Copyright © 2025 The Author(s)
Didaktika: Jurnal Kependidikan, Vol. 14 No. 2 Mei 2025

# Digital Transformation Strategy for Higher Education: Soft System Methodology Analysis

**Oscar Radyan Danar[1], Gita Zulfie Ramadhani[2], Dhefara Hersaning Djati[3], Durratun Nashihah[4]**
[1,2,3]Universitas Brawijaya, Indonesia
[4]Universitas Merdeka Malang, Indonesia

**Abstract**

Universitas Brawijaya (UB) has established itself as a leading educational institution in East Java, Indonesia, and is recognized for its diverse achievements both nationally and internationally. The importance of university rankings has become a focal point for educational institutions in Indonesia, including UB. The objective of this research is to analyze the factors affecting UB's ranking and to explore how these factors can inform better management practices within the university. This research uses the Soft System Methodology (SSM) approach, which involves the systematic analysis of real-world problems. This research involves in-depth interviews, observations, and focus group discussions (FGD) in data collection. The results of this study indicate that Universitas Brawijaya has limitations in global recognition, limitations in funding and digital research infrastructure, disparities in academic quality between units. The result for higher education management implies that it can create solutions that are not only technical but also contextual, making them easily accepted by all stakeholders. The Soft System Methodology approach allows Universitas Brawijaya (UB) to map digital transformation issues holistically and produce comprehensive solutions.
**Keywords:** Digital Transformation, Higher Education, SSM

## Introduction

Digital transformation in higher education is a multifaceted process requiring a strategic approach to effectively integrate technology into educational institutions. This transformation is not merely about adopting new technologies but involves a comprehensive rethinking of academic practices, stakeholder engagement, and institutional culture. In the context of digital transformation, universities must focus on creating personalized learning environments that enhance the educational experience (Kuzu, 2020). This involves not only the integration of technology but also the development of digital competencies among educators and students alike. The readiness of faculty to engage with digital tools is critical, as highlighted by Vodneva, who emphasizes the necessity for teachers to possess adequate digital literacy to facilitate effective online education (Vodneva, 2021).

The concept of digital transformation in higher education is not merely about the adoption of new technologies; it involves a fundamental shift in institutional culture, pedagogical approaches, and stakeholder interactions. According to Kuzu (2020), digital transformation is characterized by the personalization of learning experiences, which necessitates a focus on the learner and the educational environment beyond just technological advancements (Warren et al., 2019). This perspective highlights the importance of aligning digital strategies with the educational mission and values of institutions, ensuring that technology serves as an enabler of effective learning rather than a mere add-on.

One of the important aspects of digital transformation is the development of an integrated strategy to ensure that all elements of strategy, processes, products/services, people, data, and technology work synergistically (Tungpanting et al., 2022). At Brawijaya University,

this approach can be seen in their efforts to integrate information and communication technology (ICT) into the curriculum and learning process. Haddade emphasized that development and acceleration in the digital era is not something that must be avoided, but a need that must be faced (Haddade, 2023). This reflects Universitas Brawijaya's commitment to adapting to changes and utilizing technology to improve the quality of education.

Universitas Brawijaya (UB) has established itself as a prominent educational institution in East Java, Indonesia, recognized for its diverse achievements in both national and international arenas. Founded on January 5, 1963, UB has consistently aimed to enhance its academic reputation and contribute to societal development through research, education, and community engagement. However, its current ranking of 801-850 in the QS World University Rankings highlights the challenges it institutions globally. This ranking is influenced by various factors, including research output, learning experiences, employability, global engagement, and sustainability initiatives.

The significance of university rankings has become a focal point for educational institutions in Indonesia, including UB. Rankings serve not only as indicators of institutional performance but also as catalysts for change in management to adopt strategic approaches that prioritize stakeholder perspectives and enhance overall educational quality. As such, understanding the implications of these rankings is crucial for UB as it navigates the complexities of higher education management and seeks to improve its standing.

This research aims to analyze the main challenges in the digital transformation strategy at Brawijaya University, as well as propose a systemic approach based on Soft System Methodology (SSM) to design implementable solutions.This study is expected to provide practical contributions to higher education management in designing more adaptive and contextual digital transformation strategies. Methodologically, this research also demonstrates how SSM can be used to address complex issues in a university environment with multiple stakeholders.

This research seeks to contribute to the ongoing discourse on university rankings and their implications for higher education management, with a specific focus on Universitas Brawijaya. By identifying key areas for improvement and strategic development, the study aims to support UB in its mission to become a leading institution in Indonesia and a significant player on the global stage.

