

UNIVERSITY SUSTAINABILITY COMPETITIVE ADVANTAGE IN FACING TECHNOLOGICAL CHANGES

¹Bayu Indra Setia

²Tjutju Yuniarsih

³Janah Sojanah

⁴Kusnendi

⁵Eeng Ahman

⁶Erry S.R. Pangestu

¹bayuindraseta@upi.edu

^{1,2,3,4,5}Universitas Pendidikan Indonesia

Jl. Dr. Setiabudi No.229, Isola, Kec. Sukasari, Kota Bandung, Jawa Barat 40154

^{1,6}Universitas Pasundan

Jl. Tamansari 6-8, Kec. Bandung Wetan, Kota Bandung, Jawa Barat 40116

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Abstract

The purpose of this study is to analyze sustainability's competitive advantage in the face of technological change mediated by knowledge management and organizational culture. The method used in this study is descriptive verification with model 6 analysis tools from Hayes's theory. The unit of analysis is six private universities that have accreditation A, with 204 respondents consisting of top management, middle management, and low management. The results obtained from the research show that technological change is affecting the university's sustainability competitive advantage, which is mediated by knowledge management and organizational culture. Technological change mediated by knowledge management has a major influence on and contribution to the university's sustainability competitive advantage as compared to organizational culture.

Keywords: *knowledge management; organizational culture; technological change; sustainable competitive advantage; private universities*

INTRODUCTION

The problem that will be studied in this research is the low ability of tertiary institutions in Indonesia to sustain a competitive advantage. This is because many indicators related to the tri-dharma of higher education have not been fulfilled and carried out in a sustainable manner. According to the Best Educational Systems 2021, or list of countries with the Best Education Systems 2021, using the global opportunity index and quality index indicators The global opportunity index is measured based on economic, institutional, and financial aspects, while the quality index is measured using a country's physical security, economic security, employment opportunities, and other factors. Based on these indicators, according to the best educational system, Indonesia will be ranked 54th out of 78 countries in 2021.

The low competitive advantage of tertiary institutions is due to several factors, including: lack of adequate facilities and infrastructure; lack of quality human resources, especially lecturers and education staff; lack of adequate budget to support academic and research activities; weak accreditation and quality control systems in higher education; lack of university involvement in technology research and development activities; absence of clear and measurable quality standards to measure higher education success; low community participation in higher education.

Therefore, to improve the competitiveness of higher education institutions in Indonesia, it is necessary to make efforts to improve the quality and capacity of human resources, improve access and quality of facilities and infrastructure, increase the budget and quality control of higher education, and encourage the involvement of higher education institutions in educational activities. technology research and development. In addition, it is also important to have clear and measurable quality standards to measure the success of higher education as well as to encourage community participation in higher education. (Kurniawan, Y. 2018; Asrori, M., & Nugroho, A. E., 2019; Salamah, U., & Utama, A. S. ,2020 ; Indrawati, D. ,2021 ; Rianasari, D. D., & Fitria, A.,2021).

Indicators of a university's sustainable competitive advantage are education quality, research and innovation, infrastructure and technology, partnerships and networking, sustainability, and social responsibility. Changes in technology and information systems are currently developing quite rapidly. Technology with a new approach that combines the physical and digital worlds will fundamentally change the pattern of human life and interaction. Industry 4.0, as a phase of the technological revolution, changes the way human activities are carried out in terms of scale, scope, complexity, and transformation from previous life experiences. Humans will even live in global uncertainty; therefore, humans must have the ability to predict a future that changes very quickly. Each country must respond to these changes in an integrated and comprehensive manner. This response involves all global political stakeholders, from the public, private, academic, and civil society sectors, so that the challenges of Industry 4.0 can be managed into opportunities. However, the development and implementation of the Industrial Revolution 4.0 in Indonesia are still not running optimally due to a lack of public knowledge about digital literacy and using technology and the internet in a healthy and positive manner (Llopis-Albert et al., 2021; Smuts et al., 2021; Wibowo et al., 2020).

Facing the era of the Industrial Revolution 4.0, the role of higher education, especially universities, is very important, especially in the development of science and technology. Industry 4.0 challenges and opportunities encourage university innovation and creation. The government needs to review the relevance between universities and the industrial world as users of graduates to respond to changes, challenges, and opportunities in the industrial era 4.0 while still paying attention to the humanities aspect. University challenges are becoming increasingly complex with Industry 4.0. Universities are also directed to increase individual independence in entrepreneurship according to the competencies possessed by students.. (Naruetharadhol et al., 2022; Sirozi, 2019; Yahya, 2018).

