

Digital Transformation at Forefront: Impact of Digital Orientation, Capabilities, and IT-Business Synergy on Higher Education Institutions Performance

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Abstract: *This study investigates the impact of digital orientation, digital capabilities, and IT-business synergies on digital transformation. Additionally, it explores how these three variables influence higher education institutions' performance, using digital transformation as a mediating factor. This research was conducted based on the reality gap between the demands of adapting and making changes or transforming towards digital and higher education readiness. This research was conducted during the COVID-19 pandemic, a phenomenon that has triggered digital transformation. The object of this research is higher education institutions. This research adds IT factors and business synergy, which means the business in this research is educational programs and services in higher education. Data was gathered through an online survey of higher education institutions across Indonesia. The number of questionnaires processed was 124. The data was then analyzed using the SEM-PLS method. The study's findings reveal that digital orientation, digital capabilities, and IT-business synergy all significantly and positively impact digital transformation. Furthermore, digital transformation mediates the influence of digital orientation, digital capabilities, and IT-business synergy on collegiate performance. This research provides several things that need to be paid more attention to by higher education institutions when it comes to the findings in this study. First, higher education institutions must write clearly in their policies. Second, higher education institutions do not only focus on human resources but must also be supported by qualified technological resources. Third, higher education institutions must consider the involvement of the teaching team in IT projects.*

Keywords: *Digital Orientation, Digital Capability, IT and Business Synergy, Digital Transformation, Higher Education Institutions Performance*

Abstrak: *Penelitian ini mengkaji pengaruh orientasi digital, kapabilitas digital, dan sinergi IT-bisnis terhadap transformasi digital. Selain itu, penelitian ini juga mengkaji bagaimana ketiga variabel tersebut memengaruhi kinerja perguruan tinggi dengan menggunakan transformasi digital sebagai faktor mediasi. Penelitian ini dilakukan berdasarkan kesenjangan realitas, yaitu kesenjangan antara tuntutan adaptasi dan perubahan atau transformasi menuju kesiapan digital perguruan tinggi. Penelitian ini dilakukan pada masa pandemi COVID-19, yaitu fenomena yang memicu transformasi digital. Objek penelitian ini adalah perguruan tinggi. Penelitian ini menambahkan*

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faktor sinergi IT dan bisnis, yang dimaksud bisnis dalam penelitian ini adalah program dan layanan pendidikan di perguruan tinggi. Pengumpulan data dilakukan melalui survei daring terhadap perguruan tinggi di seluruh Indonesia. Jumlah kuesioner yang diolah sebanyak 124. Data tersebut kemudian dianalisis menggunakan metode SEM-PLS. Temuan penelitian ini mengungkapkan bahwa orientasi digital, kapabilitas digital, dan sinergi IT-bisnis secara signifikan dan positif memengaruhi transformasi digital. Lebih lanjut, transformasi digital memediasi pengaruh orientasi digital, kapabilitas digital, dan sinergi IT-bisnis terhadap kinerja perguruan tinggi. Penelitian ini memberikan beberapa hal yang perlu lebih diperhatikan oleh perguruan tinggi terkait temuan dalam penelitian ini. Pertama, perguruan tinggi harus menuliskan kebijakannya dengan jelas. Kedua, perguruan tinggi tidak hanya berfokus pada sumber daya manusia saja, tetapi juga harus didukung oleh sumber daya teknologi yang mumpuni. Ketiga, perguruan tinggi harus mempertimbangkan keterlibatan tim pengajar dalam proyek IT.

Kata Kunci: *Orientasi Digital, Kapabilitas Digital, Sinergi IT dan Bisnis, Transformasi Digital, Kinerja Perguruan Tinggi*

1. Introduction

Technological developments, from time to time, occur very quickly. Around 2000, the world entered the Industrial Revolution 4.0. At that time, many organizations were competing to create online-based systems and carry out automation by creating technology that connects one computer to another, called digital technology. Organizations are interested in digital technology because it has many benefits, including speeding up the transaction process, requiring fewer resources, and reducing costs in the long term (Ulas, 2019). Therefore, many new digital-based organizations have emerged, which have made competition even more competitive (Vial, 2019). Still, traditionally based organizations must adapt quickly to survive and compete with these digitally based organizations. The pressure to make changes towards a digital-based organization does not only come from the Industrial Revolution 4.0. In 2019, a disaster occurred when the coronavirus disease (COVID-19) spread. The Indonesian government implemented several policies in response to the WHO's pandemic announcement. Based on Government Regulation of the Republic of Indonesia Number 21 of 2020, the Government of Indonesia implemented *Pembatasan Sosial Berskala Besar (PSBB)* so that organizations in all sectors must implement health protocols and

limit activities that require physical contact. Implementation of these policies makes the organization adapt to new circumstances. Then, the regulations were updated with the implementation of *Pemberlakuan Pembatasan Kegiatan Masyarakat (PPKM)*, which has the same goal.