## Method

This study uses the Soft System Methodology (SSM) approach, which involves a systematic analysis of real-world problems. The presence of Soft System Methodology is an interpretative approach to applying actor mapping holistically. Furthermore, Checkland (2000) states that this concept also describes complex and diverse situations explained through the use of rich pictures and analysis using the CATWOE method, which stands for Customers, Actors, Transformation, Worldview, and Environmental Constraints. This method is often used in social research because its character aligns with social studies, is oriented towards systemic learning, rooted in the complexity paradigm, holds the view that all systems can be explored, the view that models are intellectual constructs, the view that the discovery process in a social context is continuous, has a very high involvement of human elements in research, answers questions about what and how, with very complex and unstructured problems.

The data collection techniques will be divided into 3 methods, namely: (1) Interviews with predetermined informants to obtain the necessary information related to governance by

Copyright © 2025 The Author(s)


utilizing digital transformation, then (2) Observation, specifically observation through online media to observe activities and events as well as in-depth observation of the implementation of governance and digital transformation management and implementation of the ongoing digital transformation, as well as (3) Documentation to capture and preserve every activity conducted and support the research.

The use of SSM is to understand the roles of each stakeholder and the existing governance model by performing 5 out of 7 steps, because the study focuses on the process of exploration and formulation of an applicable conceptual model in the context of governance. The 6th and 7th stages of the classic SSM model, which include identifying desired systemic changes and implementing actions, are integrated into the fifth stage through participatory discussion forums with stakeholders. In this way, the process of joint validation and reflection on potential changes has encompassed the evaluative and transformative dimensions that are the essence of the last two stages in the SSM framework. The five stages are carried out as follows: (1) The first stage, the problem situation is considered problematic; at this stage, the researcher maps the problems in detail that occur in the field through in-depth interviews, observations, and FGDs with the specified individuals/figures/units/divisions. (2) The second stage is the expressed problem situation, at this stage, the researcher reveals the issues that occur through rich images containing explanations of how the issues are related to the implementation of governance by utilizing digital transformation as a pillar in the effort to realize Universitas Brawijaya. This effort is realized through images and illustrations of social elements that include structure, regulation, conflict, and current issues. (3) The third stage, the root definition of the relevant purposeful activity system, formulates a conceptual model by depicting the system structure (human activities) relevant to the problematic situation (Root Definition), through CATWOE analysis. (4) The fourth stage is the conceptual model of the system mentioned in the root definition. Based on the data acquisition of the problem in the third stage, the researcher then creates a collaborative governance policy model based on the root definition realized through the activities of the involved actors and institutions. (5) The fifth stage is the comparison between the model and the real world. Compare the model with the conditions of its potential implementation in real-world scenarios, through focus group discussions (FGD) with stakeholders.

