SUSTAINABILITY REPORTING STRATEGY IN UNIVERSITIES: USING THE UI GREENMETRIC TO MEASURE THE SUSTAINABILITY CONTRIBUTION OF UNIVERSITIES IN ASIA

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Abstract

This research is concerned with universities as agents of change in achieving sustainable development goals. Universities have great potential to contribute to sustainability through their innovations and programs. Sustainability reporting is one form of conveying information about universities' sustainability contributions. This study aims to analyze the relationship between university rank, region, and university size among 685 universities in Asia that participated in the UI GreenMetric during the 2022–2023 period, totaling 1,273 observations. The data were analyzed using regression analysis. The results indicate that university rank and region significantly influence sustainability reporting and that university size does not. This suggests that universities are strongly influenced by external factors, such as rankings and regional considerations, when reporting their

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sustainability contributions to fulfill the demands of external stakeholders. This research is useful in determining sustainability reporting policies for universities in the Asian region.

INTRODUCTION

Universities play a crucial role in community development and sustainable progress by preparing future graduates who will become the leaders of tomorrow (Alonso-Almeida et al., 2015). In today's world, universities must not only produce high-quality graduates capable of creating a sustainable society but also manage the economic, social, and environmental impacts of their operations, both positive and negative (Disterheft et al., 2012). As sustainability leaders and advocates, universities are expected to ensure that the needs of current and future generations are met, equipping professionals with expertise in system development to guide students in transitioning to sustainable social practices (Lozano et al., 2013). Therefore, information on the steps and actions taken toward sustainable development must be communicated to all university stakeholders.

Traditionally, information disclosure in higher education has focused on research outcomes, graduates, and financial information. Sustainability reporting in higher education should involve broader considerations, such as identifying and meeting stakeholder expectations and enhancing information transparency (Garde-Sánchez et al, 2013). Sustainability reporting can take various forms to meet the information needs of higher education stakeholders, including students, faculty staff, and the broader community (Ceulemans et al., 2015). It also provides an opportunity for universities to be transparent and accountable (Alonso-Almeida et al., 2015). Thus, sustainability reporting is considered a managerial and accountability tool, linking it to the strategic goals of the organization (Brusca et al., 2018).

In 2010, Universitas Indonesia launched the UI GreenMetric World University Ranking on Sustainability, an initiative aimed at promoting sustainability in higher education institutions globally. UI GreenMetric (UIGM) incorporates several sustainability reporting standards specific to higher education, allowing universities to share their experiences and best practices on sustainability issues. It also provides a framework for measuring sustainability policies and facilitates comparisons among universities. UIGM is the first and only ranking system that has established a voluntary standard for improving university infrastructure and fostering sustainable campuses worldwide.

The UIGM World University Ranking on Sustainability refers to several models of sustainability assessment and academic ranking of universities

using three aspects as criteria: environmental, economic, and social aspects. The environmental aspect comprises natural resource use, environmental management, and pollution control. The economic aspect includes profit and efficiency, and the social aspect encompasses education, community, and social involvement (UIGM Guideline, 2019).

The UIGM World University Ranking on Sustainability does not require reports from participants, but universities only submit sustainability information through an online survey in six main categories. The criteria and their respective weights are green statistics (15%), energy and climate change (21%), waste management (18%), water use (10%), transportation (18%), and education (18%). The UIGM World University Ranking on Sustainability represents the first effort to establish sustainable practices in universities, encouraging institutions to commit to green initiatives and promoting sustainable operations. It provides universities with an opportunity to assess their strengths and weaknesses in promoting green campuses and sustainable development (Suwartha dan Sari, 2013). UIGM was attended by 1,050 universities in 84 countries in Asia, Africa, Europe, North America, Latin America, and Oceania. Asia, comprising Central Asia, East Asia, South Asia, Southeast Asia, and West Asia, has the highest number of participants. UIGM is designed as a practical tool for beginners to assess the sustainability of higher education institutions.

