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Enhancing Higher Education Sustainability Through Quality Management Models

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ABSTRACT

Higher education, as part of the service sector, faces significant challenges in managing its systems effectively. To remain competitive and foster growth, private universities require sustainable models that enhance their quality and operational efficiency. This research explores sustainability models for private universities by conducting field surveys and distributing online questionnaires. Data analysis was performed using descriptive statistics and Structural Equation Modeling (SEM). The descriptive analysis highlights key demographic and behavioral characteristics of the respondents, while SEM reveals relationships and factors influencing customer satisfaction and loyalty. Results show that planning, governance, and administration significantly impact education quality, which directly influences the sustainability of private universities. The study also finds that the roles of students, alumni, reputation, and cooperation are crucial in maintaining long-term institutional sustainability. These findings offer practical insights for improving education quality and formulating strategies for private universities to achieve sustainable development.

Keywords: sustainability, quality management, higher education, structural equation modelling, private universities

1. Introduction

The competition faced by Private Universities (PUs) both nationally and globally compels university administrators to adopt models that enable adaptation and growth. However, initial data indicates that the Quality Assurance System of PUs in Medan City has struggled to meet the demands of national competition[1], [2]. The primary aim of this research is to develop a model that enables universities to grow and maintain sustainability. Many institutions face challenges in implementing sustainability principles. One effective approach is using sustainability reporting as a means to communicate and document all performance-related activities[3]–[5]. Several reporting methodologies have been implemented in universities, including the Global Reporting Initiative (GRI) Methodology, which is tailored for higher education institutions but primarily addresses activities outside of research and teaching[6], [7]. If an institution has an existing committee responsible for addressing environmental

issues, this can contribute to the sustainability aspect. Analyzing sustainability reports submitted by over 20 universities worldwide, using the Global Reporting Initiative (GRI) methodology, helps identify the most relevant and commonly used sustainability indicators. Achieving the goal of transforming all levels of education requires a continuous and long-term shift in mindset. Graduates from top universities can assess whether their institution is sustainable, as many schools have already incorporated sustainable designs into their educational and practical frameworks. As key drivers of societal change, universities implement these goals through nine established criteria. Various global initiatives support these efforts, one of which is the Sustainability Tracking, Assessment & Rating System (STARS). This system is examined here to provide knowledge and insights that can guide higher education institutions in their pursuit of sustainability[8]–[10].

Different managerial strategies have been implemented across universities to manage higher education personnel effectively. Among these, the Total Quality Management (TQM) approach has emerged as a prominent method for enhancing quality management processes[11]. Ganguly states that numerous managerial innovations in Total Quality Management (TQM) have been successfully implemented in higher education institutions across many developed countries[12]. Efforts to enhance the quality of higher education must begin with a robustly institutionalized internal quality assurance system. Higher education quality assurance is divided into two categories: (1) internal, managed by the university leadership, and (2) external, overseen by government-appointed bodies. Law No. 62 of 2016, concerning the Internal Quality Assurance System (SPMI), mandates that each higher education institution autonomously implements a systematic quality control process to monitor and improve the delivery of education in a structured and sustainable way. Meanwhile, the External Quality Assurance System (SPME) involves an accreditation process to assess the feasibility and performance of universities and their academic programs, ensuring they meet established quality standards[13], [14]

Nuryana emphasized the critical importance of ensuring education quality, stating that a high-quality university demonstrates its ability to serve its customers and stakeholders effectively, including students, the community, and others. For this to happen, the quality control system must focus on stakeholder satisfaction. A credible, respected, and successful educational institution is one that excels in both its outputs and outcomes [15] is able to prepare a good quality assurance system. The quality of the main work processes of higher education institutions is related to quality: learning, research, service, and management[16], [17]. The quality of learning is primarily focused on the effectiveness of the interaction between lecturers and students. Furthermore, the quality of higher education is determined by how well the institution aligns its practices with established standards, including both the National Higher Education Standards and the specific guidelines set by higher education authorities[18], [19].

