



The Moderating Role of Digital Transformation Strategy on the Relationship between Intellectual Capital and Competitive Advantage in Private Universities in South Sumatra, Indonesia

Irayani ^{a*}, Kamaludin ^a, Fachruzzaman ^a
and Muhammad Rusdi ^a

^a University of Bengkulu, Indonesia.

Authors' contributions

This work was carried out in collaboration among all authors. All authors designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Author Irayani managed the analyses of the study and the literature searched. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJEBA/2023/v23i191071

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/104619>

Original Research Article

Received: 03/06/2023
Accepted: 08/08/2023
Published: 12/08/2023

ABSTRACT

Aims: The increment of Indonesian higher education institutions has intensified competition. After the global pandemic created pressure to accelerate digital transformation, changes in the global economy have also triggered some institutions to prioritize the high quality of service for their clients. The aims of this to investigate the moderating effect of a digital transformation strategy on the

*Corresponding author: E-mail: Irayani0707@gmail.com, ir4yani.makmun@gmail.com;

relationship between intellectual capital and competitive advantage in private universities in South Sumatra. Indeed, intellectual capital is generally an essential aspect and one of the most conducive to innovative and unrestrained competition.

Study Design: Explanatory Study.

Place and Duration of Study: Sample: 300 respondents from ten private universities took part in the survey in April 2022 to June 2022.

Methodology: The respondents from ten selecting private universities implementing the digital transformation strategy. Using the quantitative and Partial Least Square (PLS) to analyze the data and test the hypotheses.

Results: Digital Transformation Strategy (DTS) significantly impacts the competitive advantage of private universities in South Sumatra. The results mean that the higher the digital transformation strategy, the higher the competitive advantage. Digital transformation strategy as the moderator to significantly increase the effect of intellectual capital on competitive advantage.

Conclusion: The variable of intellectual capital significantly affects the competitive advantage of private universities in South Sumatra. This result means that the higher the intellectual capital with the dimensions of human capital, organizational capital and relationship capital (collaboration), the higher the competitive advantage. Furthermore, Digital transformation strategies have a quasi-moderating role (Quasi Moderator). It means the higher the digital transformation strategy, the higher the competitive advantage. The digital transformation strategy is to significantly increase the effect of intellectual capital on competitive advantage.

Keywords: Competitive advantage; digital transformation strategy; higher education institution; intellectual capital; resource-based view.

1. INTRODUCTION

To gain a competitive advantage, an organization can analyze internal and external factors that help the organization. Internal factors that source the company's competitive advantage are important for success. The concept of competitive advantage through appropriate management actions when managing an organization's structure, processes, culture, and people. Organizations can identify and improve their competitive advantage by analyzing resources, capabilities, and core competencies to develop a strategy that leverages strengths to create value for customers and gain a competitive advantage over competitors [1]. Jackson et al. [2] explained that one area with great potential for digital transformation is the education system sector, especially the education system at universities. The university education system requires developing a digital transformation strategy, namely using digital technology in higher education and changing *value creation*. Digital-based university platforms can play an important role in using digital systems in education and modernizing traditional education services [3].

Todericiu et al. [4] said that universities can contribute to higher education's intellectual capital (human capital of human resources, organizational capital and relationship capital) by

providing access to science, research, and innovation. The University becomes a research and development center and produces graduates with specific skills and knowledge that can be valuable to companies. In addition, universities can collaborate with companies on research projects or provide consulting services to help companies solve problems or develop new products, and this allows universities to have the ability to increase their competitive advantage. Shan et al. [5] explained that from the three dimensions of intellectual capital, namely human resource capital, structural capital and relationship capital, it is known that relationship capital is the most influential important point in achieving competitive advantage for organizations for an organization because strong relationships with customers can help organizations to help organizations to maintain and survive in the market. Dyer and Singh [6] highlighted that relationship capital has a high potential to create a distinct advantage for universities by collaborating with other universities through routine knowledge sharing and inter-university connectivity.

Yaseen et al. [7] said that structural capital and relation capital positively affect competitive advantage. Relation capital and structural capital influence competitiveness in the industrial market of Telecommunication companies. Capital relations have a greater influence on competitive

advantage compared to structural capital. Although surprising, the fact shows that human capital does not significantly influence competitive advantage. However, human capital indirectly affects competitive advantage through its influence on relationship capital. The study found that relationship capital and structural capital have a significant influence on competitive advantage, and this finding is consistent with previous research [8] finding that relationship capital is the largest factor among intellectual capital components in Taiwanese design firms. Andreeva et al. [9] said that the management of intellectual capital in companies would help achieve a competitive advantage and obtain information related to the size of the company's capacity following the knowledge they have. In the context of higher education, intellectual capital is often described as having three dimensions: human capital, structural capital, and relational capital [10]. Human capital refers to the intangible value found in the skills, expertise, skills, and experience of faculty, researchers, administrative staff, and students. Structural capital refers to the following resources contained in the organization such as research projects and databases, research and education processes, research infrastructure, culture and reputation of the University.

Relationship capital refers to intangible resources that have the potential to create value related to the University's internal and external relations [11]. Furthermore, [12] said that human capital positively and significantly affects competitive advantage. The results showed that all three elements of intellectual capital (human capital, structural capital and relationship capital) significantly affect the competitive advantage of the microfinance industry in Uganda.