Technological changes that are currently taking place make university management increasingly difficult because many government policies require the academic community to play an active role in producing quality resources (graduates) who can compete in the world of work. In creating resources that are innovative and adaptive to technology, it is necessary to adjust learning facilities and infrastructure in terms of information technology, the internet, big data analysis, and computerization. Universities that provide learning infrastructure are expected to be able to produce graduates who are skilled in the areas of data literacy, technology literacy, and human literacy. Innovation breakthroughs will lead to increased industrial productivity and give birth to technology-based start-up companies, such as those that are popping up in Indonesia at the moment (Florek-Paszowska et al., 2021; Liu et al., 2017; Ramakrishnan et al., 2021; Wijaya & Rahardjo, 2020).

Universities that can answer the challenges of technological change will increase their sustainable competitive advantage. Therefore, the university's sustainable competitive advantage to win the competition is to own and manage human resources who have knowledge and an adaptive organizational culture. Knowledge management owned by universities currently cannot be utilized as well as possible due to limited knowledge resulting from technological changes (Roscoe et al., 2019; Ruël & Lake, 2014; Shet, 2020; Zsigmond et al., 2021).

In addition to knowledge management, the benchmark for dealing with technological changes so that the university can continue is organizational culture. University leaders must prepare and cultivate human resources who are ready to comply with the rules and policies of the government regarding the university's Tri Dharma. A good university is one that is productive in carrying out the Tri Dharma of Education in accordance with existing regulations, namely conducting teaching, research, and community service at least twice a year, plus supporting aspects such as attending training, seminars, webinars, or becoming a member of a competency association (Binsawad et al., 2019; Harling & Tobi, 2018; Mukhid, 2007; Nurhidayat et al., 2020; Putri, 2018).

Many previous studies have discussed sustainability competitive advantage ranging from industry to services as carried out by (Hu et al., 2022; Muñoz-Pascual et al., 2020; Pérez Vergara et al., 2021; Pratono & Han, 2021; Srivastava et al., 2020; Zhang et al., 2015). But unfortunately, this research does not specifically explain which sectors it examines, so researchers try to fill in the gaps in previous research by including changes in technology, knowledge management, and organizational culture as determining factors of a university's sustainable competitive advantage. The unit of analysis is universities in West Java. To support the novelty of this study, the data analysis method used is one of model number 6 from Hayes, which is commonly called process analysis.

The term "technology cannot be separated from the word information, so the term information technology appears, which consists of hardware and software needed by organizations to achieve their business goals. The era of technological change is an era of fundamental innovation and change because the presence of technology can change systems that occur globally. One example of this technological development has its own negative impact: the substitution of jobs from humans to robots. The existence of robots that are starting to replace human jobs is very threatening to various professions in the world (Llopis-Albert et al., 2021; Xu et al., 2022).

The role of information and communication technology currently allows a community or people to share knowledge with people who are spread out in different places so that they can still share knowledge even though there are obstacles or limitations. There are two styles of interaction in a virtual community: face-to-face and online. So that it can be a means to implement social exchange (Costa-Sánchez et al., 2019; Kolding et al., 2018; Wynn, 2018).

The role of information and communication Technology currently allows a community or people to share knowledge with people who are spread out in different places, so that they can still share knowledge even though there are obstacles or limitations. There are two styles of interaction in a virtual community: face-to-face and online. So that it can be a means to implement social exchange. (Faqih, 2019; Marczewska et al., 2020). H₁: There is a significant effect of technological changes on sustainable competitive advantage.

Knowledge management is about making the right knowledge available to the right people. This ensures that an organization can learn and that they will be able to retrieve and use their knowledge assets in current applications as needed. In the words of Peter Drucker, it is the "coordination and exploitation of organizational knowledge resources to create competitive advantage." (Drucker 1999). On the other hand, knowledge management is a process that involves collecting, organizing, disseminating, and utilizing existing knowledge within an organization. The main objective of knowledge management is to ensure that the knowledge possessed by individuals and groups within the organization can be used effectively to achieve organizational goals (Ikujirō & Takeuchi, 1995).

Knowledge management is the management of knowledge within an organization to improve performance, innovation, and competitive advantage. By leveraging existing knowledge and ensuring access to the right individuals at the right time, organizations can optimize the use of their resources, reduce duplication of work, and accelerate innovation (Chua, A. Y., & Goh, D. H. 2008, Setia, B. I., et.al.,2022).