Based on the above description, universities as organizations must prove their commitment to sustainability, as they are aware of the economic, social, and environmental impacts of their activities. Higher education has several similarities with other complex organizations, such as companies, government organizations, and nongovernmental organizations (Siboni et al., 2013). In addition to being complex organizations, universities are pivotal in transforming society. Universities play an active role in sustainability by educating future generations, assisting the business sector in adopting the sustainability agenda, and fulfilling their organizational responsibilities. Universities must be actively involved in planning their organizational change for sustainability by assessing and reporting efforts in education, research, community services, partnerships, and campus experiences. Sustainability reporting supports the implementation of the Sustainable Development Goals (SDGs) and provides many benefits for universities in evaluating the appropriateness of activities with prevailing norms and values in society, thus building trust and credibility.

Some previous studies (Fonseca et al., 2011; Lozano, 2011; Alonso-Almeida et al., 2015; Ceulemans et al., 2015; Sassen and Azizi, 2018; Sepasi et al., 2019) have affirmed that sustainability reporting in higher education is still in its infancy both in terms of quantity and quality. Although universities have practiced sustainability in various areas (teaching, research, governance, and institutional practices), they have been slow to adopt comprehensive sustainability reporting. This includes the publication of consistent and regular reports that meet third-party standards and the integration of sustainability reporting into their overall management systems (Bice & Coates, 2016). Additionally, there has been little effort to explore the implementation of sustainable development in higher education (Lozano,

2010), and universities are lagging in the process of SDG implementation (Leal Filho et al., 2019).

The current study aims to determine the sustainability reporting strategies of universities in the Asian region using UIGM indicators to measure their contribution to sustainability. Sustainability reporting should be able to provide information for all stakeholders and can encourage comparisons of sustainable development between universities and benchmarking activities (Lozano, 2006).

This research contributes novelty to the existing literature and bridges the gap in the literature regarding universities' contribution to sustainability through sustainability reporting. Sustainability reporting in higher education is still in its infancy, both in quantity and quality. The literature on sustainability reporting in higher education is also limited. Therefore, this study tested H1. it evaluates the disclosure of sustainability information by universities using data from the UIGM Ranking, which measures their sustainability contributions as reflected in their overall score and its impact on their reputation.

This paper is structured as follows: Section 2 reviews the relevant literature to analyze the hypotheses; Section 3 analyzes the methodology used to conduct empirical research on higher education sustainability reporting; Section 4 contains the results of this study; Section 5 presents a discussion of the research findings; and Section 6 concludes the paper.

LITERATURE REVIEW

Legitimacy theory

According to legitimacy theory, there is a contract between companies and society, and companies seek legitimacy by meeting society's expectations. This theory expands the principal agent relationship to include a broader group of stakeholders to represent society's interests and expand the role of corporate governance mechanisms to align corporate activities with stakeholder interests. Thus, managers are motivated to disclose more information to support their claims of legitimacy (Shamil et al., 2014).

This theory implies that organizations can operate only if society supports their goals. This means that legitimacy is the general perception of the organization's actions. This implies that colleges must pay attention to the rights of the broader community. If society perceives that an organization is operating acceptably, then it can pose a threat to the organization. Failure to meet societal expectations can lead to sanctions imposed by the community (Sassen et al., 2018).

Sustainability disclosure is a prerequisite for corporate legitimacy claims and provides a broader explanation for companies to disclose sustainability information. Therefore, generally accepted voluntary disclosure will strengthen the legitimacy of an organization by demonstrating that it is well organized, knowledgeable, and operates in an ethical and socially appropriate manner (Ntim et al., 2017). Thus, legitimacy strategies aim to

secure legitimacy as a valuable resource for the organization (Hahn & Kühnen, 2013).

Sustainability reporting in higher education demonstrates a university's commitment to maintaining and improving its reputation and good relations with stakeholders through transparency and communication. It also allows universities to communicate with stakeholders about their efforts in achieving sustainability goals and to respond to criticism and feedback from stakeholders. This will create a better understanding of their societal role. Additionally, it can build trust with stakeholders because universities not only take academic responsibilities but also care about social and environmental impacts.

Sustainability reporting in higher education

Sustainability reporting is a formal communication tool to disclose an organization's sustainability performance (Kaur & Lodhia, 2018). The normative foundations of sustainability and CSR explain that the economic, social, and environmental dimensions (Triple Bottom Line) are interconnected over time. Thus, sustainability and CSR are consistent concepts (Hahn & Kühnen, 2013).