Intellectual capital, which includes human capital, structural capital and relation capital, is an invisible asset (tangible) for universities [13]. The essence of the concept of intellectual capital is how existing resources, organizational structures and relationships owned by the University can create a user-friendly college education platform. The platform is designed to centralize all services from the University and integrate all users into one social network, so it is important to have a convenient inter-user and mobile application. Innovation emphasizes digital innovation teaching is not just technical innovation but academic, curriculum, organizational and structural innovation [14]. Based on the results of research that is not yet conclusive, there is an

empirical gap from the results of existing research that competitive advantage can be influenced by intellectual capital (human resource capital, structural capital and relationship capital) depending on the type of organization and the state of the existing organization. In addition, there is a gap phenomenon related to competitive advantage. The factors that affect competitive advantage will change based on the demands of organizational users such as students, the community and the government, especially the Ministry of Education which makes regulations related to higher education at universities. Digital transformation in the global higher education industry determines the future roadmap toward sustainable education management strategies. Digital transformation can be used to build a competitive advantage for universities. Building competitive advantage is a relative, evolving, and important concept in strategy formulation. Over the past few years, particularly in the education industry, the idea of building competitive excellence has been challenged by global phenomena such as globalization of digital transformation, information exchange, digitalization and social media in most global industries [15].

This study uses *the resource-based view* theory to explain the effect of intellectual capital on competitive advantage. According to Radjenovic and Krstic [13], RBV theory which is a resource-based view, is a managerial framework used to determine what strategic resources a company can utilize to achieve competitive advantage. RBV theory, explained by Barney [16] says that the resources owned by the organization must create added value and provide a competitive advantage. RBV theory contributes to understanding the factors shaping an organization's competitive advantage. In addition to intellectual capital, the novelty of this research is to use digital transformation strategy factors, which are considered an important factor in the industrial revolution 4.0 and also use university samples as organizations that are considered important to improve their competitive ability in the era of digitalization. The changing business environment and response are so rapid that digital transformation strategies are suggested as alternatives to corporate-level business-level digital-based strategies, competitive strategies for digital innovation, open innovation platform strategies, and suggested customer value-oriented strategies. Furthermore, this is necessary to present a strategy to survive the new normal era and build a competitive

advantage. Contribution to further systematize digital-based strategies and support universities must face difficult situations with policies to implement more strategic responses systematically.

Digital transformation strategy (STD) consists of the use of technology and change in value creation as *moderation variables which are novelty, namely whether they can strengthen or weaken the influence of intellectual capital variables (human capital, structural capital and relational capital)* to the variable competitive advantage (Y). This research uses digital transformation strategies as moderation variables, which can strengthen the influence of intellectual capital consisting of human resources, structural, and relational capital on competitive advantage. Previous research has yet to explain digital transformation strategy as a variable that can moderate intellectual capital to an organization's competitive advantage. Gurbaxani et al. [17] revealed the change (transformation) of learning methods from traditional to online learning into a trend. A Digital Transformation Strategy (DTS) outlines how businesses will capitalize on emerging technologies. It can include changes to business models, innovations in products and services, and the development of new value chains to meet changing customer needs. Digital transformation's benefits encourage companies worldwide to adopt digital transformation strategies. South Sumatra Province is one of the main regions representing cities and regencies and has several universities, especially Private Universities. Therefore, these educational institutions must be able to adapt to changing times. One way to achieve this is by creating strategies that can provide a competitive advantage for universities, such as digital transformation management practices that leverage the latest technology to manage digital transformation strategies.

Angelopoulos et al. [18] Formulating an effective, realistic, and measurable digital transformation strategy as a central philosophy that integrates all university functions is necessary. The utilization and integration of digital technologies enable universities to transcend conventional virtual boundaries and enhance study program portfolios and research collaborations between universities [19]. Because people certainly consider various factors to continue their education at University, especially if they choose private universities. Therefore, PTS needs to

strive to have a competitive advantage that exceeds competitors by building relevant strategies in the era of digitalization through digital transformation. Schauerte et al. [20] said digital transformation at the University level is categorized as diversity and flexibility of learning technology. It is observed that universities have the fewest digital transformation strategies related to research and services, social missions and pedagogical methodological innovation. This research emphasizes that innovation in digital teaching is not just technical innovation but academic, curriculum, organizational and structural innovation. In this case, using digital educational resources enables new roles for lecturers and students, creating flexible and motivating ways of learning and becoming more independent and collaborative [21]. From previous studies, Li et al. [22] said competitive advantage is carried out by conducting research *excellence* which can be a source of competitive advantage, which helps universities or colleges to improve their reputation, and image to attract funds and students, as well as talented lecturers. Research excellence contributes to the reputation of the University.

This research focuses on private higher education institutions in the South Sumatra Province. These institutions are expected to contribute to advancing the higher education system in Indonesia, which aims to produce knowledge and technology and produce quality, creative and innovative human resources as markers of competitiveness. This study also examines how intellectual capital (human capital, structural capital and relationship capital) influences competitive advantage, and digital transformation strategy (STD) becomes a moderation variable that will strengthen or weaken the relationship between intellectual capital and competitive advantage. One of the universities' biggest challenges today is finding the right way to shape competitive advantage.

2. MATERIALS AND METHODS

2.1 Intellectual Capital to Competitive Advantage

Intellectual capital is one of the most influential factors in achieving a competitive advantage in private universities in South Sumatra. It is because intellectual capital includes the abilities, knowledge, and skills individuals or groups possess in an organization. In the context of

private universities in South Sumatra, intellectual capital can consist of lecturers, students, administrative staff, and others. By having quality intellectual capital, private universities can improve the quality of education offered and provide a better learning experience for students.

In addition, intellectual capital can also influence innovation and the development of products or services offered by private universities in South Sumatra. By having strong intellectual capital, private universities can produce products or services that are superior and in accordance with market needs. It can be a significant competitive advantage for private universities in South Sumatra.