The education sector is affected by technological developments and government policies regarding the COVID-19 pandemic. Educational institutions must adapt to overcome the phenomena that occur. According to the results of the Central Bureau of Statistics Republic of Indonesia survey on Community Behavior during the Covid-19 Pandemic, the majority of people received online education since PPKM was enacted (70.4%, a mixture of online and offline education 14.7%, no teaching and learning activities 4.3%, and normal or still get offline education by 1%). Based on these data, it can be concluded that educational institutions can adapt to new conditions by conducting online teaching and learning activities, commonly called online education. In addition to teaching and learning activities, educational organizations must change other activities, such as admitting new students, paying tuition fees, managing academic data, and other administrative activities (Putri et al., 2021). According to the Joint Decree of the Ministry of Education and Culture, Ministry of Religious Affairs, Ministry of Health, Ministry of Home Affairs of Indonesia Number 01/KB/2020, Number 516 of 2020, Number HK.03.01/Menkes/363/2020, and Number 440-882 of 2020 concerning Guidelines Implementation of Learning in the 2020/2021 Academic Year and 2020/2021 Academic Year during the COVID-19 Pandemic Period, face-to-face learning may be carried out by education units at the levels of early childhood education, basic education, and secondary education since the 2020/2021 school year following applicable zoning regulations. According to the Joint Decree of the Four Ministers, the green zones can conduct face-to-face learning, while the yellow, orange, and red zones still conduct online learning. However, this is an exception for the higher education level. At this level, you must continue to carry out the teaching and learning process online without considering the applicable zone provisions. Therefore, this study chose higher education institutions as research objects because they continued to carry out the teaching and learning process online.

The change process from traditional-based higher education institutions to digital technology-based institutions can be called digital transformation. Vial (2019) defines digital transformation as a process that uses information technology, computing, communication, and connectivity to improve an entity by bringing about significant changes in its properties. However, it is not easy to carry out digital transformation. In the process, many organizations fail to achieve the desired digital transformation and thus fail to achieve the expected benefits of leaders when carrying out digital transformation (Bughin, Deakin, and O’beirne, 2019). The reason for organizational failure in carrying out the digital transformation process is the existence of a digital divide and employee rejection. According to Putri et al. (2021), the digital divide refers to the difference in technological infrastructure owned by higher education institutions and the ability to integrate this technology into daily practice. Gatherer (2021) states that more than 80% of organizations experience digital transformation failure due to employee rejection.

Based on the explanation above, the problem is that there is a gap between demands to adapt by making changes or transforming towards digital and the readiness of higher education institutions, so researchers try to examine the factors that influence digital transformation so that higher education institutions can prepare their organizations to minimize failure in carrying out a digital transformation. This research is different from previous research by Khin and Ho (2019), Kwon and Park (2017), Lee, Dedahanov, and Rhee (2015), and Al-Ansari, Altalib, and Sardoh (2013). First, this research was conducted during the COVID-19 pandemic, a phenomenon that triggers digital transformation. Second, the object of this research is higher education institutions, while the previous research was about a business entity engaged in IT. Third, this study adds IT factors and business synergy. In this study, the business refers to educational programs and services in higher education institutions. According to the resource-based theory of the firm proposed by Wernerfelt (1984), an organization must have superior resources to achieve competitive advantage, and ultimately, this advantage will impact organizational success, which is reflected in organizational performance. Digital transformation has a broad scope and consequences, so organizations must coordinate

and prioritize many independent digital transformations (Matt, Hess, and Benlian, 2015). Therefore, on this occasion, the author decided to conduct this research, which aims to determine what factors higher education institutions must have and strengthen to achieve success in digital transformation and its impact on higher education performance.

2. Literature Review and Hypothesis Development

2.1. Resource-Based Theory of The Firm

The firm's resource-based theory was put forward by Birger Wernerfelt in 1984. This theory identifies the strengths and weaknesses of the resources owned to determine the organization's strategy. Wernerfelt (1984) states that organizations must avoid weaknesses and optimize resources to achieve competitive advantage. The characteristics of resources that have advantages can be obtained through resources that have valuable value, are unique or scarce, are difficult to imitate (inimitable), and are difficult to replace with other resources (non-substitutable) (Wernerfelt, 1984). Then, the firm's resource-based theory was increasingly developed, and many researchers who used it contributed to its development. Several figures who discuss the firm's resource-based theory and relate it to performance include Hansen and Wernerfelt in 1989, Rumelt in 1991, and McGahan and Porter in 1997. Hansen and Wernerfelt (1989) state that three factors will ultimately affect the company's performance. First is the people factor: skills, personalities, and age. Second is the organizational factor, which consists of organizational structure, systems run by the organization, size, and history. Third is the environmental factor: sociology, politics, economics, and technology.

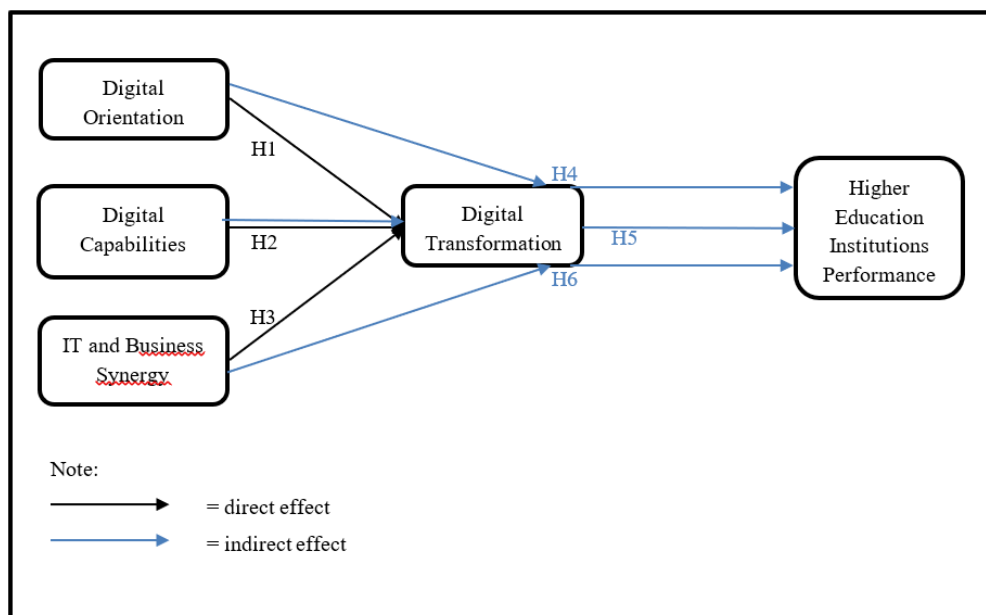
Researchers use the firm's resource-based theory because it finds suitability and thinks this theory can describe the connections and influences that exist between the variables that will be studied. This study discusses the effect of digital orientation, digital capabilities, and IT-business synergies on higher education institutions' performance, with digital transformation as a mediating variable. If related to this theory, the digital orientation variable is included in the human factor, the digital capability variable is included in the environmental factor, and the IT-business synergy