Sustainability reporting is a voluntary activity that aims to provide a means of communication and accountability regarding the impact of sustainable development on stakeholders. It can also help in assessing and improving sustainability performance over time, comparing with other organizations, facilitating transparency and external audits, and demonstrating the influence of and on stakeholders (Ceulemans et al., 2015).

Moreover, sustainability reporting aims to provide information on sustainability impacts to address stakeholder needs and serve as an instrument to measure an organization's sustainability performance (Larrán Jorge et al., 2019). Sustainability reporting in higher education offers a way to assess the current state of higher education in economic, environmental, social, and educational dimensions. It also helps in communicating the intitution's sustainability efforts to stakeholders (Lozano, 2011). Furthermore, it allows an organization to communicate its values, actions, and performance through the most important goal of sustainable development, while engaging various stakeholders to achieve shared objectives (Adams, 2015).

Sustainability reporting serves as a tool for universities to assess where they are and plan future directions for system development in higher education. Changes due to sustainability reporting must be institutionalized and reinserted into the higher education system. To reach its full potential, sustainability reporting must incorporate material issues and involve external stakeholders (Ceulemans et al., 2015). Higher education must actively engage in planning its organizational change for sustainability by assessing and reporting efforts in education, research, community outreach, operations, university collaborations, institutional frameworks, educational programs, and campus experiences (Ceulemans et al., 2015). For universities, sustainability reporting is a medium to communicate more

comprehensively with stakeholders. The institution's sustainable activities positively impact the organization and its stakeholders. The information presented in sustainability reports should meet the needs and expectations of various stakeholders, offering valuable insights into the university's sustainable activities (Sassen & Azizi, 2018).

University sustainability information is commonly disclosed through platforms like UIGM. UIGM uses a ranking system to measure and compare the sustainability performance of universities around the world. Rankings are based on various indicators that reflect universities' contributions to sustainability, such as green infrastructure, energy efficiency, waste management, water use, and environmental policies. The rankings encourage universities to continuously improve their contribution to sustainability to improve their position in the rankings. The ranking system provides a benchmark for universities to compare their performance with other institutions and identify areas for improvement. Universities with low rankings can gain a competitive advantage and can position themselves internationally (Marienge, 2009).

Universities participating in UIGM comprise universities from different countries with environmental challenges. Therefore, universities tend to disclose their contributions to addressing local issues. The level of awareness and concern for sustainability issues also differs between regions, which can affect how detailed and comprehensive sustainability reporting is. As with research in the corporate sector, cross-border research is closely related to institutional arrangements that affect organizational behaviour and relationships with stakeholders (Wu, 2001). Some of the literature explaining commitment to sustainability has been supported by the principles of legitimacy theory.

UIGM as a ranking seeks to measure universities' contributions and is a tool for universities to gain international recognition. It also assists universities in reporting their sustainability contributions to both academic and non-academic activities. Thus, the more information a college reports about its sustainability activities, the more transparent it becomes. Therefore, the hypothesis of this study is as follows: There is an influence between region, ranking, and campus type on university sustainability contributions.

RESEARCH METHODS

The UIGM ranking is a ranking through online survey results related to the condition and sustainability policies of universities around the world. UIGM comprises six indicators, namely, setting and infrastructure, energy and climate change, waste, water, transportation, and education and research. It also includes 17 SDGs in each indicator. The setting and infrastructure indicator covers SDGs 11, 12, and 17; the energy and climate change indicator covers SDGs7, 11, 13 and 17; the waste indicator covers SDGs 3, 12, 14, 15, and 17; the water indicator covers SDGs 6 and 17; the transportation indicator covers SDGs 11, 13, and 17; and the education and

research indicator covers SDGs 1, 2, 3, 4, 5, 8, 9, 10, 13, 14, 16, and 17. Thus, universities that participate in UIGM are also expected to have made efforts to fulfil the SDGs.

The current research was conducted at universities participating in UIGM in the Asian region, including Central Asia, East Asia, South Asia, Southeast Asia, and West Asia. The Asian region was chosen because almost more than 50% of UIGM participants in 2022–2023 were universities in Asia. Therefore, the sample of this study amounted to 685 universities, with a total of 1,273 observations for the 2022–2023 period.