Human capital is a value related to human resources that is knowledge of ideas, innovation, commitment, experience and abilities; human capital is a combination or collaboration of abilities, knowledge and skills a person has in carrying out his duties and responsibilities, creating value to achieve goals. Cricelli et al. [15] showed that human capital positively and significantly affects competitive advantage. Goldin et al. [23] shows that human capital positively and significantly affects competitive advantage in retail companies.

Research Kato et al. [24] said some previous studies had shown significant and direct effects of human capital on the competitive advantage at the level of founders of educational foundations. Therefore, to better understand the effects of human capital, one should pay more attention to its indirect effects on innovation outcomes. Chahal and Bakshi [25] argue that human capital has a greater impact on intellectual capital, suggesting that variations in employee skills determine the outcome of competitive advantage. Chen et al. [26] say that human capital, relational capital and structural capital, the three components of intellectual capital, positively affect competitive advantage. Among the three components, he further found that relation capital has a higher predictive power in influencing competitive advantage than the other two components, namely relationship capital and structure capital. The study found that relationship capital is the most abundant among these three types of intellectual capital and more than human capital and structural capital in Taiwan's information and electronics industry. Aun argues that human capital is more significant in influencing intellectual capital and states that

variations in employee aptitude determine the outcome of competitive advantage.

Sardo et al. [27] said that the human capital factor significantly impacts the competitive advantage in Uganda's microfinance industry. Therefore, human capital makes up 45% of fluctuations in the level of microfinance performance. In this case, human and related capital are important predictors or determinants of competitive advantage in the microfinance industry. Human capital is measured using an intangible asset monitor developed by Sveiby [28], which was later modified by Petty and Guthrie [29], and the main focus is on knowledge, education, vocational qualifications, work-related knowledge, work-related competencies, entrepreneurial spirit, innovation, proactive and reactive abilities, and the ability to change.

Lovi et al. [30] say that in the human resources construct, personnel has sufficient experience to carry out their duties satisfactorily, and staff aligns their interests with company goals. to carry out their tasks satisfactorily, staff align their interests with company goals. Employee attachment to the company is a key driver for the enrichment of knowledge and innovative ideas within the company. The results showed that the staff were skilled and competent in their work domain. The results of data analysis conducted on research by minimarket retail companies stated that human capital had a positive effect on the strategy based on the estimation results on the regression coefficient with a path coefficient of 0.808. Human capital is the expertise, knowledge, talents and experience individuals possess. Human capital or human capital at the company level can have a positive impact because human capital is a driver of economy, competition and prosperity. The human ability to apply knowledge and expertise can improve behavioral abilities, self-development and is an important element in strategy implementation [31]. Many studies state that human capital is a critical factor and the engine of economic growth signifies the level of efficiency and productivity of labor; Human capital contributes to increasing competitive advantage during the diffusion of innovation and technology. Higher growth of technological change in a sector can lead to significant demand for an educated and trained workforce [32] The most important benefit for target customers of private universities (PTS) is the basis for branding strategies, such as product differentiation in the form of services. In addition,

the benefits received by students are part of the value system [4]. From previous research, it is empirically suspected that human capital positively affects competitive advantage.

Structural (organizational) capital is a company's ability to complete the process of daily activities supporting workers in an effort to improve business performance and competitive advantage. Goldin et al. [23] say that structural capital positively and significantly affects competitive advantage in pharmaceutical companies. The results of Tovstiga and Tulugrova [34] obtained the same results: structural capital has a positive and significant impact on competitive advantage in cooperative businesses. King et al. [35] state that organizational knowledge is a source of sustainable competitive advantage. It suggests that an increase in structural capital increases the value of competitive advantage. Sar [36] said that structural capital significantly positively affects competitive advantage. An increase in structural capital will increase competitive advantage. It is due to the importance of structural capital for the continuity of the organization. This convenience and convenience increases employee productivity and gives colleagues a competitive advantage in the Indian Oil and gas industry. Taie [37] found that structural capital has a significant positive impact on competitive advantage.

This study further enhances understanding of the role of intellectual capital in enhancing innovation in the context of developing economies. Wu say that all three structural capitals facilitate organizational innovation. It posits that innovation results from knowledge that enables organizations to develop competitively advantageous capabilities. Moreover, they further add that in the current strategic environment, only a learning organization that intends to increase its intellectual capital continuously can maintain a competitive advantage. Alternatively, it is also said that the development of intellectual capital accelerates innovation, increasing the learning ability of people in an organization. Structural capital considers all component aspects of an organization. Goldin et al. [23] and Relevan et al. [38] provide empirical evidence that structural capital positively influences competitive advantage. Relationship capital relates to all capabilities of a company's external relations with customers, suppliers, investors, and other stakeholders.

Osland [39] explain that relation capital has a significant positive effect on competitive advantage. Capital-related improvements will increase the competitive advantage of universities. Relationship capital is knowledge incorporated into the relationships of customers, vendors, trade associations, or other stakeholders and positively influences the organization's continuity. Good relationships between lecturers and students, colleagues, and the community will improve the general image of the University. From previous research, it is empirically suspected that relationship capital affects innovation (competitive advantage). Cuganesan [40] says that the idea of developed countries shifting to technological services in innovative learning systems is sufficient. In the "new economy," information and knowledge are seen as key drivers of value creation and competitive advantage generated by organizations' increasingly critical invisible assets. Thus, from the opinions of the experts above can be derived the following hypotheses:

H1: Intellectual Capital Affects Competitive Advantage Strategi Transformasi Digital (STD) memoderasi pengaruh Modal Intellectual to Competitive Advantage.