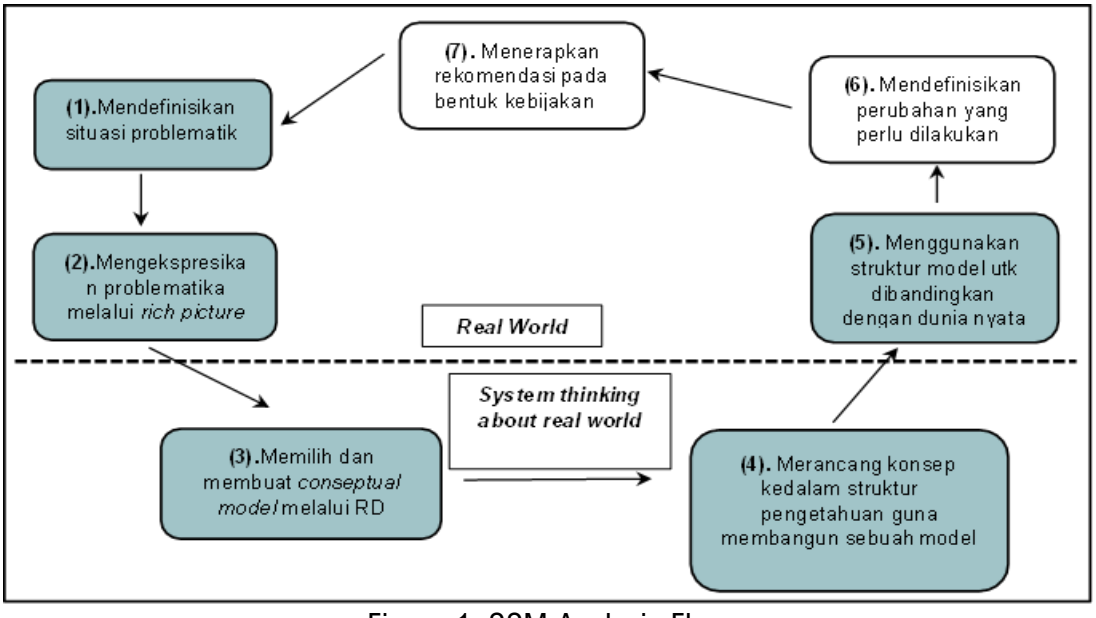



Figure 1. SSM Analysis Flow

# Results

### *Proposed Framework*

Digital transformation in higher education is a critical process that involves the integration of digital technologies into all aspects of educational institutions. This transformation is not merely about adopting new technologies; it encompasses a fundamental shift in how institutions operate, deliver education, and engage with students and stakeholders. The process is influenced by various factors, including organizational culture, strategic planning, and the digital maturity of both faculty and students.

One of the key aspects of digital transformation is the emphasis on personalization in learning experiences. Kuzu highlights that effective digital transformation in higher education must focus on the learner and their experiences, moving beyond just the implementation of information technologies (Kuzu, 2020). This approach necessitates that universities develop strategic plans that include training for academic staff, which can help bridge generational gaps in technology use and enhance the overall learning environment. The importance of a learner-centered approach is further supported by Forid et al., who found that digital transformation significantly influences student satisfaction, which is crucial for retention and engagement (Forid et al., 2022).

Moreover, the digital maturity of students plays a significant role in the success of digital transformation initiatives. Awdziej et al., demonstrate that students with higher levels of digital competence are more likely to accept and engage with the digital transformation efforts of their universities (Awdziej et al., 2023). This acceptance is vital, as it can lead to improved educational outcomes and a more robust learning experience. Institutions must therefore prioritize the development of digital skills among students to facilitate a smoother transition to digital learning environments.

Strategic planning is another critical component of digital transformation in higher education. Ibrahim emphasizes that having a clear vision for digital transformation is essential for fostering positive change among faculty and aligning institutional goals with technological advancements (Ibrahim, 2023). This strategic approach should include the identification of specific objectives and the allocation of resources to support digital initiatives. Alenezi and Akour also stress the urgency for higher education institutions to adapt to the digital age, highlighting that integrating digital technology into every aspect of the educational process is essential for maintaining competitiveness (Alenezi & Akour, 2023).

Based on the above explanation, the presence of the QS World Ranking, which is an annual ranking in ranking universities, is a reference that reflects the quality and performance of universities, which in this ranking is obtained from several influencing factors, namely research and discovery, learning experience, employability, global engagement, and sustainability. The Research and Discovery Lens evaluates the quality and volume of research as well as the academic reputation of an institution through two main indicators: Academic Reputation and Citations per Faculty. Academic Reputation assesses not only the quality of research, but also academic collaboration, educational innovation, and institutional impact on education and society. Citations per Faculty measure the average citation frequency by academic staff, which indicates the quality and influence of the institution's scientific publications.

The Learning Experience Lens evaluates student learning experiences, including exam assessments and interactions with lecturers and inter-students, through the Faculty Student Ratio which measures the ratio of lecturers to students. The higher this ratio, the better the learning experience will be due to optimal academic support. The Employability Lens assesses the ability of institutions to prepare graduates for successful careers through Employer

Copyright © 2025 The Author(s)


Reputation and Employment Outcomes. Employer Reputation measures the success of an institution in producing influential graduates, while Employment Outcomes focus on the institution's reputation among employers that determines graduate employment opportunities.

Lensa Global Engagement assesses the ability of institutions to establish global collaboration through the International Faculty Ratio, International Research Network, and International Student Ratio. These three indicators measure the level of diversity of international faculties, international research networks, and the diversity of international students, reflecting the institution's global reputation and attractiveness. Lensa Sustainability assesses an institution's commitment to sustainability by paying attention to ESG (Environmental, Social, and Governance) aspects as well as contributions to the SDGs. Institutions involved in environmental projects, good governance, and diversity initiatives score higher in these aspects.