The research variables comprise the dependent variable, namely, university sustainability reporting, which is measured by the overall UIGM score and the scores for individual UIGM indicators. The independent variables encompass university rank, region, and size. College ranking is measured by the institution's position in the Asia ranking. The reason for selecting this variable is related to reputation and visibility, where higher-ranked universities tend to have greater visibility and face higher public expectations. In terms of resources, higher-ranked institutions often have access to greater resources, which may influence their capacity to undertake and report on sustainability initiatives. In addition, leading universities may have greater influence in setting trends and standards in sustainability reporting.

Furthermore, the region is divided into five, namely, Central Asia, East Asia, South Asia, Southeast Asia, and West Asia, where each region certainly has a different character in responding to sustainability. The reasons for selecting this variable include the regulatory context where different regions may have different regulations and policies related to sustainability and reporting. Furthermore, environmental conditions where specific environmental challenges in a region may influence the focus of sustainability initiatives and reporting. Even the level of economic development in different regions may affect the priorities and resources available for sustainability initiatives.

University size is measured by the type of institution, which is classified into two categories: specialized and comprehensive. The type of institution will certainly also provide a different color in its sustainability activities. College size relates to capacity and resources, with larger colleges likely to have more resources to allocate to sustainability initiatives and reporting. Size can also affect operational complexity, which impacts the type and scale of sustainability issues faced. In addition, larger institutions may have greater environmental and social impacts, increasing the need for comprehensive reporting. Colleges that have complex organizational structures will have a bearing on decision-making processes, which can impact sustainability implementation and reporting.

Therefore, to avoid data bias, data from UIGM was used. This is due to different reporting standards in each region. Table 1 presents the measurement of research variables.

Table 1. Variable measurement

Research Variable	Measurement
Dependent variable	
Sustainability reporting	Overall UIGM score, Individual UIGM score
Independent variable	
University rank	The position of university ranking in in Asia
Region	Central Asia = 1
	East Asia = 2
	South Asia = 3
	Southeast Asia = 4
	West Asia = 5
Size	Specialized type = 1
	Comprehensive type = 2

The present study used regression analysis to explain the effect of ranking, region, and campus type on the contribution of sustainability in higher education. The research model to test the proposed hypothesis is as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon,$$

where:

Y: overall score

β_0: constant term

β_n: coefficients of independent variables

X_1: university rank

X_2: region

X_3: size

RESULTS

The results of the descriptive analysis confirm that the average overall score is 5548.05, which translates to a 55% level of sustainability information disclosure according to UIGM. Additionally, each indicator also reaches almost 50%. This illustrates that universities have tried to contribute to sustainability even though not all of them have (Table 2).

Table 2: Summary of descriptive analysis

Variable	Minimum	Maximum	Mean	Std. deviation

Overall score	475.00	8,925.00	5,548.05	1,924.58
IS	60.00	1,475.00	868.45	282.27
EC	60.00	1,950.00	1,087.60	391.14
WS	.00	1,800.00	894.28	443.71
WR	.00	1,000.00	525.60	267.49
TR	10.00	1,750.00	1,052.20	389.19
ED	25.00	1,800.00	1,120.19	429.19
University rank	1.00	685.00	320.59	186.97
Region	1.00	5.00	3.79	1.17
Size	1.00	2.00	1.69	.46

Figure 1 shows the score per indicator during 2022–2023, where the contribution of universities to education and research (ED) has the highest value compared with other indicators. This is due to the characteristics of universities engaged in education and research. The education and research indicator includes SDGs 1, 2, 3, 4, 5, 8, 9, 10, 13, 14, 16, and 17, which means that universities have a good sustainability contribution. However, there are still some things that must be improved because the contribution is still at 50%, for example, the waste indicator (WS) that includes SDGs 3, 12, 14, 15, and 17. Universities must increase their awareness of their contribution to waste management, both organic and nonorganic waste.