Digital transformation strategy has dimensions of technology use and value creation change. In the era of digitalization, people must undergo digital transformation. This digital transformation is the beginning of creating new, more effective and efficient ways to replace the old process of doing things. This activity is carried out by utilizing existing technology. Garido [41] said that the use of Social Media is very important in today's digital landscape and is recognized as a major component of digital transformation strategies; Digital platforms tend to engage in strategic actions and implement rules and regulations, from pure value creation in the ecosystem, and towards actions that lead to the advantages of more modern platforms and their impact positively affect the competitive advantage.

The process of change in *value creation* and digitizing all services requires mutual support, digitalization of higher education is important in such as student admissions, registration, system examinations, quality assurance systems, lecture plans/hours, syllabi/modules and the workforce of the university academic community. On the other hand, digital transformation in education is considered a prerequisite for progress by everyone, and changes in student learning

methods and the use of technology are highly calculated that can be used as a competitive advantage in higher education. Social media tools are defined as "a group of Internet-based applications built on ideology" and the technological underpinnings of Web 2.0 technologies, and enabling the creation and exchange of user-generated content" [42]. Most research on human capital focuses on the strategic importance of an organization, its relationship to innovation positively affects competitive advantage, its impact on human capital, the level of innovation, and using the performance of the college.

Knowledge within human beings, i.e., human capital, seems to be a fundamental component of intellectual capital [43] It is difficult to adapt to such rapid changes. Transitioning education to technology-based occurs so quickly that many people feel shocked because they are not used to technology. Benevene [44] also showed that intellectual capital is human capital that significantly influences competitive advantage. Research [45] results show a significant influence of relative importance or weight of individual intellectual capital elements that affect competitive advantage [43].

Chatterji et al. [42] most research on human capital focuses on the strategic importance of an organization, its relationship to human capital positively affects competitive advantage, its impact on human capital, and the level of innovation. It uses firm performance, neglected studies of human capital, academic performance, and knowledge economy. From previous research, it is empirically suspected that digital transformation strategies (STDs) moderate the influence of intellectual capital on competitive advantage. *Resource-based view* theory to explain the effect of intellectual capital on competitive advantage. According [13], RBV theory, which is a resource-based view, is a managerial framework used to determine what strategic resources universities can utilize to achieve competitive advantage. RBV theory, explained by Barney [16], says that the resources owned by the organization must create added value and provide a competitive advantage. RBV theory makes an important contribution to understanding the factors that can shape a college's competitive advantage.

Rhoda [46] said that in determining whether human capital affects competitive advantage in universities. The results showed that human

capital is an important component that affects competitive advantage. The results showed that human capital explains the competitive advantage. Human capital is a major and very important component of intellectual capital because it is a very important source of innovation. The research findings maintain that human capital influences competitive advantage whereby digital transformation strategies (STDs) as moderation, i.e., These variables strengthen or weaken where intellectual capital through a type of intelligence, level of intelligence and creative ability, experience and expertise, innovation and creation, most of all competencies and human capital capabilities that cannot be replicated against competitive advantage in higher education. The analysis of the relationship between human capital and competitive advantage shows a strong relationship between human capital and competitive advantage. DTSs in value creation dimensions and the use of technology strengthen or weaken (moderate) intellectual capital against competitive advantage. Thus, from the opinions of the experts above can be derived the following hypotheses:

H2: Digital transformation strategy (STD) moderates the influence of Intellectual Capital on competitive advantage

2. METHODS

2.1 Operational Definitions and Research Indicators

The operational definitions of variables and indicators used in this study are described in the following Table 1.

2.2 Population and Sample

The population of this study consisted of private universities in South Sumatra. The sample of this study is a private university in South Sumatra that implements a digital transformation strategy. The research sample was taken using a *non-probability sampling* method with *purposive sampling techniques* in the form of *self-reports* using questionnaires and Likert scale measurements [51]. The respondents of this study were university leaders or managers at the faculty level, namely vice-rectors, deans, deputy deans, heads of study programs, secretaries, secretaries and several lecturer representatives. The questionnaires distributed to private

Table 1. Research Variables, Dimensions and Indicators

No	Variable	Dimension	Indicators	Source	Scale
1	Intellectual Capital	Human capital	-Knowledge -Skill -Experience -Innovation -Competence -Adaptation -Motivation -Education	[33][43]	likert
		Structural capital	-Research and development, -Technology and systems, -Culture -Organization -Updates.	[43] [47][33]	
		Relational capital	-Students and College Partners -Reputation -Belief -Loyalty	[33]	
2.	Digital Transformation Strategy	Use of technology	- Online-based information system - Web usage -Academic information system -Student-lecturer interaction in digital platforms Student trust in an educational institution can be understood as their trust in its integrity and reliability -Based on students' Personal experiences with faculty members -Image as the sum of beliefs -Ideas and impressions that a person has of an object -The image of the company is described as the overall impression made in the public's mind about the company	[48]	Likert

No	Variable	Dimension	Indicators	Source	Scale
		-Value creation Changes	-Adaptation of the definition of satisfaction that suggests that it is a short-term attitude resulting from the evaluation of their experience with the educational services received.	[49]	
3.	Competitive advantage	Innovation	-Educational services offered (courses and support services) -The ability of universities to innovate -Facilities and infrastructure -technology -location of higher education institutions	[16]	Likert
		Differentiation	The ability of human resources (lecturers and educators, recognition of special competencies at the University -Target graduates -organizational culture, -private university reputation	[50]	

universities in South Sumatra consisted of 4 cities and nine districts, which were included in the research sample collected. As many as 278 questionnaires had been filled out and added 22 additional questionnaires so that the processed were as many as 300. From ten PTS in South Sumatra to complete 300 respondents, 22 respondents were added to the existing sample (278 respondents); using the proportion of the population from each private university to determine the number of respondents added two respondents in 8 PTS, and three respondents in 2, namely UTP and UMP to each of the 10 PTS.