Human resources play a critical role in driving prosperity. Developing skilled and highly competitive human capital is essential for fostering progress and achieving economic growth. In the context of economic globalization, the integration of market forces through trade and economic activities is becoming more streamlined, enhancing both efficiency and competitiveness[20], [21]. Indonesia's low human development index has contributed to a decline in the nation's overall competitiveness. This decline is largely due to the poor quality of education, which is influenced by several factors, including the quality of educators, administrative staff, and inadequate learning infrastructure, such as textbooks, learning media, resources, and laboratory facilities. To address this issue, the government must prioritize the development and optimization of human resources across various sectors based on specific needs. This study is grounded in the theory of human resource empowerment, which emphasizes the importance of improving educational quality by enhancing the performance of professional educators. Empowerment in this context has two key meanings: (1) to grant power, authority, or responsibility to others, and (2) to provide individuals with the necessary skills and abilities. These definitions suggest that the current approach to improving education quality has not fully harnessed the potential of educator empowerment, which is essential for driving educational progress. Based on this analysis, the research focuses on addressing the following problem formulation:

a. How can the sustainability of private universities in Medan City be effectively measured?
b. What is the current level of preparedness of private universities in Medan City for achieving sustainability?
c. What key factors influence the sustainability of private universities in Medan City?
d. What strategies are being implemented by private universities in Medan City to enhance their sustainability?

2. Methods

The research was conducted through a direct field survey, with questionnaires distributed to respondents online. Online surveys are particularly valuable for assessing latent constructs well-defined, theory-based concepts that generate testable hypotheses. One of the key advantages of online surveys is their ability to reach a larger and more geographically diverse sample, making it easier to gather responses from a wide range of participants. The case survey method was employed to compare previously published case studies, using various conventional statistical analysis techniques. For data processing, the study utilized descriptive analysis and Structural Equation Modeling (SEM). Descriptive analysis was applied to explain consumer characteristics, including demographic and general purchasing behaviors. SEM, on the other hand, was used to identify the relationships and factors that influence customer satisfaction and loyalty. SEM aims to evaluate both observable variables (indicators) and unobservable variables (latent variables), making it ideal for testing complex structural models. The development of the model's structure was based on a solid theoretical foundation. In this study, the Partial Least Squares (PLS) technique was employed using a second-order construct approach. The research was divided into two stages: assessing the higher-order constructs and the lower-order constructs. Two approaches were considered for the second-order construct: the repeated indicator approach and latent variable scores. Due to concerns about overloading the latent variables, especially with an imbalanced number of indicators, the study opted for the latent variable scores approach.

3. Result and Discussion

Sustainable development (SD) has become an increasingly prominent concern within the global academic community. However, the persistence of unsustainable practices indicates that the transition to sustainable living remains slow. By exchanging ideas, concepts, tools, and lessons learned across various contexts, we can collectively enhance the skills needed to advance sustainable development in both academic institutions and industries. As a result, education for sustainable development has gained growing importance in universities worldwide. Shifting education toward sustainability requires systemic thinking and an interdisciplinary approach. Like any ambitious and transformative initiative, this process involves a "boiling" phase a period of intense idea generation, discussion, refinement, and adjustment necessary to bring these concepts to fruition.

Educational services that are perceived to be of high quality and aligned with the needs and expectations of students can significantly influence prospective students' decisions when choosing a university. The closer the alignment between the educational services offered by universities and the preferences of prospective students, the stronger their intent to pursue studies at those institutions. To attract and retain students, universities must prioritize the quality of their offerings, ensuring that programs are relevant, accredited, and perceived as meeting high educational standards. A truly sustainable university not only focuses on its academic quality but also ensures that its social and economic activities spanning classrooms, laboratories, transportation, and campus services contribute to long-term environmental and social sustainability. However, the national education system still faces challenges, as the quality of education remains low despite government efforts. Various educational policies have been introduced, yet they have not fully succeeded in improving the overall quality of education across the country. Efforts to improve the quality of education are being pursued globally. Numerous national and international organizations are dedicated to advancing sustainability in higher education by offering support through conferences, publications, research, and communication forums. These organizations also provide certifications and awards to institutions that excel in sustainability, earning them the title of "sustainable university" in various fields. Notable organizations in this area include the University Leaders for a Sustainable Future (USLF), the Association for the Advancement of Sustainability in Higher Education (AASHE), the Higher Education Professional School (HEPS), and the International Sustainable Campus Network (ISCN). These groups offer valuable resources to universities, enabling them to collaborate with external stakeholders, share knowledge, and work toward common sustainability goals.