Research that has been conducted states that there is a relationship between technological change and knowledge management. The research states that there are two main drivers of change in HR, namely technology and knowledge management, so that with rapid technological change, it must be accompanied by changes in knowledge management. In this case, every time there is a change, there must be new knowledge in it, so that with management With good knowledge, technological change will be handled well and thus have an impact on sustainable competitive advantage (Bashir et al., 2022; Nuryakin, 2018; Terán-Bustamante et al., 2021).

Based on the concepts and theories as well as previous research, there is still not much research examining knowledge management as a mediating variable, so a hypothesis based on Hayes' process theory concept can be built. H₂: There is a significant effect of technological change on sustainable competitive advantage, mediated by knowledge management.

Organizational culture plays a very important role in shaping organizational behavior and performance. Organizational culture is a set of values, norms, beliefs, and practices shared by members of an organization. This culture reflects the unique identity of the organization and shapes the way members interact, make decisions, and work together. Lecturers are professional educators and scientists with the main task of transforming, developing, and disseminating science, technology, and art through education, research, and community service (Nizam et al., 2020).

Organizational culture can be a source of competitive advantage. A culture that is unique and difficult for competitors to imitate can be a valuable asset for an organization. A culture based on innovation, customer satisfaction, or excellence in service can set an organization apart from competitors and create a sustainable competitive advantage. (Schein, E. H.,2010). Organizational culture can change over time. Organizational culture is not something static but develops along with changes in the external and internal environments of the organization (Cameron, K., & Quinn, R., 2011). Organizational leaders play an important role in shaping, influencing, and changing organizational culture by reinforcing desirable values and eliminating unwanted cultural elements (Denison, D. R., & Spreitzer, G. M.,1991).

Previous research has stated that there is a relationship between technological change and organizational culture. Technology is a reference in the progress of a company, including universities; the more rapid the development of technology, the more practical and easier it is for every employee to do. The combination of technology and communication has resulted in a revolution in the field of information systems, where technology plays a very important role in enhancing organizational culture. Technology and organizational culture interact and can shape the dynamics of the organization as a whole. It is important for organizations to understand how technology can influence and be affected by their culture, as well as manage the cultural changes that may occur as a result of adopting new technologies (Orlikowski, W. J., 2000; Monteiro, E., & Hanseth, O.,1995; Zammuto, R. F., Griffith, T. L., Majchrzak, A., Dougherty, D. J., & Faraj, S. 2007; Avgerou, C.,2000).

Based on previous concepts, theories, and research, there is still not much research examining organizational culture as a mediating variable, so a hypothesis based on Hayes' process theory concept can be built. H₃: There is a significant effect of technological changes on sustainable competitive advantage, which is mediated by organizational culture. H₄: There is a significant effect of technological changes on sustainable competitive advantage, mediated by knowledge management and organizational culture.

METHODS

This study takes the unit of analysis to universities in West Java. The population of this study is a private university that has accreditation A (excellent). The samples taken were from top management (rectorate), middle management (dean), and low management (study programs), so the total sample was 204 respondents. The research method used is descriptive verification by using the analytical test tool Hayes's PROCESS macro with model 6, namely using two mediating variables. This study has four variables with several dimensions and indicators as the basis for data collection. Technological changes will be explained by five indicators, namely cost, quality, customers, regulation, and resources, (Millar et al., 2018) whereas knowledge management is divided into three dimensions, namely knowledge acquisition, knowledge sharing, and knowledge utilization. (Bryan Bergeron, 2004). The organizational culture dimension has dimensions of academic excellence, collaboration and participation, academic freedom, diversity and inclusion, tradition, and history (Deal, T. E., & Peterson, K. D. 2016). Meanwhile, sustainable has dimensions of education quality, research and innovation, infrastructure and technology, partnerships and networks, sustainability, and social responsibility (Holsapple, C.W., & Lee-Post, A., 2018 ; Bari, A., & Khan, M., 2018 ; Khan, M.A., & Ishaq, M.I. ; 2020).

RESULTS

The characteristics of the respondents based on the data obtained stated that of the 6 universities with A accreditation in West Java, there were 204 respondents, consisting of 6 rectors and 18 vice-chancellors, 30 deans with 90 vice-deans, and 60 people from study programs. The majority of functional positions that universities have have the titles of Professor (40%), Associate Professor (53%), and Lector (7%). This indicates that universities that already have A accreditation, when viewed from a functional standpoint, have met the standards issued by the government.