Analysis Structural Equation Model-Partial Least Square (SEM)

To examine the effect of intellectual capital on competitive advantage directly, the following equation was used:

1. *Multiple Regression Analysis (MRA)*, *Moderated Regression Analysis (MRA)* or

interaction test is a special application of multiple linear regression, where the regression equation contains an element of interaction (multiplication of two or more independent variables) with the following equation formula:

$$1. CA = \alpha + \beta_1IC + \varepsilon \dots \quad (1)$$

$$2. CA = \alpha + \beta_1IC + \beta_2DTS + \varepsilon \dots \quad (2)$$

3. RESULTS AND DISCUSSION

3.1 Outer Model Testing

3.1.1 Test validity

A. Convergent Validity

Convergent Validity Aims To Determine The Validity Of Each Relationship Between Indicators And Their Latent Constructs Or Variables. In This Study, A Loading Factor Limit Of 0.60 Will Be Used.

Table 2. Construct parameter convergent validity testing (First Order)

Variable	Competitive adv	Intellectual capital	Digital transformation strategy
Competitive advantages (ca)	INV	Human Social Relation	UT CVC
CA1	0.785		
CA2	0.745		
CA3	0.846		
CA4	0.894		
CA6	0.890		
CA7	0.779		
CA8	0.812		
Intellectual capital (IC)			
IC1		0.692	
IC2		0.761	
IC3		0.762	
IC4		0.754	
IC5		0.777	
IC6		0.774	
IC7		0.791	
IC8		0.796	
IC9			0.782
IC10			0.744
IC11			0.772
IC12			0.748
IC13			0.750
IC14			0.749
IC15			0.682
IC16			0.757
IC17			0.771
IC18			0.786
IC19			0.787

Variable	Competitive adv	Intellectual capital	Digital transformation strategy	
Digital Transformation Strategy (DTS)	DTS1		0.960	
	DTS2		0.969	
	DTS3		0.849	
	DTS4		0.979	
	DTS5		0.947	
	DTS6			0.732
	DTS7			0.732
	DTS8			0.727
	DTS9			0.808
	DTS10			0.821
	DTS11			0.786
	DTS12			0.774

Source: Research Results From 2022, Processed

B. Validity of Discriminants

Table 3. Discriminant validity test results with cross-loading values

	CVC	HC	IC	INOV	RC	SC	STD	IC*STD D	The Use of Technology
IC *	-0.603	-0.192	-0.455	-0.572	-0.286	-0.465	-0.731	1.000	-0.717
STD									
X1	0.182	0.692	0.325	0.060	0.229	0.272	0.175	-0.040	0.130
X10	0.535	0.378	0.736	0.486	0.425	0.744	0.521	-0.334	0.396
X10	0.535	0.378	0.736	0.486	0.425	0.744	0.521	-0.334	0.396
X11	0.567	0.367	0.764	0.525	0.374	0.772	0.574	-0.478	0.461
X11	0.567	0.367	0.764	0.525	0.374	0.772	0.574	-0.478	0.461
X12	0.643	0.370	0.744	0.566	0.438	0.748	0.590	-0.358	0.407
X12	0.643	0.370	0.744	0.566	0.438	0.748	0.590	-0.358	0.407
X13	0.456	0.378	0.731	0.413	0.307	0.750	0.435	-0.251	0.319
X13	0.456	0.378	0.731	0.413	0.307	0.750	0.435	-0.251	0.319
X14	0.585	0.444	0.751	0.426	0.442	0.749	0.566	-0.310	0.428
X14	0.585	0.444	0.751	0.426	0.442	0.749	0.566	-0.310	0.428
X15	0.357	0.238	0.284	0.256	0.682	0.280	0.317	-0.166	0.208
X16	0.393	0.330	0.360	0.288	0.757	0.351	0.299	-0.081	0.134
X17	0.541	0.249	0.469	0.532	0.771	0.458	0.481	-0.378	0.314
X18	0.459	0.326	0.416	0.285	0.786	0.417	0.357	-0.169	0.170
X19	0.449	0.282	0.438	0.386	0.787	0.442	0.365	-0.239	0.197
X2	0.269	0.761	0.488	0.171	0.201	0.440	0.262	-0.070	0.199
X3	0.300	0.754	0.428	0.179	0.324	0.380	0.255	-0.128	0.152
X4	0.319	0.773	0.379	0.125	0.328	0.325	0.296	-0.179	0.209
X5	0.289	0.777	0.465	0.259	0.276	0.417	0.270	-0.206	0.192
X6	0.336	0.774	0.493	0.233	0.281	0.434	0.308	-0.225	0.213
X7	0.324	0.791	0.466	0.185	0.370	0.407	0.281	-0.128	0.175
X8	0.371	0.796	0.577	0.213	0.290	0.457	0.342	-0.170	0.238
X8	0.371	0.796	0.577	0.213	0.290	0.457	0.342	-0.170	0.238
X9	0.521	0.431	0.775	0.464	0.402	0.782	0.545	-0.376	0.457
X9	0.521	0.431	0.775	0.464	0.402	0.782	0.545	-0.376	0.457
Y1	0.495	0.177	0.423	0.785	0.351	0.437	0.511	-0.388	0.420
Y2	0.404	0.119	0.406	0.745	0.321	0.422	0.402	-0.323	0.314
Y3	0.499	0.210	0.508	0.846	0.376	0.525	0.519	-0.498	0.431
Y4	0.621	0.260	0.626	0.894	0.426	0.635	0.636	-0.543	0.518
Y6	0.679	0.273	0.625	0.890	0.484	0.638	0.654	-0.530	0.489
Y7	0.420	0.077	0.362	0.779	0.292	0.378	0.396	-0.374	0.286