variable is included in the organizational factor. These factors will shape an organizational climate and ultimately affect the performance of higher education institutions.

2.2. Research Model

This research adapts the model by Khin and Ho (2019), in which digital orientation and digital capabilities are the independent variables, digital transformation is a mediating variable, and the performance of higher education institutions is the dependent variable. In addition, this study also adds IT and business synergy variables based on research conducted by Kwon and Park (2017). The research model is shown in the following figure.

Picture 1.
Research Model



2.3. Hypothesis development

2.3.1. Effect of digital orientation on digital transformation

Digital orientation is an organization's commitment to implementing new technology and being responsive to changes in this technology (Khin and Ho, 2019). Before the pandemic, higher education institutions still provided face-to-face

educational programs. However, after the pandemic, they started to consider transforming by switching to providing digital education programs. Therefore, digital orientation is needed to succeed in digital transformation.

In the firm's resource-based theory, digital orientation is included as a people factor that will influence organizations to gain a competitive advantage. In developing new processes, products, and services, a significant factor is the willingness and commitment to acquire a background in technology. The technology policy of higher education institutions reflects their attitude and commitment to transformation. This attitude can determine the achievement of higher education institutions in gaining a competitive advantage. The stronger the technological orientation of a higher education institution, the higher the level of success in carrying out digital transformation.

On the other hand, if higher education institutions do not have a technology orientation, resistance will hinder the digital transformation process. Research conducted by several previous studies stated that digital orientation positively influences digital transformation (Khin and Ho, 2019; Lee, Dedahanov, and Rhee, 2015; Al-Ansari, Altalib, and Sardoh, 2013). Based on this explanation, the following hypothesis can be formulated.

H1: Digital orientation has a positive effect on digital transformation

2.3.2. Effect of digital capabilities on digital transformation

Digital capabilities are companies' skills, talents, and expertise in managing digital technology for new product development (Khin and Ho, 2019). When the pandemic occurred, higher education institutions started to consider transforming by switching to providing educational programs digitally. Technology infrastructure is needed to support the success of this digital transformation. In addition, digital skills are also a much-needed factor.

In the firm's resource-based theory, digital capability is an environmental factor influencing organizations to gain a competitive advantage. The higher education institutions' technological capability can be seen from their technological infrastructure and human resource capabilities in utilizing this technology. Acquiring and developing new processes, products, and services requires professional human resources with skills,

talents, and expertise in technology. The better the digital capabilities of higher education institutions are, the higher the success rate of digital transformation. On the other hand, higher education institutions do not have the ability, or their digital capabilities are not good, so the digital transformation that will be carried out will be hampered. Research conducted by several previous studies stated that digital capabilities positively influence digital transformation (Khin and Ho, 2019; Kwon and Park, 2017). Based on this explanation, the following hypothesis can be formulated.

H2: Digital capabilities have a positive effect on digital transformation

2.3.3. Effect of IT and business synergy on digital transformation

Before the pandemic, higher education institutions carried out educational processes, programs, and services in the usual way: through traditional or face-to-face meetings. However, higher education institutions must transform digitally to survive the pandemic. The digital transformation can cause new obstacles if the new digital strategy is not implemented using the strategies of education programs and services implemented previously. Therefore, higher education institutions must align IT strategies with educational programs and services so the transformation process can be carried out properly.

In the firm's resource-based theory, IT-business synergy will influence the organization to gain a competitive advantage. In this study, the business in question is educational programs and services implemented by higher education institutions. The synergy between IT and educational programs and services can be achieved when organizations apply IT appropriately to meet organizational goals, strategies, and needs for educational programs and services, as well as the accuracy of sharing information in making decisions for digital transformation (Kwon and Park, 2017). When higher education institutions succeed in aligning their IT strategy with the previously determined educational program and service strategies, there will be no gap between the technical, technological, and management needs of educational programs and services, so the success rate of digital transformation will be higher. On the other hand, when the IT strategy of higher education institutions cannot be aligned with the previously implemented education programs and service strategies, the digital transformation

process will be hampered. Previous research by Kwon and Park (2017) states that IT and business synergies positively influence digital transformation. Based on this explanation, the following hypothesis can be formulated.