Table 1 shows the results of data processing. The direct effect of technological change on the university's sustainable competitive advantage obtained a result of 0.2718, which indicates that there is a direct effect of technological change on the university's sustainable competitive advantage. Hypothesis 1, which states that there is an effect of technological change on the university's sustainable competitive advantage mediated by knowledge management, is supported by an estimated value of 0.2428, a SE of 0.1009, a BootLLCI of 0.0409, and a BootULCI of 0.4408, because the LLCI and ULCI values have zero in between. This confirms that knowledge management mediates the relationship between technological change and the university's continuing competitive advantage. Furthermore, Hypothesis 2, which states that there is an effect of technological change on the university's sustainable competitive advantage mediated by organizational culture, is supported by an estimated value of 0.1694, a SE of 0.0547, a BootLLCI of 0.0690, and a BootULCI of 0.2813. Because the LLCI and ULCI have no zero in between, this confirms that organizational culture mediates the relationship between technological change and the university's continuing competitive advantage. Hypothesis 3, which states that there is an influence of technological change on the university's sustainable competitive advantage, which is mediated by knowledge management and organizational culture, is serially supported by an estimated value of 0.0914, a SE of 0.0423, a BootLLCI of 0.0232, and a BootULCI of 0.1878. Since the LLCI and ULCI scores have no zeros in between, this confirms that knowledge management and organizational culture serially mediate the relationship between technological change and the university's continuing competitive advantage. For more details, see Figure 1 on the conceptual framework and results of hypotheses.

Table 1. Results for Hypotheses

Models	Mediator	Point Estimates	SE	BootLLCI	BootULCI
Tech → Sust	KM	0,2428	0,1009	0,0409	0,4408
	OC	0,1694	0,0547	0,0690	0,2813
	KM & OC.	0,0914	0,0423	0,0232	0,1878
	Total Indirect Effect	0,5036	0,0789	0,3458	0,6597
	Direct effect on Sust.	0,2718	0,0854		
	Total Effect on Sust.	0,7754	0,0482		
R ²		0,6461			

Notes: Tech, Technology; Sust, Sustainable; KM, Knowledge Management; OC, Organizational Culture.

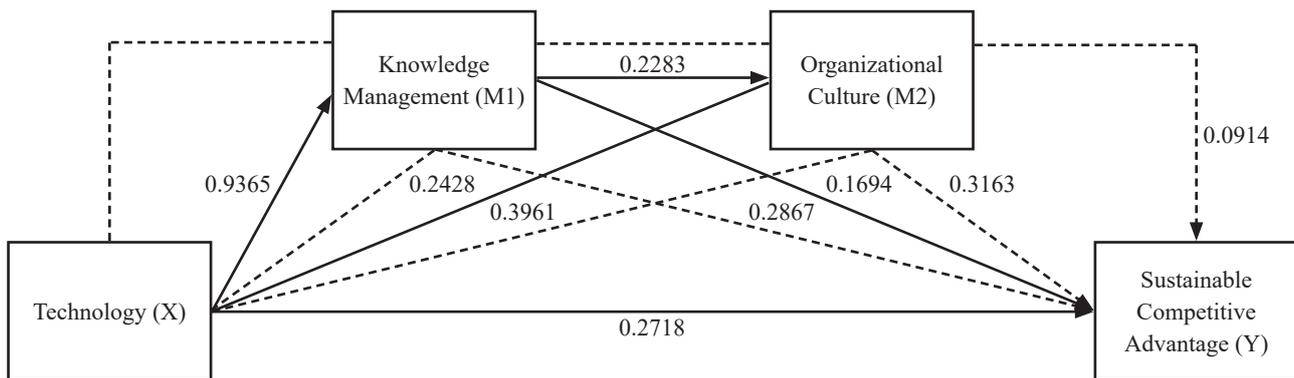


Figure 1. Conceptual Framework and Results of Hypotheses

DISCUSSIONS

Based on Hypothesis 1, which states that there is an influence of technological change on the university's sustainability Competitive advantage means that if the university wants the institution to have an advantage and enter into competition in educational services, it must respond quickly to technological changes that occur. Universities that respond quickly to technology will be able to compete and get or retain their institutions, so university performance will get better. The impact that will be felt by universities that can compete and win these technological changes will have an impact on the number of students enrolling at the university. This is in line with previous research, which stated that institutions that cannot adapt to technology will be abandoned by lecturers and students, resulting in decreased institutional performance (Oleśniewicz et al., 2020; Purwati & Wijaya, 2019; Wang et al., 2021).