University rankings such as the QS World University Rankings are an important tool to measure the quality of global education with the above indicators. Universitas Brawijaya (UB) and Nanyang Technological University (NTU) are examples of two universities that have different roles in the global arena. UB focuses on improving education and international competitiveness, while NTU has a global influence through technology research and innovation as well as strong international collaboration. Based on this, an analysis related to digital transformation was also carried out in the management of Brawijaya University and Nanyang University as shown in the following table:

Table 1. University Ranking Score of Universitas Brawijaya and Nanyang Technological University on an International Scale

| Lens | Indicator | Brawijaya University | Nanyang Technological University |
|---|---|---|---|
| | | Rank: 801-850 | Rank: 15 |
| Research and Discovery | Academic Reputation | 19,2 | 91,9 |
| | Citation per Faculty | 1,4 | 92,4 |
| Learning Experience | Faculty Student Ratio | 11,5 | 80,6 |
| Employability | Employer Outcomes | 42,4 | 73,3 |
| | Employment Results | 13,1 | 83,9 |
| Global Engagement | International Student Ratio | 1,4 | 83,5 |
| | International Research Network | 19,6 | 89,4 |
| | International Faculty Ratio | 13,7 | 100 |
| Sustainability | Sustainability Score | 9 | 95,6 |

Source: QS World Ranking, 2024

From the table above, it can be explained that the score of Universitas Brawijaya has several significant shortcomings that affect the global ranking of Universitas Brawijaya. First, low scores in Academic Reputation and Citations per Faculty show that research at Universitas Brawijaya lacks international recognition and limited global collaboration. This is closely related to the limitations of the International Research Network and the International Faculty Ratio, which reflects the lack of engagement with international academics and cross-country researchers. In addition, a low Faculty Student Ratio indicates a high potential workload for lecturers, which

can have an impact on the quality of teaching and student learning experience. In terms of employability, low scores on Employer Reputation and Employment Outcomes indicate that Universitas Brawijaya graduates may not be fully prepared to meet the demands of the global job market. Finally, the very low score on Sustainability also shows that sustainability initiatives at Universitas Brawijaya need to be strengthened, given the importance of environmental and social awareness in world university rankings. Overall, although Universitas Brawijaya has great potential, various aspects need to be improved to be able to compete more effectively with leading universities in the world.

Universitas Brawijaya faces several challenges in improving its global ranking, especially related to digital transformation. Low scores on Academic Reputation and Citations per Faculty show that although the quality of research already exists, it is still limited in terms of global collaboration and the use of digital technology to expand the impact of research. The implementation of technology in the research and publication process can increase the visibility and citations of academic works. In addition, a low Faculty Student Ratio score indicates the need for an increase in the number of teaching staff that can be supported with a digital-based learning platform that allows for more efficient teaching. To improve Employer Reputation and Employment Outcomes, Brawijaya needs to utilize technology to create training programs and collaborate with the industry, as well as introduce a more interactive digital career platform to facilitate relationships with employers. Global engagement, reflected in low scores on the International Faculty and International Student Ratio, can also be improved by enhancing international partnerships through digital programs, such as webinars and online courses, which will attract international faculty and students. Finally, sustainability can be improved through the use of technology to manage on-campus sustainability initiatives and research focused on the Sustainable Development Goals (SDGs).

Table 2. CATWOE Analysis & Root Definition

| | |
|---|---|
| **C (Customers)** | a. Students who receive a better learning experience through digital platforms.<br>b. Lecturers who get better research facilities through digital infrastructure.<br>c. Employers who benefit from graduates with high digital skills.<br>d. International stakeholders such as international students and faculty who collaborate in global research. |
| **A (Actors)** | a. University leaders who direct digital transformation policies.<br>b. Teams and digital developers who facilitate technology implementation.<br>c. Lecturers and students who are actively using digital platforms to learn and collaborate.<br>d. Career and international relations managers who enhance global connections and careers through digital platforms. |
| **T (Transformation)** | A digital transformation process that transforms the way universities manage learning, research, international collaboration, and sustainability, by leveraging technology to improve the efficiency and global impact of universities. Implementation of digital infrastructure for research and |

Copyright © 2025 The Author(s)


| | |
|---|---|
| | learning, as well as more efficient management of data and resources. |
| **W (Worldview)** | The view that digital transformation can change the position of universities in the academic world by improving the quality of research, learning experience, sustainability, and employability. The belief is that technology is a key driver in improving the quality of universities and in meeting the demands of an increasingly digital and globally connected age. |
| **E (Environmental Constraints)** | a. Limited budget for technology investment and digital transformation.<br>b. Infrastructure constraints in several areas of the university are not fully ready to support digital transformation.<br>c. Cultural challenges and changes in technology adoption among lecturers and students.<br>d. Government regulations related to education may limit the implementation of certain technologies. |
| **E (Owners)** | a. The leadership of Universitas Brawijaya has the authority to design digital transformation policies.<br>b. The government as a party has a role in regulating and funding the education sector, especially those related to the application of technology. |
| **Root Definition** | |
| A system to improve the university's position through integrated digital transformation, by involving internal and external stakeholders in improving research quality, learning experiences, sustainability, and employability, to strengthen the university's academic reputation and global performance. | |