Several methodologies have been developed to assess sustainability in higher education, varying in their focus and scope, with many evaluating education and research separately. However, it is essential that universities adopt a broader perspective on sustainability, promoting public awareness of how sustainability can be integrated into everyday practices. While some universities focus on reducing water use, controlling gas emissions, and managing waste, a more comprehensive strategy is

necessary. This strategy should encompass environmental management to minimize resource consumption and reduce the negative impacts of university operations. Achieving sustainability in higher education requires a holistic approach, including the integration of academic programs, institutional policies, and collaboration with stakeholders to ensure consistent and effective progress.

The most commonly adopted methods include the Green Building approach, ISO 14001, and the Eco-Management and Audit Scheme (EMAS). The Green Building strategy focuses on minimizing waste production, reducing the use of environmentally harmful materials, and optimizing energy consumption by transforming university buildings into energy-efficient structures. Its primary goal is to maximize resource efficiency within buildings. ISO 14001, widely implemented by universities across the United States and Europe, provides a framework for managing environmental impacts, offering an internationally recognized standard for evaluating environmental management practices. Similarly, EMAS, established in 1993, was designed to improve environmental performance through systematic evaluation and management.

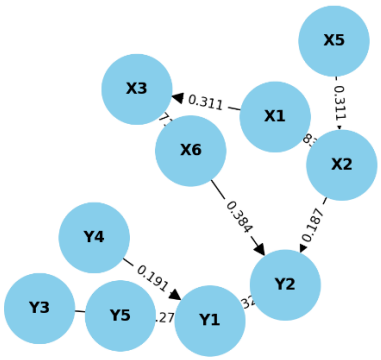

Fig 1. Results of Processing Model Sign

In this model, it is shown that all factors in this study have a positive relationship, including: Facilities and Infrastructure, Finance, and Planning have a positive effect on Operations; Planning factors also have a positive effect on Administration and Governance; Governance, Administration, and Operational factors have a positive effect on the Quality of Education; and the Education Quality factor has a positive effect on the Sustainability of Private Universities. Reputation factors supported by the role of students and alumni also have a positive influence on the sustainability of private universities.

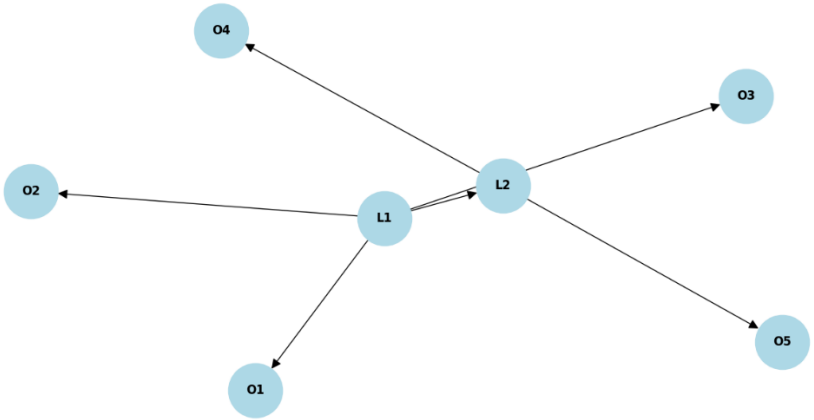

Fig 2: Processing Results of Sign Absolute Values Model

Table 1. Statistical approaches

lval	rval	Estimate	Std. Err	z-value	p-value
L2	L1	1,90	0,21	8,89	0,00
O1	L1	1,00	-	-	-
O2	L1	0,93	0,15	5,99	0,00
O3	L1	2,44	0,29	8,49	0,00
O4	L2	1,00	-	-	-
O5	L2	0,79	0,07	11,19	0,00
L1	L1	0,18	0,04	4,72	0,00
L2	L2	0,00	0,07	0,00	1,00
O1	O1	0,78	0,05	15,15	0,00
O2	O2	1,30	0,08	15,55	0,00
O3	O3	0,13	0,08	1,57	0,12
O4	O4	0,91	0,08	11,49	0,00
O5	O5	0,89	0,07	13,57	0,00