	CVC	HC	IC	INOV	RC	SC	STD	IC*STD	The Use of Technology
Y8	0.617	0.203	0.516	0.812	0.435	0.530	0.614	-0.564	0.482
Z1	0.602	0.177	0.488	0.495	0.212	0.500	0.859	-0.696	0.960
Z1	0.602	0.177	0.488	0.495	0.212	0.500	0.859	-0.696	0.960
Z10	0.821	0.370	0.603	0.512	0.454	0.598	0.737	-0.468	0.491
Z10	0.821	0.370	0.603	0.512	0.454	0.598	0.737	-0.468	0.491
Z11	0.786	0.202	0.512	0.515	0.394	0.526	0.710	-0.472	0.481
Z11	0.786	0.202	0.512	0.515	0.394	0.526	0.710	-0.472	0.481
Z12	0.774	0.245	0.572	0.544	0.444	0.571	0.670	-0.461	0.412
Z12	0.774	0.245	0.572	0.544	0.444	0.571	0.670	-0.461	0.412
Z2	0.574	0.205	0.491	0.477	0.274	0.501	0.848	-0.687	0.969
Z2	0.574	0.205	0.491	0.477	0.274	0.501	0.848	-0.687	0.969
Z3	0.632	0.312	0.539	0.537	0.281	0.537	0.820	-0.646	0.849
Z3	0.632	0.312	0.539	0.537	0.281	0.537	0.820	-0.646	0.849
Z4	0.567	0.225	0.504	0.482	0.272	0.510	0.849	-0.696	0.979
Z4	0.567	0.225	0.504	0.482	0.272	0.510	0.849	-0.696	0.979
Z5	0.533	0.264	0.512	0.475	0.254	0.514	0.813	-0.649	0.947
Z5	0.533	0.264	0.512	0.475	0.254	0.514	0.813	-0.649	0.947
Z6	0.862	0.414	0.654	0.604	0.520	0.647	0.833	-0.574	0.626
Z6	0.862	0.414	0.654	0.604	0.520	0.647	0.833	-0.574	0.626
Z7	0.732	0.445	0.595	0.394	0.399	0.582	0.654	-0.385	0.431
Z7	0.732	0.445	0.595	0.394	0.399	0.582	0.654	-0.385	0.431
Z8	0.727	0.238	0.490	0.449	0.535	0.489	0.626	-0.333	0.385
Z8	0.727	0.238	0.490	0.449	0.535	0.489	0.626	-0.333	0.385
Z9	0.808	0.265	0.586	0.623	0.509	0.591	0.760	-0.593	0.546
Z9	0.808	0.265	0.586	0.623	0.509	0.591	0.760	-0.593	0.546

Source: 2022 Research Results, Processed

C. Reliability Test

Reliability Measurement (Reliability Test) Is A Parameter That Measures The Consistency Of Results If Repeated Measurements Are Made On A Criterion [52]. A Questionnaire Can Be

Considered Reliable Or Reliable If A Person's Answers To Statements Remain Consistent Over Time [51]. In This Study, Construct Reliability Will Be Measured Using Cronbach Alpha. Sekaran [53] States That Cronbach's Alpha Value > 0.60 Can Explain Reliability.

Table 4. Average Variance Extracted (AVE)

	Ave Value
Human Capital (Hc)	0.586
Structural Capital (Sc)	0.574
Relational Capital (Rc)	0.574
Inovation (Inv)	0.678
Penggunaan Teknologi (Uot)	0.888
Perubahan Cipta Nilai (Cvc)	0.622

Source : Hasil Penelitian 2022, Diolah

Table 5. Reliability test results

	Cronbach's Alpha	Composite Reliability
CVC	0.898	0.920
HC	0.900	0.919
IC	0.850	0.887
INOV	0.920	0.936
RC	0.816	0.871
SC	0.851	0.890

Source: 2020 Research Results, Processed

3.2 Inner Model Testing

Inner Model Testing In Structural Models Is Used To Determine The Feasibility Of Structural Models And Hypothesis Testing. The Presentation Of Test Results Is Explained Below:

3.3 Feasibility Testing of Structural Models

Generally, Structural Models Are Often Evaluated Using R², While T-Tests Are Used To Test Hypotheses. R², Or The Coefficient Of Determination, Is Used To Evaluate The Ability Of Exogenous Variables To Explain Endogenous Variables In Structural Models. In This Context, The Value Of Multiple Determinations Shows How Much Influence Intellectual Capital (Such As Human Capital, Structural Capital, And Relationship Capital) Has On Competitive Advantage Variables. Based On The Results Of Data Analysis, It Was Revealed That The R-Square Value Of The Endogenous Variable, From The Results Of Data Analysis, It Is Known That The R-Square Value Of *The* Dependent Construct (Endogenous) Are Summarized In Table 6.

3.4 Hypothesis Testing Results

The Next Stage Of Analysis In Pls Is To Perform A Hypothesis Test. In This Study, The Test Was Carried Out With Two Types Of Tests, Namely The Main Effect Test, Which Tests The Direct Relationship Between The Independent And Dependent Variables. The Second Test Was Conducted By Looking At The Effect Of Moderation Variables In Structural Models. The Test Results Are Presented in Table 7.