Source: Prepared by the Author, 2024

Intervention variables in the context of digital transformation are strategic steps that can be taken to improve the performance of the system, in this case, universities, by utilizing digital technology optimally. These interventions aim to strengthen aspects such as research quality, learning experiences, digital skills, international networks, and sustainability. Each of the proposed variables serves to create sustainable positive changes in the university's academic and operational environment. Here are five intervention variables that are important to improve universities in the digital age:

1. Digital Research Infrastructure

The enhancement of digital research infrastructure, such as data management systems and access to international research networks, can drive improvements in research quality. Better access to digital resources will increase the number of citations and the academic reputation of the university. The first step is to conduct an audit of digital research needs to understand the shortcomings faced by researchers. Next, the university can develop a research data management (RDM) system and establish connections with international research networks. Intensive training also needs to be conducted for lecturers and researchers so that they can make the most of the digital infrastructure. The effectiveness of this intervention can be tracked through indicators such as the number of researchers using the system, the frequency of digital data access, the increase in citations, and the number of international research collaborations formed.

2. E-Learning Platform

A digital-based learning platform allows flexibility in the learning process, enhancing the student experience. This can enhance the quality of teaching and make the learning process more interactive and accessible. Implementation begins with the selection or enhancement of a Learning Management System (LMS) such as Moodle or Canvas. The curriculum is then adjusted to support interactive online learning, with digital pedagogy training for lecturers. The use of the platform needs to be monitored through student satisfaction surveys and integration with a broader academic system. Indicators that can be used include the number of courses conducted digitally, faculty participation in training, user satisfaction levels (both students and faculty), and the intensity of learning activities in the LMS.

3. Digital Skills Development

Developing digital skills for students and lecturers through e-learning can expand career opportunities for graduates. Better digital skills also enhance academic capabilities, support research, and contribute to the institution's reputation in the job market. Digital skills training programs can be offered through e-learning platforms and linked to digital certifications. Integration into the formal curriculum as well as staff training programs also needs to be carried out. The success of this initiative can be evaluated by the number of participants who complete the training, the increase in digital literacy scores, the number of alumni absorbed in technology-based fields, and the number of digital certificates awarded.

4. Global Digital Collaboration Network

Building an international digital collaboration network enables cross-border research and learning. This collaboration enriches students' experiences and strengthens the university's reputation in the global academic community. The university can start with mapping potential strategic global partners, followed by drafting MoUs for collaboration in research and teaching. Programs such as joint lectures and virtual exchanges can be implemented once the infrastructure is in place and coordination between faculties is prepared. Effectiveness indicators include the number of active MoUs, the frequency of international collaborative activities, the level of participation of faculty/students in global programs, and the number of joint publications with foreign partners.

5. Sustainable Digital Solutions

The implementation of environmentally friendly digital solutions, such as the use of green technology and energy efficiency on campus, improves the university's sustainability score. This also demonstrates the university's commitment to sustainable development goals, which can enhance the institution's reputation in terms of social and environmental responsibility. UB can formulate green IT policies, adopt energy-efficient technologies, and educate the academic community about sustainable digital practices. Monitoring is conducted through measuring the reduction in energy consumption and the number of environmentally friendly devices used.

By implementing these interventions, universities can create a mutually supportive cycle of improvement, encouraging the improvement of academic, operational, and social quality in the era of digital transformation. Based on that explanation, Brawijaya University's efforts/contributions to achieve the goals for increasing rank in international class universities. The depiction of the institution's effort can be explained below:

Copyright © 2025 The Author(s)