Based on Hypothesis 2, which states that there is an effect of technological change on the university's sustainability competitive advantage that is mediated by knowledge management, which is stated to have a significant effect, this indicates that with the increasingly rapid technological change, universities must immediately adapt to policies issued by the government. One thing that can increase the university's sustainable competitive advantage with technological changes is the policy of the leadership in preparing existing resources, in this case lecturers, to be able to keep up with these technological changes by increasing literacy. Leaders must change the organizational design by establishing knowledge management to deal with technological changes. With the existence of knowledge management prepared by the university leadership, there will be healthy competition between lecturers, which will improve their performance based on the Tri Dharma of higher education. Thus, it can be said that knowledge management as a mediating variable is in accordance with the concepts discussed above because it can mediate technological change towards the sustainable competitive advantage of universities. These results are in accordance with research that states that knowledge management is currently needed to deal with technological changes so that universities can win the competition (Kordab et al., 2020; Mukhtar et al., 2020; Shropshire et al., 2020).

Based on Hypothesis 3, which states that there is an effect of technological change on the university's sustainable competitive advantage that is mediated by organizational culture, which is stated to have a significant effect, this indicates that with the increasingly rapid technological changes, universities must immediately adapt to policies issued by the government. Organizational culture has a very important role in creating a competitive advantage in higher education. Organizational culture refers to the values, norms, beliefs, and practices shared by members of the organization. A strong organizational culture can help build a unique college identity and image. A rich and consistent culture can help a college stand out and be an attractive option for students, faculty, and potential partners. A strong identity and image can increase competitive advantage by attracting quality students, the best faculty and researchers, and the attention of external institutions and organizations, which can increase collaboration and support. An organizational culture that supports innovation and creativity will encourage tertiary institutions to continue to adapt to environmental changes and advance knowledge and practice in their fields. Colleges with cultures that encourage collaboration, experimentation, and risk-taking are more likely to generate innovative research and development, create new, relevant programs, and build strategic partnerships with industry and society. An organizational culture that is oriented towards the quality of education will become a strong foundation for achieving a competitive advantage. If a tertiary institution has a culture that emphasizes student academic and professional development, an interactive and collaborative learning process, and support for academic achievement, it will enhance the reputation of the institution and its attractiveness to prospective students and other stakeholders (Cameron, K. S., & Quinn, R. E., 2011; O'Reilly, C. A., Chatman, J., & Caldwell, D. F., 1991; Damanpour, F. 1991).

Based on Hypothesis 4, it states that there is an influence of technological change on the university's sustainable competitive advantage, which is mediated by knowledge management and organizational culture, which are stated to have a significant effect. In this regard, knowledge management and organizational culture play an important role in linking technological change with the university's sustainable competitive advantage. Technological changes affect the way universities manage, store, and share knowledge. Knowledge management is key to maximizing the potential of this technology. With an effective knowledge management system in place, universities can collect, store, and manage the knowledge generated by faculty, students, and staff. This enables universities to increase efficiency, optimize decision-making, and encourage collaboration in a digital environment. Good knowledge management also facilitates the transfer of knowledge between generations of faculty and students, accelerates innovation processes, and improves the quality of education and research. Technological changes also affect the organizational culture of universities. An organizational culture that is adaptive and open to technological changes will accelerate the integration and adoption of new technologies. A culture that encourages innovation, collaboration, and continuous learning will facilitate more effective use of technology. In addition, a culture that supports diversity, inclusivity, and collaboration will strengthen collaboration between faculty, students, and staff in the use of technology to achieve university goals. An organizational culture that values change and technological adaptation will strengthen the university's sustainable competitive advantage in the digital era. Technological changes can also affect university sustainability and competitiveness. With effective knowledge management and a supportive organizational culture, universities can integrate technology with existing strategies and operations to improve the quality of education, research, and services. Universities that are able to adopt and utilize technology appropriately will have a competitive advantage in attracting quality students, offering educational programs that are relevant to industry demands, and strengthening networks of cooperation with external partners. This can enhance the university's reputation, attractiveness, and long-term sustainability.

CONCLUSIONS

The conclusion of this study describes the university's sustainable competitive advantage in facing technological change mediated by knowledge management and organizational culture. The method used is descriptive verification with model 6 analysis tools from Hayes's theory. The unit of analysis is six private universities that have accreditation A, with 204 respondents consisting of top management, middle management, and low management. The results obtained from this research show that technological changes affect the university's sustainable competitive advantage, which is mediated by knowledge management and organizational culture. Technological change mediated by knowledge management has a greater influence and contribution to the university's sustainable competitive advantage than organizational culture. The impact of this research is that it has filled the gaps in previous research, both in terms of the variables and analytical tools used, which have been adapted to the concepts, theories, and research that are used as references. The limitation of this study is that the unit of analysis used is only universities with A accreditation and locations only in West Java, so for further research, it is possible to add additional units of analysis by adding research locations. The model used is the Hayes model, so future researchers can use the Hayes model with different types of models, for example, by moderating or adding other variables related to university sustainability.

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