H3: IT and business synergies have a positive effect on digital transformation

2.3.4. The role of digital transformation mediation

Digital transformation is a process that uses a combination of information technology, computing, communication, and connectivity to improve an entity by bringing about significant changes in its properties (Vial, 2019). When a pandemic occurs, higher education institutions must adapt to new conditions to continue to operate and survive. One way that can be done is by carrying out digital transformation. The transformation of higher education institutions can enable them to carry out their business processes and improve their performance (Chatterji and Kiran, 2022).

In the firm's resource-based theory, digital transformation can be considered a competitive advantage that creates a new work climate in higher education institutions and will ultimately affect their performance. This study's three factors are digital orientation (the people factor) and digital capability (the environmental factor). IT-business synergy (an organizational factor) will place higher education institutions in a good position to carry out digital transformation to satisfy parties, especially students, so that, in the end, it will increase the performance of higher education institutions.

Previous research conducted by Al-Ansari, Altalib, and Sardoh (2013) stated that digital orientation influences digital transformation but does not affect performance directly. Then Al-Ansari, Altalib, and Sardoh (2013) stated that there is an effect of digital transformation on performance, so there is a possibility that digital transformation has a role that can mediate digital orientation and digital transformation. Other researchers state that digital transformation has a role that can mediate digital orientation and digital capabilities on performance (Khin and Ho, 2019; Lee, Dedahanov, and Rhee, 2015). Based on this explanation, the following hypothesis can be formulated.

H4: The effect of digital orientation on higher education institutions' performance is mediated by digital transformation

H5: The effect of digital capabilities on higher education institutions' performance is mediated by digital transformation

H6: The effect of IT and business synergies on higher education institutions' performance is mediated by digital transformation

3. Research Method

3.1. Population and sample

This study uses a quantitative method by conducting a survey. In general, the object of this research is higher education institutions throughout Indonesia. Researchers obtained the list of higher education institutions through the Webometrics website (www.webometrics.info) and chose the Indonesian region. The reasons for the researcher to directly research a large population, that is, all of Indonesia, are: 1) the researcher considered the adequacy of the sample size for using an online questionnaire using the email questionnaire technique, 2) the researcher chose the entire population of Indonesia because the researcher hoped that the results obtained could be generalized so that they could represent actual conditions. Researchers get emails from higher education institutions by visiting the websites of the listed institutions one by one and looking for emails that can be contacted. Of the 2,624 higher education institutions registered on Webometrics, only 1,826 have active websites and contain emails that can be contacted, so the researchers only sent emails to 1,826 of these. The participants in the survey were the head of the IS/IT division, the deputy head of the IS/IT division, the staff of the IS/IT division, and other positions related to the division. These parties were selected because they are directly involved in digital transformation and are expected to represent higher education institutions and answer questionnaires to the best of their capacity. Researchers sent questionnaires to 1,826 higher education institutions and gave a two-week deadline for completing the questionnaires. Researchers closed access and continued data processing after the time limit for completing the questionnaire ended.

Researchers used a purposive sampling technique in which certain conditions had to be met to be selected as the sample. There are several sample criteria in this research.

First, higher education institutions in Indonesia are included in the Webometrics list, which can be accessed via the website www.webometrics.com. Second, higher education institutions carried out digital transformation when the COVID-19 pandemic occurred. Third, higher education institutions that have active emails that can be contacted. Fourth, higher education institutions will be excluded from the sample if they do not answer emails or return questionnaires distributed online. The distribution of questionnaires and data collection were carried out from October 10, 2022, to October 21, 2022.

However, because the amount of data collected was insufficient to be processed, the second stage of questionnaire distribution and data collection was carried out from October 24, 2022, to November 4, 2022. Respondents must fill out the questionnaire completely and correctly so that there are no incomplete and no errors, and all returned questionnaires provide sufficient data for processing. However, 38 questionnaires were filled in by parties that were unsuitable for this research, so only 124 questionnaires could be processed from the 162 returned questionnaires. Each higher education institution only completed one questionnaire, so the 124 questionnaires came from 124 higher education institutions. The minimum sample size is 5 times the number of indicators used in the research (Hair et al., 2017). The number of indicators in this study is 21, so the minimum sample size is 105. The number of questionnaires returned is 124, so it can be concluded that the sample processed in this study has exceeded the minimum sampling number.

3.2. Operational variable

Operational variables are techniques for reducing abstract ideas or concepts into research characteristics that are more likely to be observed (Sekaran and Bougie, 2016). This study examined the variables of digital orientation (DO), digital capabilities (DC), IT and business synergy (IBS), digital transformation (DT), and higher education institution performance (CP). The operationalization of these variables is shown in the table 1.

Table 1.
Operational Variable

Variable		Indicator	Ref.
Digital Orientation	DO1	Our higher education institution is very committed to using digital technology in developing educational programs.	Khin and Ho (2019)
	DO2	The educational programs used by our higher education institution are based on the latest, superior digital technology.	
	DO3	New digital technologies available at our higher education institution are readily accepted and utilized by students, faculty, and staff.	
	DO4	Our higher education institution always tries to use digital technology to innovate.	
Digital Capabilities	DC1	Personnel in our higher education institution have sufficient competence and skills related to the use of digital technology.	Khin and Ho (2019)
	DC2	Higher education institution personnel can manage and use the latest digital technology, such as carrying out teaching and learning processes using online platforms.	
	DC3	Personnel within our higher education institution can identify new digital opportunities that the higher education institution can take advantage of.	
	DC4	Personnel in our higher education institution have the competencies and skills necessary for program development and the required education.	
IT and Business Synergy	IBS1	Our team of higher education institution educators engages in IT projects and operations effectively.	Kwon and Park (2017)
	IBS2	IT projects can be completed on time according to our higher education institution's strategy and business needs.	