The table presents the results from a Structural Equation Model (SEM) analysis, showing relationships between latent variables (L_1, L_2) and observed variables (O_1 to O_5)he "Estimate" column represents the strength of these relationships, with most estimates being statistically significant, as indicated by low p-values (≤ 0.05) and high z-values. For example,(L_1) significantly influences L_2 (Estimate: 1.90, p-value: 0.00) and the observed variables O_1, O_2, and O_3. Similarly, L_2 has significant effects on O_4 and O_5 The variances (covariances) of these variables are also significant, except for O_3 where the residual variance is not statistically significant. Overall, the table suggests strong, reliable relationships in the model, with most paths indicating significant effects.

Based on the absolute values model, the factors that have the most positive influence are Planning (X_1) on Governance (X_3) and Administration (X_6). Then followed by the influence of Governance (X_3) on the Quality of Education (Y_2); Operational (X_2) on Education Quality (Y_2); Planning (X_1) to Operations (X_2). And having the lowest positive value but still having an influence is the Administrative factor (X_6) on the Quality of Education (Y_2); Financial factors (X_5) to Operations (X_2).

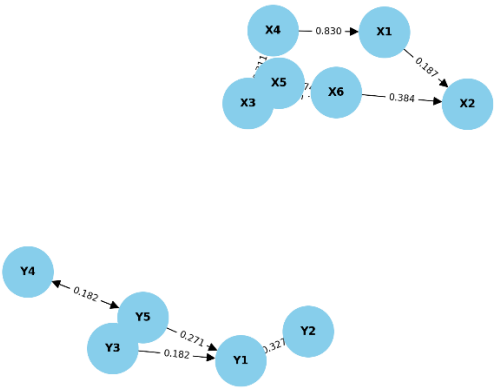

Fig 3: Processing Results Sign Relative Values Model

Based on the sign relative values model, the factor that has the most positive influence is the Quality of Education (Y_2) affecting the Sustainability of Private Universities (Y_1) followed by the influence of Students and Alumni (Y_5) influences the Sustainability of Private Universities (Y_1). And followed by the influence of Reputation (Y_3) and Cooperation (Y_4) affecting the Sustainability of Private Higher Education (Y_1).

Universities should have the advantage of delivering the best knowledge that should demonstrate the excellent solutions for the social, economic and environmental challenges through

shaping the mentality of the university's academic staff and students; usually at youth age. This case persistently draws back with the lack of "sustainable development" proficiency among: academic staff, curriculum, on-site practices, research, and students; the factors that formulate a "Sustainable University". Sustainable development is seen as an integrated concept comprising four pillars: environmental, economic, social, and cultural consideration, where the cultural aspect finds common ground in the area of ethical values. A growing concern in several areas is that the three-pillar model of sustainability, consisting of environmental, economic, and social dimensions, needs to be adjusted as demanded by environmental, economic, social, and cultural challenges. A campus requires an environment that provides academic support and comfort through making the space safe, healthy, and clean.

4. Conclusions

Based on the analysis of the data and its theoretical relationships, this study concludes that administration, finance, operations, planning, facilities, infrastructure, and governance significantly influence the sustainability of private universities. Financial factors, planning, and infrastructure also positively affect the quality of education, which in turn contributes to sustainability. According to the absolute values model, planning has the strongest positive effect on governance and administration, followed by governance and operations influencing the quality of education. The sign relative values model shows that the quality of education has the most substantial impact on sustainability, with students, alumni, reputation, and cooperation also playing crucial roles. To attract students, universities should implement marketing strategies that leverage reference groups to shape perceptions of educational quality and design affordable tuition fees with flexible payment systems, ensuring students can complete their education with ease.

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