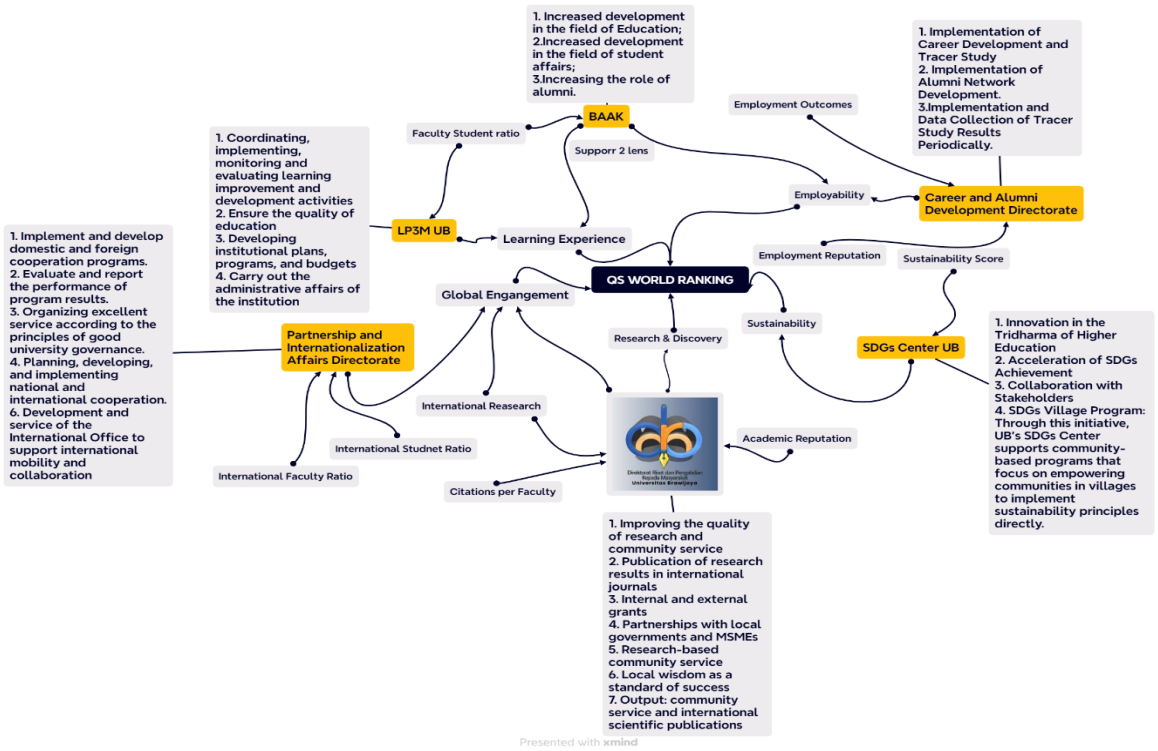
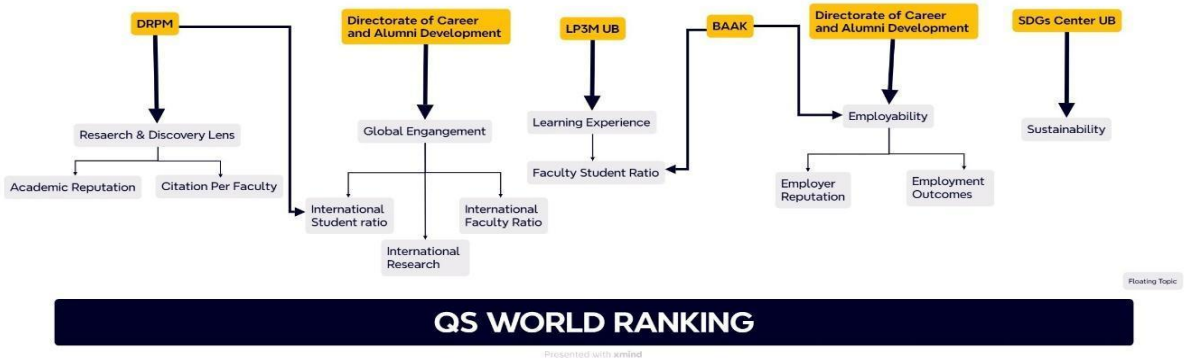




Figure 2. Rich Picture of Institution Contribution (Source: Prepared by the Author, 2024)

From the direction of the description, it can be explained again in a conceptual model that can be used as one of the guidelines and directions of university policy in the effort. The depiction is more descriptive of the efforts made by university actors that can later affect the appropriate world-class university indicators.




leading educational institution in Indonesia, including diverse academic programs, strong research output, and community engagement. However, it also faces weaknesses that need to be addressed to enhance its global standing and improve its ranking in international assessments. By leveraging its strengths and addressing its weakness, UB can develop effective strategies to improve its overall performance and reputation in the higher education landscape.

