reporting practices through financial and non-financial disclosure, *Journal of Cleaner Production*, vol.249, 2020.
[22] N. Bocken and T. H. J. Geradts, Barriers and drivers to sustainable business model innovation: Organization design and dynamic capabilities, *Long Range Planning*, vol.53, no.4, 2020.
[23] J. Ali, S. Sorooshian and Y. Javed, Impact of the cognitive learning factors on sustainable organizational development, *Heliyon*, vol.5, no.9, 2019.
[24] M. Miterev, A. Jerbrant and A. Feldmann, Exploring the alignment between organization designs and value processes over the program lifecycle, *International Journal of Project Management*, vol.38, no.2, pp.112-123, 2020.
[25] S. Bannerman, The World Intellectual Property Organization and the sustainable development agenda, *Futures*, vol.122, 2020.
[26] F. Torabi and J. El-Den, The impact of knowledge management on organizational productivity: A case study on Koosar Bank of Iran, *Procedia Computer Science*, vol.124, pp.300-310, 2017.
[27] A. D. Vaio, R. Palladino, R. Hassan and O. R. Escobar, Artificial intelligence and business models in the sustainable development goals perspective: A systematic literature review, *Journal of Business Research*, vol.121, pp.283-314, 2020.
[28] C. Pattinson, ICT and green sustainability research and teaching, *IFAC-PapersOnLine*, vol.50, no.1, pp.12938-12943, 2017.
[29] Y.-J. Cai and T.-M. Choi, A United Nations' Sustainable Development Goals perspective for sustainable textile and apparel supply chain management, *Transportation Research Part E: Logistics and Transportation Review*, vol.141, 2020.
[30] C. M. Lopes, A. Scavarda, L. F. Hofmeister, A. M. T. Thomé and G. L. R. Vaccaro, An analysis of the interplay between organizational sustainability, knowledge management, and open innovation, *Journal of Cleaner Production*, vol.142, no.1, pp.476-488, 2017.
[31] K. Surana, A. Singh and A. D. Sagar, Strengthening science, technology, and innovation-based incubators to help achieve Sustainable Development Goals: Lessons from India, *Technological Forecasting and Social Change*, vol.157, 2020.
[32] J. Castor, K. Bacha and F. F. Nerini, SDGs in action: A novel framework for assessing energy projects against the sustainable development goals, *Energy Research & Social Science*, vol.68, 2020.
[33] C. J. Vörösmarty, V. R. Osuna, A. Cak et al., Ecosystem-based water security and the Sustainable Development Goals (SDGs), *Ecohydrology & Hydrobiology*, vol.18, no.4, pp.317-333, 2018.
[34] P. Centobelli, R. Cerchione and E. Esposito, Pursuing supply chain sustainable development goals through the adoption of green practices and enabling technologies: A cross-country analysis of LSPs, *Technological Forecasting and Social Change*, vol.153, 2020.
[35] W. Santika, T. Urmee, Y. Simsek, P. A. Bahri and M. Anisuzzaman, An assessment of energy policy impacts on achieving Sustainable Development Goal 7 in Indonesia, *Energy for Sustainable Development*, vol.59, pp.33-48, 2020.
[36] Y. A. Fatimah, Industry 4.0 based sustainable circular economy approach for smart waste management system to achieve sustainable development goals: A case study of Indonesia, *Journal of Cleaner Production*, vol.269, 2020.
[37] K. Shulla, W. L. Filho, J. H. Sommer, A. Salvia and C. Borgemeister, Channels of collaboration for citizen science and the sustainable development goals, *Journal of Cleaner Production*, vol.264, 2020.
[38] E. Kumi and T. Yeboah, Private sector participation in advancing the Sustainable Development Goals (SDGs) in Ghana: Experiences from the mining and telecommunications sectors, *The Extractive Industries and Society*, vol.7, no.1, pp.181-190, 2020.

[39] S. L. Pan and S. Zhang, From fighting COVID-19 pandemic to tackling sustainable development goals: An opportunity for responsible information systems research, *International Journal of Information Management*, vol.55, 2020.

[40] M. A. Hannan, M. S. H. Lipu, M. Akhta et al., Solid waste collection optimization objectives, constraints, modeling approaches, and their challenges toward achieving sustainable development goals, *Journal of Cleaner Production*, vol.277, 2020.