Variable	Indicator	Ref.
	IBS3 IT projects and operations are aligned with our higher education institution's goals.	
	IBS4 IT operations and projects produce IT solutions and services that benefit the education function and the users.	
Digital Transformation	DT1 Digital-based educational programs have been successfully launched and can be used optimally.	Khin and Ho (2019)
	DT2 Digital technology can optimize operational processes in our higher education institution.	and Vial (2019)
	DT3 The digital business model that our higher education institution has chosen can be carried out effectively.	
	DT4 All users of digital technology in our higher education institutions (students, lecturers, and staff) can collaborate and coordinate effectively through digital platforms.	
Higher Education Institution Performance	CP1 Our higher education institution has created a new curriculum (online curriculum) that can replace the offline system and meet our needs.	Chatterji and Kiran (2022)
	CP2 Our higher education institution's online system can improve the quality of educational programs for students.	
	CP3 Our higher education institution can optimally prepare and maintain the goals and results of the teaching and learning process.	
	CP4 Our higher education institution maintains student satisfaction with the teaching and learning process.	
	CP5 Our higher education institution maintains a level of student satisfaction concerning infrastructure.	

3.3. *Data collection and analysis*

This study uses quantitative data types, such as survey data from respondents. The survey was conducted by distributing questionnaires to respondents online via email. Respondents can complete the questionnaire by pressing the Google questionnaire form link in the email. Emails will be sent directly to the population, that is, 1,826 higher education institutions throughout Indonesia. The statements in the questionnaire were written by the researcher according to the indicators in the previous study and were measured using a Likert scale. According to Sekaran and Bougie (2016), the Likert scale measures respondents' level of agreement with a statement. This study uses a Likert scale with five scale points, that is, 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree.

This study uses multivariate analysis to understand the more complex causal relationships between variables (Creswell, 2009). The statistical method used to carry out multivariate analysis in this study is structural equation modelling (SEM) with a partial least squares approach, commonly called PLS-SEM. SmartPLS software assisted in this study's analysis. The path analysis model for all latent variables in PLS consists of two relationships: the outer model, which displays the relationship between latent variables and their indicators or manifest variables, and the inner model, which indicates the relationship between latent variables (Hair et al., 2017).

The objective of testing the measurement model (outer model) is to determine how constructs or latent variables are measured and to examine the instruments' construct validity and reliability in this study (Hair et al., 2017). Two aspects can be examined during a validity check: convergent validity and discriminant validity. Convergent validity measures the magnitude of the construct's correlation with latent variables. Convergent validity can be determined by looking at the value of the standardized loading factor, which describes the magnitude of the correlation between each indicator and its construct (Hair et al., 2017). A loading factor value above 0.70 means that the indicator can be said to be valid or ideal as an indicator that measures constructs; a loading factor value between 0.40 and 0.70 means that the indicator is still acceptable, while a loading factor value below 0.40 means that the indicator can be removed from

the model. Apart from the loading factor value, convergent validity can be determined by looking at the AVE value. An AVE value of 0.50 or higher indicates that the average construct explains more than half of the indicators. In contrast, a value of less than 0.50 indicates more error indicators than the construct can explain. Discriminant validity can be determined by comparing the AVE value's square root with the latent variable's correlation (Hair et al., 2017), so that the formula for measuring discriminant validity can be expressed by the root of $AVE > \text{latent variable correlation}$. A reliability test is used to prove the consistency and stability of measuring devices. Reliability can be determined by the composite reliability value, with the criteria for composite reliability > 0.70 meaning acceptable, while 0.80 and 0.90 mean very satisfying.

The objective of testing the structural model (inner model) is to test hypotheses or the relationship between the studied variables (Hair et al., 2017). The structural model (inner model) is tested using R-squared and path coefficients. The R-squared value is used to measure how strong the causal relationship is between the dependent and independent variables. In contrast, the path coefficient is used to measure the significance level of the hypothesis testing conducted in this study (Hair et al., 2017). The R-square result criterion used in this study is that 0.67 means good, 0.33 means moderate, and 0.19 means weak (Hair et al., 2017). The R-square value usually lies between 0 and 1. The closer to 1, the stronger the causal relationship between the variables being measured. Hypothesis testing is shown in the t-values with the following criteria: the independent variable affects the dependent variable, or the hypothesis is accepted if $t\text{-count} > t\text{-table}$ with a t-table value of 1.96 at a significance level of 5% (Hair et al., 2017). In addition to t-values, hypothesis testing can also be seen in p-values, with the criterion that p-values must be less than 0.05 (Hair et al., 2017).

4. Results, Discussions, and Implications

4.1. Respondent demographics

This section presents a table describing the research respondents' data, that is, gender, age, last education, and respondents' position. The demographic table of the respondents can be seen below.