Table 3. Strengths and Weakness

| Strengths | Weakness |
|---|---|
| Diverse Academic Programs: Universitas Brawijaya offers a wide range of academic | Limited Global Recognition: Despite its achievements, UB's current ranking of 801- |

| | |
|---|---|
| programs across various disciplines, including sciences, engineering, social sciences, and humanities. This diversity attracts a broad spectrum of students and facilitates interdisciplinary research and collaboration. | 850 in the QS World University Rankings indicates that it faces challenges in gaining global recognition. This limited visibility can hinder its ability to attract international students and faculty. |
| Research Output and Innovation: Universitas Brawijaya has made significant strides in research, contributing to various fields of study. The university has established partnerships with national and international research institutions, enhancing its research capabilities and visibility. This focus on research is crucial for improving its ranking in global assessments. | Challenges in Research Funding: Securing funding for research initiatives can be a significant challenge for UB. Increased competition for research grants and limited access to funding sources may hinder the university's ability to conduct high-impact research. |
| Strong Community Engagement: Universitas Brawijaya is committed to community service and engagement, which is reflected in its various outreach programs. This engagement not only enhances the university's social responsibility but also strengthens its ties with local communities, fostering goodwill and support. | Variability in Academic Quality: While UB offers a diverse range of programs, there may be variability in the quality of education across different faculties and departments. Ensuring consistent academic standards and quality across all programs is essential for enhancing the university's reputation. |
| Employability of Graduates: The university has developed strong connections with industries, facilitating internships and job placements for its graduates. This focus on employability enhances the university's reputation among prospective students and employers alike. | Resource Constraints: Like many institutions in Indonesia, UB may face challenges related to funding and resource allocation. Limited financial resources can impact research capabilities, infrastructure development, and the overall quality of education. |
| Commitment to Sustainability: The university has initiated various programs aimed at promoting social responsibility. This commitment aligns with global trends in higher education and enhances UB's reputation as a socially responsible institution. | Need for Enhanced Learning Experiences: Although UB has made strides in improving the learning environment, there may still be areas for enhancement, such as the integration of technology in teaching, student support services, and the overall student experience |

## Discussion

The framework aimed at identifying and prioritizing barriers that may affect the digital transformation process in higher education. Digital transformation in higher education is a multifaceted process influenced by various barriers that institutions must identify and prioritize to enhance their digital capabilities. The barriers affecting this transformation can be categorized into several dimensions, including technological, organizational, strategic, and environmental factors.

Firstly, the barriers to digital transformation in higher education institutions (HEIs) are diverse and interconnected. According to Aditya et al., (2021), these barriers do not exist in isolation

Copyright © 2025 The Author(s)


but rather from complex correlations that inhibit progress. This obstacle aligns with the finding that international research collaboration and participation in global networks are still minimal. Then, constraints in research funding and limitations in digital research infrastructure emerged as the main identified obstacles, further reinforced by findings that access to international digital research networks and research data management systems is neither uniform nor optimal. This affects the research performance of UB, both in terms of output and citations, which are important components in the assessment of international rankings. They emphasize the importance of understanding these relationships to develop effective strategies for overcoming obstacles. Similarly, Gkrimpizi et al., (2023), conducted a systematic literature review that identifies and classifies barriers such as technological, organizational, and strategic, providing a comprehensive framework for understanding the challenges faced by HEIs. Furthermore, Graham (2023), highlights that digital transformation often focuses on technology implementation without accompanying pedagogical and organizational changes, which can lead to ineffective outcomes.

In assessing these barriers, it is crucial to consider their contextual relationships. Budiyanto (2024) suggests that analyzing participants' perspectives on digital transformation can provide insights into the readiness and strategic planning necessary to address these barriers. This aligns with the findings of Liu (2023), who argues that the level of digital literacy among educators significantly impacts the success of digital transformation initiatives. The interplay between various barriers, such as the lack of leadership skills and inadequate IT infrastructure, must be assessed to prioritize interventions effectively (Aditya et al., 2021).

Prioritizing barriers is essential for developing actionable strategies. Aditya et al., (2021) propose a diagnostic framework that helps institutions identify and prioritize barriers based on their impact on digital transformation processes. This framework can guide HEIs in focusing their efforts on the most critical challenges, such as cyber threats, data privacy concerns, and the need for a clear vision for digital integration. Additionally, the urgency of managing digitization in higher education is underscored by Saragih et al., (2023), who argue that institutions must adapt to changing demands and expectations from students and external stakeholders to remain competitive.

## Conclusion

Through the comparison with Nanyang Technological University, we can see that there is still a lot to be done by higher education actors in Indonesia, especially Brawijaya University. Based on the results of the analysis and depiction, of course, efforts have also been implemented as a manifestation towards world-class universities through digital transformation. In conclusion, the digital transformation process in higher education is hindered by a variety of barriers that require careful identification, assessment, and prioritization. The interconnected nature of these barriers necessitates a strategic approach that considers both the technological and organizational dimensions of transformation. By leveraging frameworks that categorize and prioritize barriers, HEIs, especially Universitas Brawijaya, can develop targeted strategies to enhance their digital capabilities and better serve their students in an increasingly digital world.