3.3 Discussion

3.3.1 The effect of intellectual capital on competitive advantage

The Intellectual Capital Of Lecturers And Administrative Staff Consists Of Employees' Knowledge, Experience, And Skills. An Organization's Intellectual Capital Comprises Databases, Cultures, Philosophies, And Systems. Intellectual Capital Generally Involves Knowledge Assets That Can Generate Profits [54] And Increase Competitiveness. In Addition, Intellectual Capital Also Consists Of

Technological Capabilities, Skills, And Professional Knowledge [55]. In Addition, Intellectual Capital Adds Value To The Company And Plays A Role In Achieving A Competitive Advantage. Furthermore, Intellectual Capital Is The Most Effective Competitive Weapon That Impacts Organizational Innovation Performance. The Latter Involves Human Capital (E.G., Skills, Experience, Competencies, And Knowledge), Structural Capital (E.G., Organizational Processes, Business Processes, Software, and Databases), & Relational Capital (E.G., Customers, Suppliers, Creditors, Investors, And Other Stakeholders) And Adds Value To The Organization, As Well As Improving Organizational Performance [56].

Intellectual Capital Consists Of Human Capital, Structure Capital (Organization) And Relation Capital; Based On The Results Of Research Is Known That Human Capital Has A Negative And Insignificant Effect On Innovation (Competitive Advantage). This Result Means That The Lower The Use Of Human Capital In Activities At Private Universities In South Sumatra, The Lower The Innovation (Competitive Advantage). Conversely, If The Use Of Human Capital Increases, Then The Innovation In Private Universities Is Getting Higher.

Resource Base View *Theory* Also States That Universities With Human Capital Capabilities Must Encourage Lecturers To Improve And Explore Competencies In The Digital Field And Need To Organize Training For Lecturers To Improve Digitalization Capabilities And Are Willing To Be A Forum For Sharing Experiences Between Lecturers Who Master It Expertise And Lecturers Who Do Not Have It Expertise. Human Capital Has Various Definitions But Generally Refers To The Knowledge, Expertise, Competencies, And Other Characteristics Individuals Possess And Are Related To Economic Activity In Private Educational Institutions. The University Has Invaluable Resources, Including Lecturers, Researchers, Administrative Staff, And Students. These Resources Are Part Of Intellectual Capital, An Intangible Asset To The College And A Significant Resource In Achieving Organizational Excellence. Higher Education Is A Place Where Knowledge Is Generated And Processed Through Knowledge Management By A Knowledgeable Community That Can Learn And Has The Power Of Innovation.

Table 6. R-square value structural model

Variable	R Square
Competitive Advantage	0,504

Source: 2022 Research Results, Processed

Table 7. Total effect model

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
IC -> INOV	0.512	0.512	0.052	9.804	0.000
IC -> DTS	0.709	0.709	0.033	21.389	0.000
DTS -> INOV	0.265	0.259	0.080	3.305	0.001
IC*DTS -> INOV	-0.226	-0.228	0.060	3.753	0.000

The Results Of This Study Are Consistent With The Resource-Based (Rbv) Developed By Barney [16] and Stewart [47], Which States That Organizations That Have A Competitive Advantage Can Create Added Value For Teachers And Manage Knowledge Capabilities Well According To The Needs Imposed In A University. These Findings Prove That Intellectual Capital, Namely Human Capital, Is A Group Of Tangible Assets Owned By A University And, From Research, Has Not Significantly Affected The Competitive Advantage Position Of Private Universities In South Sumatra. It Can Prove Empirically That The Provision Of Competitive Advantage Is Related To Human Capital.

Based On The Study's Results, It Is Known That Intellectual Capital Positively Influences Innovation, Which Means That Better Intellectual Capital Consisting Of Human Resources, Good Relationships And Structural Capital Will Increase Innovation Changes In Universities. The Results Of This Study Are Consistent With The Resource-Based Developed By Barney [16]) And Stewart [47], Which States That Organizations With A Competitive Advantage Can Create Added Value For Their Stakeholders And Manage Their Strategic Assets Efficiently. These Findings Prove That Intellectual Capital, Namely Relation Capital, Is A Group Of Intangible Assets Owned By An Organization In The Form Of Universities And Significantly Affects The Competitive Advantage Position Of Private Universities In South Sumatra. It Can Prove That Providing A Competitive Advantage Is Related To Relationship Capital.

Human Capital Is Considered An Important Aspect That Drives Other Aspects, Namely

Intellectual Capital. Human Capital Is Organizational Knowledge That Is Possessed By Employees But Does Not Remain In Organizations Such As The College Where They Belong. In Addition, Human Capital Is The Professional Competencies, Employee Skills, And Leadership Abilities That Add Value To Organizational Processes. In This Context, Human Capital Is Key To Gaining A Competitive Advantage [57]. Human Capital Refers To The Knowledge, Experience, And Abilities That Employees Bring To An Organization.

3.3.2 Digital transformation strategy's role moderates intellectual capital's influence on competitive advantage

A Digital Transformation Strategy Is A Plan Executed By An Organization To Adopt Digital Technology And Utilize It Effectively To Transform Operations, Business Processes, And Business Models. Digital Transformation Refers To The Overall Change When Digital Technology Is Applied To Change How An Organization Operates And Provides Added Value To Customers Or Other Stakeholders. Deep Digital Transformation (Process) Is The Implementation Of These Strategies In The Organization's Business Processes To Optimize Business Processes, Increase Efficiency, Improve Customer Experience, And Create Added Value. It Involves Adopting New Technologies, Changing Organizational Culture, Restructuring Operations, And Developing New Skills To Meet The Challenges And Opportunities Of A Digital World.