Figure 1. Score per indicator

The current study also analyzed universities in each region. Figure 1 shows that universities in the Southeast Asia region are represented by 38% of the total sample, followed by West Asia at 31%. Subsequently, universities

in South Asia represent 18%, Central Asia 8% and East Asia 5%. The data shows that the region that discloses the most sustainability activities through UIGM is Southeast Asia. Based on the 2022–2023 data, 38% of universities are in Southeast Asian countries, including Indonesia, Malaysia, Philippines, Vietnam, and Thailand, while the least UIGM participants are universities located in East Asian countries at 5%. This shows that the awareness of universities in sustainability in the Asian region as a whole is still uneven.

Figure 2. Campus region

■ Asia Tengah ■ Asia Timur ■ Asia Selatan ■ Asia Tenggara ■ Asia Barat
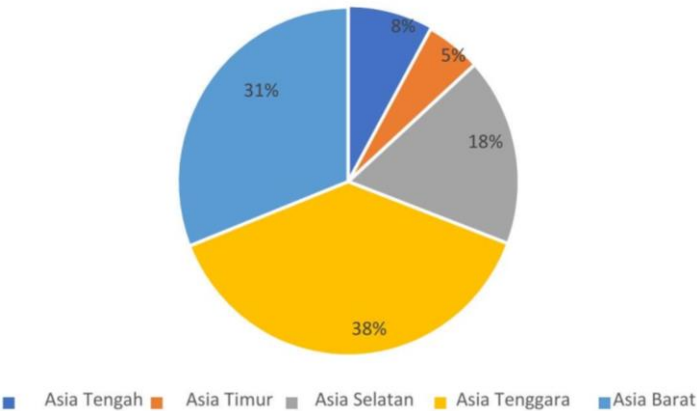
Furthermore, the Pearson correlation test was conducted to determine whether there is a relationship between the two research variables. The results of the analysis validate that the sig. > .01 value means that there is no correlation between the research variables (Table 3.)

Table 3: Correlation matrix

	Overall	IS	EC	WS	WR	TR	ED	University rank	Region	Size
Overall score	1.000									
IS	.836**	1.000								
EC	.854**	.643**	1.000							
WS	.889**	.687**	.683**	1.000						
WR	.879**	.696**	.710**	.790**	1.000					
TR	.890**	.715**	.709**	.739**	.757**	1.000				

ED	.882**	.712**	.703**	.716**	.712**	.731**	1.000		
University rank	−.978 **	−.815**	−.883**	−.878**	−.863**	−.870**	−.858*	1.000	
Region	−.054	−.077*	−.075*	−.005	.004	−.073**	−.053	.043	1.000
Size	.199**	.216**	.149**	.187**	.133**	.134**	.216**	−.198**	.076**	1.000

Note: This table presents the Pearson correlations (** denotes significance at the .01 level).

The regression analysis results verify that the proposed research model is feasible with a value of $F = .000$. The magnitude of the influence of the independent variable on the dependent variable is 95.7%, as shown by R^2. For the research variables, university rank and region affect sustainability reporting (overall score), but size has no effect (Table 4).

Table 4. Regression analysis

Variable	Unstandard coeff.	Standard coeff.	t	Sig.
University rank	-10.500	-.976	-164.311	0.000
Region	-19.965	-.012	-2.086	0.037
Size	27.061	0.006	1.091	.275

DISCUSSION

Universities are characterized by teaching and research, but today, they are also contributors to social change. Universities must develop effective institutional strategies based on priorities to meet current demands (Gorpe et al., 2023). Therefore, universities have a responsibility to contribute to sustainability. Rankings such as UIGM provide additional motivation for universities to develop their sustainability strategies. The United Nations developed the SDGs, where all sectors including government, companies, and communities are asked to engage in the SDGs to reduce inequality, improve health and education, and spur economic growth. As such, universities must include sustainability topics in their strategies. One way universities can contribute to the SDGs is by including them in their reporting (Leal Filho et. al., 2022).

The results of descriptive statistical analysis with a sample period of 2022–2023 affirmed that universities did not experience significant changes in sustainability contributions. The IS (setting & infrastructure) indicator covering SDGs 11, 12, and 17 has not changed, while the WS (waste) indicator covering SDGs 3, 12, 14, 15, and 17 and TR (transportation) covering SDGs 11, 13, and 17 have only increased by 1%. Furthermore, the EC (energy and climate change) indicator covers SDGs 7, 11, 13, and 17; WR (water) covers SDGs 6 and 17; and ED (education and research) covers SDGs 1, 2, 3, 4, 5, 8, 9, 10, 13, 14, 16, and 17 decreased by 1%. If we look at the number of UIGM participants in the research period, an additional 97 universities participated. However, this did not have a real impact on sustainability contributions. This means that the new participant universities have almost the same contribution or even some are still lacking in their sustainability contribution.