Table 2.
Respondent Demographics (N=124)

Respondent Data	Frequency	Percentage
Gender		
Man	102	82,26
Woman	22	17,74
Age		
21-30 years old	46	37,10
31-40 years old	48	38,71
41-50 years old	23	18,55
> 50 years old	7	5,65
Last Education		
Senior high school	11	8,87
Diploma 1	1	0,81
Diploma 2	1	0,81
Diploma 3	7	5,65
Bachelor's degree	61	49,19
Master degree	38	30,65
PhD degree	5	4,03
Position		
Head of the IS/IT division	28	22,58
Deputy head of the IS/IT division	12	9,68
Staff of the IS/IT division	75	60,48
Head of the computer centre	3	2,42
LPTSI administration sub-coordinator	1	0,81
Head of the digitalization section	1	0,81
Network technical coordinator	1	0,81
IT research group coordinator	1	0,81
Head of IS and Server Development	1	0,81
SPMI manager	1	0,81

Based on Table 2 regarding the demographics of the respondents, it can be seen that, based on the gender of the respondents, there were 102 males, or 82.26%, and 22 females, or 17.74%. Based on age, respondents 21–30 were 46 people or 37.10%, 31–40 years were 48 people or 38.71%, 41–50 years were 23 people or 18.55%, and more than 50 years were seven people or 5.65%. In the same table, it can also be seen that based on their last education, 11 people, or 8.87%, graduated from high school; diploma 1 was one person, or 0.81%; diploma 2 was one person, or 0.81%; diploma 3 was seven people, or 5.65%; a bachelor's degree was 61 people, or 49.19%; a master's degree was 38 people, or 30.65%; and a PhD was five people, or 4.03%. Based on their position, the respondents who became heads of the IS/IT division were 28 people, or 22.58%. The deputy heads of the IS/IT division were 12 people, or 9.68%. The IS/IT division staff was 75 people, or 60.48%. The head of the computer centre is three people, or 2.42%. LPTSI administration sub coordinator one person or 0.81%, head of digitalization section one person or 0.81%, network technical coordinator one person or 0.81%, IT research group coordinator one person or 0.81%, head of IS and server development one person or 0.81%, and SPMI manager one person or 0.81%.

4.2. Measurement model testing (outer model)

This section discusses the measurements used to measure convergent and discriminant validity and reliability. Convergent validity test in PLS using loading factor and AVE. The criteria for using a loading factor are above 0.70, which means it is valid and ideal; between 0.40 and 0.70, it is acceptable; below 0.40, it is invalid and must be excluded from the model. The criteria for using AVE are that above 0.70 means strong, between 0.50 and 0.70 means moderate, or the construct explains enough, and below 0.50 means it is invalid and there are many errors (Hair et al., 2017). The results of convergent validity testing are shown in the table 3.

Table 3.
Convergent Validity Test Results

Variable	Indicator	Outer Loading	AVE
Digital Orientation	DO 1	0,793	0,630
	DO 2	0,809	

Variable	Indicator	Outer Loading	AVE
Digital Capabilities	DO 3	0,748	0,714
	DO 4	0,823	
	DC 1	0,850	
	DC 2	0,817	
	DC 3	0,881	
IT and Business Synergy	DC 4	0,882	0,765
	IBS 1	0,824	
	IBS 2	0,878	
	IBS 3	0,910	
Digital Transformation	IBS 4	0,884	0,714
	DT 1	0,869	
	DT 2	0,884	
	DT 3	0,854	
Higher Education Institution Performance	DT 4	0,769	0,743
	CP 1	0,780	
	CP 2	0,846	
	CP 3	0,904	
	CP 4	0,885	
	CP 5	0,890	

The discriminant validity test in PLS was carried out using loading and cross-loading factors. The criteria used are that the value of a loading factor must be greater than a cross-loading factor in each variable (Hair et al., 2017). The results of convergent validity testing are shown in the table 4.

The discriminant validity testing results presented in Table 4 show that all indicators have a loading factor value greater than a cross-loading factor. Based on these results, it is possible to conclude that each construct of a variable has no relationship with items in other constructs, so it can be said to be valid.

Table 4.
Discriminant Validity Test Results

	Digital Orientation	Digital Capabilities	IT and Business Synergy	Digital Transformation	Higher Education Institution Performance
Digital Orientation	0,794				
Digital Capabilities	0,697	0,845			
IT and Business Synergy	0,604	0,591	0,875		
Digital Transformation	0,661	0,721	0,710	0,845	
Higher Education Institution Performance	0,701	0,699	0,691	0,783	0,862

A reliability test is used to prove the consistency and stability of measuring devices. Reliability can be determined by looking at the composite reliability value, with the criteria of composite reliability > 0.70, meaning acceptable, while 0.80 and 0.90 mean very satisfying (Hair et al., 2017). The results of convergent validity testing are shown in the table 5.

Table 5.
Reliability Test Results

Latent Variable	Composite Reliability
Digital Orientation	0,909
Digital Capabilities	0,935
IT and Business Synergy	0,929
Digital Transformation	0,909
Higher Education Institution Performance	0,872

The reliability testing results in Table 5 show that the composite reliability value of all variables is more than 0.70. These results suggest that the tools used to measure each of these variables are consistent and stable, or can be said to be reliable.

4.3. Structural model testing (inner model)

The structural model (inner model) is tested by bootstrapping on SmartPLS, and then the results can be seen in the R-square and path coefficient. The R-square value is used to measure how strong the causal relationship is between the dependent and independent variables. In contrast, the path coefficient is used to measure the significance level of the hypothesis testing conducted in this study (Hair et al., 2017). It can be seen from the adjusted R-square value to determine the value of the influence of all variables simultaneously. The test criteria are that more than 0.67 means a strong influence, more than 0.33 means a moderate influence, and more than 0.19 means a weak influence (Hair et al., 2017). The adjusted R-square value is shown in the table 6.