On The Other Hand, A Digital Transformation Strategy Is A Plan Adopted By An Organization To Achieve That Digital Transformation. The

Strategy Includes Concrete Steps To Be Taken To Implement Digital Technologies To Achieve Transformation Goals. It Involves Identifying Business Opportunities Generated By Digital Technologies, Evaluating Existing Technology Infrastructure, Developing Implementation Plans, Allocating Appropriate Resources, And Measuring The Results.

Digital Transformation Strategies Have A Quasi Moderator Role. The Moderation Effect Of The Digital Transformation Strategy That Occurs Is To Increase (Strengthen) The Influence Of Intellectual Capital On Competitive Advantage. From The Results Of The Overall Research That The Model Tested In This Study, Namely The Role Of Variable Moderation Of Digital Transformation Strategies As Quasi-Moderation On The Influence Of Intellectual Capital (Human Capital, Structural Capital And Relationship Capital) On Competitive Advantage In Private Universities In South Sumatra Is Appropriate.

Intellectual Capital With Dimensions Of Human Resource Capital, Relationships And Organizational Structure Significantly Affect Innovation (Competitive Excellence) In Private Universities In South Sumatra. Based On The Results Of The Study, It Is Known That The Moderation Effect Of Structural Capital Shows That The Interaction Of Structural Capital On Innovation (Competitive Advantage) Moderated By Digital Transformation Strategies Proxied By The Use Of Technology And Changes In Creation Value Has A Significant Effect On Innovation (Competitive Advantage). This Result Means That Digital Transformation Strategies With Dimensions Of The Use Of Technology Moderate Capital Structures (Organizations) Towards Innovation (Competitive Advantage) In Activities At Private Universities In South Sumatra.

Intellectual Capital In The Form Of Human Capital, I.E., Professors And Researchers Are In A Teaching Capacity And Research Competence (Innovation In Teaching, Teaching Quality, Research Quality, Participation In National And International Projects, Percentage Of Doctorates). Administration And Service Staff Work On One Of The Applicative Transformations From Tacit Knowledge To Explicit Knowledge By Integrating Intellectual Capital Into The Production Structure Of Universities. Finally, Students Represent A Kind Of Knowledge Pipeline, A Connection That Allows Knowledge To Flow From Professors Into

The Business World And Eventually Back To College. Intellectual Capital Influences Innovation (Competitive Excellence) In Private Universities In South Sumatra. Based On The Study's Results, It Is Known That After The Moderation Effect Of Capital Structure, Digital Transformation Strategies Moderate The Interaction Of Human Capital Towards Innovation (Competitive Advantage).

4. CONCLUSION

From the results of the research and discussion, the following conclusions can be drawn:

1. The variable of intellectual capital significantly affects the competitive advantage of private universities in South Sumatra. This result means that the higher the intellectual capital with the dimensions of human capital, organizational capital and relationship capital (collaboration), the higher the competitive advantage. Human Resources have quality and competence; universities have high intellectual capital, including human resource capital that can conduct research and publications by producing quality research, providing superior education, providing innovative services, the number of students who complete studies quickly, sufficient financial support, up-to-date technological infrastructure, cooperation and extensive networks, Quality staff and lecturer development programs, as well as a culture of innovation instilled in the university environment in increasing intellectual capital which becomes a competitive advantage at the University. Human resources at the University are very important in developing intellectual capital, i.e., factors such as expertise, experience, qualifications, and motivation of teaching staff and researchers can affect the level of intellectual capital the University possesses. Infrastructure and technology, namely technological progress and adequate infrastructure, is a supporting factor in optimizing the development of intellectual capital. For example, good access to hardware, software, fast internet networks, and management information systems can help universities collect, store, manage, and analyze data effectively. Cooperation and Networking is the ability of universities to establish partnerships with various parties, including industry, research institutions, and professional organizations, to support intellectual capital development.

This collaboration enables the exchange of knowledge, resources, and experience that can enhance the University's competitive advantage.

2. Digital transformation strategies have a quasi-moderating role (*Quasi Moderator*). Quasi-interaction is a variable that moderates the relationship between exogenous variables, namely intellectual capital, and endogenous variables, namely competitive advantage, which is also an independent variable in the influence of intellectual capital on competitive advantage. By exploring effective digital transformation strategies, private universities can implement interactive e-learning platforms and integrated data management systems and understand how intellectual capital, competitive advantage, and digital transformation are interconnected in the context of higher education. Where digital transformation also increases risks to data security and privacy. Private universities should protect sensitive data such as student's personal information and research results from falling into the wrong hands. It is necessary to pay attention to aspects of digital inclusion and provide appropriate efforts to ensure equitable and inclusive access for all parties in the university environment; data protection and a strong privacy policy must be a priority in the digital transformation strategy. Digital transformation strategies, therefore, play an important role in moderating the influence between intellectual capital and competitive advantage in universities. For example, the adoption of the latest information technology and digital transformation strengthens efficiency, accessibility, and collaboration in the development of intellectual capital, which is an important foothold for the development of policies, strategies, and practices related to intellectual capital management and implementation of digital transformation and by utilizing the potential of intellectual capital and implementing effective digital transformation strategies, universities can optimize their position in academic competition and provide significant added value to students, staff and the wider community.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

ACKNOWLEDGEMENTS

This research was funded by personal funds from the author without any help from Bengkulu University or others.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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