## Acknowledgment

Our gratitude goes to all those who have contributed to this research. The research team, students, informants, and others, in this research will not run well if there is no good synergy and solid teamwork. To the institution, thank you for giving us the opportunity to conduct research until we can publish this journal. Hopefully, it can be useful in the future.

## References

Awdziej, M., Jaciow, M., Lipowski, M., Tkaczyk, J., & Wolny, R. (2023). Students' digital maturity and its implications for sustainable behavior. Sustainability, 15(9), 7269. https://doi.org/10.3390/su15097269

Alenezi, M. and Akour, M. (2023). Digital transformation blueprint in higher education: a case study of PSU. Sustainability, 15(10), 8204. https://doi.org/10.3390/su15108204

Aditya, B., Ferdiana, R., & Kusumawardani, S. (2021). Identifying and prioritizing barriers to digital transformation in higher education: a case study in Indonesia. International Journal of Innovation Science, 14(3/4), 445-460. https://doi.org/10.1108/ijis-11-2020-0262

Budiyanto, C. (2024). The barriers and readiness to deal with digital transformation in higher education. Tem Journal, 334-348. https://doi.org/10.18421/tem131-35

Ford, M., Hafez, M., & Khan, W. (2022). Student satisfaction and retention: impact of service quality and digital transformation. Marketing and Management of Innovations, 13(4), 152-163. https://doi.org/10.21272/mmi.2022.4-14

Gkrimpizi, T., Peristeras, V., & Magnisalis, I. (2023). Classification of barriers to digital transformation in higher education institutions: systematic literature review. Education Sciences, 13(7), 746. https://doi.org/10.3390/educsci13070746

Graham, C. (2023). Digital learning transformation in higher education: international cases of university efforts to evaluate and improve blended teaching readiness. Education Sciences, 13(11), 1143. https://doi.org/10.3390/educsci13111143

Haddad, H. (2023). Quality assurance strategies of higher education in the digital era: anthropology of education study in Islamic higher education institution. Quality Assurance in Education, 32(1), 46-63. https://doi.org/10.1108/qae-05-2023-0084

Ikenwe, I. and Udem, O. (2022). Innovative digital transformation for dynamic information service sustainability in university libraries in Nigeria. Folia Toruniensia, 22, 67-86. https://doi.org/10.12775/ft.2022.004

Ibrahim, G. (2023). The impact of digital transformation in Egyptian private universities on achieving organizational excellence, using the German university in Cairo as a model. International Journal of Business and Management, 18(5), 47. https://doi.org/10.5539/ijbm.v18n5p47

Kuzu, O. (2020). Digital transformation in higher education: a case study on strategic plans. Vysshee Obrazovanie v Rossii = Higher Education in Russia, 29(3), 9-23. https://doi.org/10.31992/0869-3617-2019-29-3-9-23

Liu, Y. (2023). Digital transformation of college teacher education from the perspective of behaviorist psychology: initiatives, effectiveness, and pitfalls. Applied Mathematics and Nonlinear Sciences, 9(1). https://doi.org/10.2478/amns.2023.2.01598

Saragih, S., Tjakraatmadja, J., & Pratama, A. (2023). The urgency of managing digitalization in higher education. International Journal of Management Entrepreneurship Social Sciences and Humanities, 6(1), 14-24. https://doi.org/10.31098/ijmesh.v6i1.1339

Tungpantong, C., Nilsook, P., & Wannapiroon, P. (2022). Factors influencing digital transformation adoption among higher education institutions during digital disruption. Higher Education Studies, 12(2), 9. https://doi.org/10.5539/hes.v12n2p9

Tondeur, J., Howard, S., Zanten, M., Gorissen, P., Neut, I., Uerz, D., … & Kral, M. (2023). The Medicom framework: higher education teachers' digital competencies for the future. Educational Technology Research and Development, 71(1), 33-53.

Copyright © 2025 The Author(s)


https://doi.org/10.1007/s11423-023-10193-5

Tiwow, G. (2023). Human resources management in trouble time: a strategy to increase organization agility for digital transformation in university. IJITE, 2(4), 99-112. https://doi.org/10.62711/ijite.v2i4.166

Vodneva, S. (2021). Teacher readiness for the digital transformation of the educational process. https://doi.org/10.15405/epsbs.2021.12.03.112

Warren, S., Sauser, B., & Nowicki, D. R. (2019). A bibliographic and visual exploration of the historic impact of soft systems methodology on academic research and theory. Systems, 7(1), 10. https://doi.org/10.3390/systems7010010

---This page is intentionally left blank---