Table 6.
R-Square Test Result

	R Square	R Square Adjusted
Digital Transformation	0,655	0,647
Higher Education Institution Performance	0,613	0,610

Table 6 shows that the adjusted R-squared value of digital transformation is 0.647, and the performance of higher education institutions is 0.610. This means that digital orientation, digital capabilities, and IT and business synergy simultaneously affect digital transformation and higher education institution performance by 64.7% and 61.0%, respectively, or can be categorized as a moderate influence.

The bootstrapping results show the significance of the hypotheses built in this study. The criterion for using t-statistics is that the t-statistic value must be greater than the t-table value. This study uses a confidence level of 95% so that the hypothesis can be accepted if the t-count value exceeds 1.98045 or is rounded to 1.98 (Hair et al., 2017). The hypothesis test results are shown in the following path coefficient table.

Table 7.
Path Coefficient Value

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Digital Orientation -> Digital Transformation	0,165	0,168	0,081	2,044	0,041
Digital Capabilities -> Digital Transformation	0,377	0,356	0,137	2,755	0,006
IT and Business Synergy -> Digital Transformation	0,388	0,402	0,100	3,887	0,000
Digital Orientation -> Digital Transformation -> Higher Education Institution Performance	0,129	0,132	0,065	1,992	0,047
Digital Capabilities -> Digital Transformation -> Higher Education Institution Performance	0,295	0,281	0,115	2,562	0,011
IT and Business Synergy -> Digital Transformation -> Higher Education Institution Performance	0,304	0,312	0,070	4,307	0,000

Based on Table 7, every hypothesis has a t-statistic value higher than the t-table (1.98). In addition, the p-values of all hypotheses also show a value of less than 0.05, so it is possible to conclude that all hypotheses are accepted or have a significant effect.

4.4. Discussions and implications

The first factor that influences digital transformation is digital orientation. This finding is consistent with previous research. The resource-based theory of the firm states that digital orientation is included in the people factor, which influences organizations to gain a competitive advantage. The digital orientation of higher education institutions

can be seen in several aspects, including commitment to using digital technology, digital technology-based programs and services, new digital technologies that are accepted and utilized, and digital technology-based innovation. Digital orientation is closely related to human personality and the ability to accept technological developments or applications (Khin and Ho, 2019). Higher education institutions with a digital orientation will be more open to digital technology and ready to take the initiative to change towards digital.

Failure to carry out digital transformation often occurs due to rejection by human resources because they do not have a good orientation and consider technology unnecessary to implement (Gatherer, 2021). In public HEIs, rejection tends to be minimized due to the role of the government. Public HEIs must follow all policies implemented by the government, including policies on implementing new technology. For example, in 2021, the Ministry of Education and Culture implemented a smart campus program that encouraged HEIs to maximize the use of technology in education programs and services. On the other hand, private HEIs are more flexible and less dependent on government policies, so there is a greater chance of rejection of technology implementation. In addition to pressure to change from the government, a solution that can be done to minimize rejection of technology implementation by human resources is to express attitudes and commitments to transform in policies (Al-Ansari, Altalib, and Sardoh, 2013). Attitudes and commitments to transformation can be expressed through a digital-based curriculum, instilling the importance of technology in new lecturer training, and making the technology aspect one of the assessment points for promotion or lecturer certification. With the affirmation of attitudes and commitments to carry out technological transformation, rejection by human resources can be controlled, and the level of success in carrying out digital transformation is greater (Renta, 2023).

The second factor that influences digital transformation is digital capability. This finding is consistent with previous research. The theory of firm resources states that digital capability is an environmental factor that influences organizations to gain a competitive advantage. Digital capability can be seen from several aspects, including

competencies and skills related to digital technology, the ability to use the latest technology, taking advantage of opportunities created by digital technology, and the suitability of competencies and skills with programs and services of higher education institutions. Professional human resources are needed to carry out digital transformation, along with skills, talents, and expertise in the field of technology (Khin and Ho, 2019). Digital capability is not only related to the human aspect, but must also have a broader scope by involving existing technological infrastructure.

Failure to carry out digital transformation often occurs due to rejection by human resources, due to their inability to master technology (Gatherer, 2021). In addition to human resources, which cannot master technology, the technological infrastructure is sometimes not optimal (Kwon and Park, 2017). In public HEIs, the government supports the budget for educating human resources and developing technological infrastructure, so that the level of success in carrying out digital transformation is greater. On the other hand, private HEIs must provide their budget to educate human resources and develop technological infrastructure, so that the transformation can fail due to a lack of funds, and they have to work hard to find partners or investors. However, both types of HEIs have the same constraint, namely, the unwillingness of human resources to develop their ability to use technology. Incentivizing lecturers and all staff needing technology training can overcome this. Incentives can be given in various forms, such as assistance with training costs, bonuses or special allowances, ease of time, provision of special facilities, and awards in the form of certificates or opportunities for promotion. In addition to incentives, HEIs must also invest in technological resources so that good technological resources support human resource capabilities. With incentives for lecturers and employees who take part in technology training and investment in technological resources, there will no longer be a digital divide, and the level of success of HEIs in carrying out digital transformation will be even greater (Renta, 2023).