Testing the research model is performed with regression analysis, which shows the influence of university ranking and region variables. However, the size variable does not affect the sustainability reporting of universities. The ranking of universities shows the position of universities in the UIGM ranking in the Asian region. College rankings provide information about measurable dimensions of service quality; hence, they are highly important in public accountability (Adhikariparajuli et. al., 2021). Universities are increasingly motivated to achieve rankings to increase trust, credibility, and reputation in society. This is following legitimacy theory, where universities need legitimacy from the environment and society by disclosing their sustainability contributions in the form of sustainability reporting, where sustainability reporting reflects the strategies that have been conducted by universities in the form of sustainability activities. This will certainly provide its appeal to the community so that universities can compete with their competitors.

The region also plays a role in sustainability reporting in higher education, where each university will adjust to its location because it has different characteristics and sustainability issues to respond to. This is in line with the study of Larrán Jorge et al. (2019), which proves that there are differences in the information disclosed in sustainability reports by universities with different geographic locations. According to legitimacy theory, the disclosure of sustainability information as a form of contribution by universities is strategically done to improve their reputation in the eyes of stakeholders (Alonso-Almeida et al., 2015). The findings of the present study validate that universities in the Southeast Asia region have the most participants compared with other Asian regions. This indicates that universities in Southeast Asia are already aware of their contribution to sustainability. However, it does not rule out the possibility that universities in other regions also have the same awareness because the data used in this study are data sourced from UIGM. Southeast Asian universities also increased their participation in UIGM from 217 in 2022–269 in 2023. This is inversely proportional to East Asia, which has the least number of universities participating in UIGM; for instance, from 2022 to 2023, only one university participated in UIGM. Thus, the geographical location of a university will

affect sustainability reporting in universities by considering local cultural values and rules that apply in each region in sustainability reporting.

Campus type in this study refers to the grouping of universities based on scale and complexity according to UIGM. Specialist type universities focus on certain disciplines and have a small number of faculties, resulting in a small student population. In contrast to the comprehensive type, which offers various disciplines and many faculties, the student population is also larger. Therefore, this type of campus is related to the size of the university. The research data shows that comprehensive type colleges are more numerous at 68%, while the specialist type is 32%. The results confirm that campus type does not affect sustainability reporting, which are in line with the research of Larrán Jorge et al. (2019), who concluded that the size of the university does not affect sustainability reporting. This could be because sustainability reporting is more determined by the commitment and policies of the university and the motivation that arises from the university. Universities that have a sustainability invasion strategy will try to utilize resources efficiently and reduce negative impacts on the environment; thus, it is not determined by the size of the university.

CONCLUSION

The current study found that university rank and region affect sustainability reporting, while size has no effect. The ranking and region of universities will affect the context, resources, and external motivation in sustainability contributions through sustainability reporting. Higher-ranked universities will have more access and resources for developing and implementing sustainability programs. Colleges with different locations will also affect their sustainability program planning and sustainability reporting. However, the size of the college has no effect because sustainability contributions are more determined by internal commitments, policies, and motivations that exist in all sizes of colleges.

This research contributes novelty to the existing literature and bridges the gap in the literature regarding universities' contribution to sustainability through sustainability reporting. This research also provides implications for policymakers to consider sustainability reporting standards to be compatible with all universities. Thus, universities' sustainability reporting can be compared according to their characteristics. The implications of this research also can help universities improve the quality and effectiveness of their sustainability reporting, including improvements in data collection methodologies, reporting formats, and selection of relevant indicators.

The limitation of this research is that the data comes from secondary data published by UIGM. This study only covers two years (2022 and 2023). Future research is expected to use more comprehensive data, including primary and secondary sources, and extend the research period to obtain a deeper understanding. Future research could also take a qualitative approach by conducting in-depth case studies on universities that are

considered leaders in sustainability reporting to identify best practices and success factors.

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