The third factor that influences digital transformation is IT and business synergy. This finding is consistent with previous research. The company's resource-based theory states that IT and business synergy are included in organizational factors influencing its efforts to gain a competitive advantage. IT-business synergy is the combination of

technical capabilities the IT team possesses and a deep understanding of educational programs and services possessed by the team of educators and staff (Kwon and Park, 2017). The integration process is useful for aligning perceptions between IT team personnel and the team of educators and staff in terms of the use of technology so that there is alignment in determining strategies, such as what technology is used, the completion time of IT projects and their implementation, what benefits are obtained, and the suitability of the vision, mission, and goals of IT with education programs and services. With this alignment, the transformation is carried out by changing traditional education programs and services into technology-based education programs and services.

When associated with the IT and business synergy factor, the failure of digital transformation can occur due to the misalignment between IT and business (Kwon and Park, 2017). In public HEIs, the opportunity for IT-business synergy is very large because of government involvement. Human resources, technological resources, and funding are greater because the government supports them. Public HEIs only need to ensure the involvement of the education team and academic staff in decision-making in IT projects. In private HEIs, the alignment of IT-business synergy faces many obstacles. Although private HEIs are more flexible than public HEIs, limited human resources, technology, and lack of funding make it difficult for IT to support business strategies. Therefore, in addition to ensuring the involvement of the education team and academic staff in decision-making in IT projects, private HEIs must also seek funding to support business strategies fully. The involvement of the education team and academic staff in IT projects (in this case, digital transformation) will further facilitate synergy between IT and education programs and services because the education team can be the controlling party so that the digital transformation carried out remains in line with the objectives of the education program and services (Renta, 2023). The challenge is ensuring that the education team and academic staff are willing to be involved in IT projects. The education team and academic staff who already have tasks sometimes refuse to be involved in IT projects. Therefore, to ensure the education team's and academic staff's involvement in IT projects, the government can make this one of the

accreditation assessment points. In addition, HEI can also ensure this by including it in the rector's regulations. When HEIs succeed in aligning IT and business, there will be no gap between technical and technological needs and the needs of program management and educational services at HEIs, so the success rate of digital transformation will be higher (Renta, 2023).

The effect of digital orientation, digital capability, and IT-business synergy on higher education institution performance is mediated by digital transformation. These results are consistent with previous research. The firm's resource-based theory states that digital transformation can be considered a competitive advantage that creates a new work climate in higher education institutions and will ultimately affect their performance. Previously, it was explained that digital orientation (people factors), digital capabilities (environmental factors), and strong IT and business synergy (organizational factors) will place higher education institutions in a good position to carry out digital transformation. Success in digital transformation will enable higher education institutions to continue to carry out educational programs and even improve performance, which previously declined due to obstacles felt by higher education institutions when the pandemic occurred. The increase in higher education institution performance that has occurred can be seen from several things, such as the existence of a new online-based curriculum that can replace the offline system, the online system owned by higher education institutions that can improve the quality of educational programs for students, higher education institutions that can maintain goals and outcomes in the teaching and learning process optimally, and higher education institutions that obtain a high level of satisfaction from students regarding the teaching and learning process and supporting infrastructure (Renta, 2023).

From the description above, it can be concluded that this study has three impressions. First, HEIs cannot be complacent by only relying on the attitude and commitment of human resources in implementing digital transformation. However, HEIs must write clearly in their policies so that all human resources can understand them and there is no rejection or resistance to implementing digital transformation. The attitude and commitment to transform can be expressed through a digital-based

curriculum, instilling the importance of technology in new lecturer training, and making the technology aspect one of the assessment points for promotion or lecturer certification. Second, HEIs do not only focus on human resources. Human resources must be supported by qualified technology resources to support each other and accelerate the digital transformation process. HEIs can improve digital capabilities by investing in technology resources and technology training for human resources in these HEIs. To increase the willingness to carry out training, HEIs can provide incentives in the form of financial assistance, special bonuses or allowances, ease of time, provision of special facilities, and awards in the form of certificates or opportunities for promotion. Third, an important aspect that must be considered is the involvement of the education team and academic staff in IT projects, in this case, digital transformation. With a team of educators and academic staff, the IT project can be controlled by the desired education program and services. With the involvement of the team of educators and academic staff in the IT project, it can be done by making it a point of accreditation assessment and including it in the rector's regulations.

5. Conclusions, Limitations, and Suggestions for Future Research

This study reveals the importance of digital orientation, digital capability, and IT-business synergy in influencing digital transformation in higher education institutions. The third factor also influences the performance of HEIs with digital transformation as a mediating variable. The findings emphasize the importance of these factors in the success of HEIs adapting to the changing demands and needs of education, especially since the disruption during the COVID-19 pandemic. These findings are in line with previous studies, namely studies conducted by Khin and Ho (2019), Kwon and Park (2017), Lee, Dedahanov, and Rhee (2015), and Al-Ansari, Altalib, and Sardoh (2013). The practical contribution of this study is in the form of suggestions for HEIs on how to carry out digital transformation properly. First, the attitude and commitment of HEIs to transform must be implemented in policies, such as creating a digital-based curriculum, instilling the importance of technology in new lecturer training, and making the technology aspect one of the assessment points for promotion or lecturer

certification. Second, universities must invest in technological resources and provide incentives for lecturers and staff who want to develop and master technology, such as training cost assistance, special bonuses or allowances, time convenience, provision of special facilities, and awards in the form of certificates or promotion opportunities. Third, universities must ensure the teaching team's and academic staff's involvement in technology projects, such as making it an accreditation assessment point and stating it in the rector's regulations. In addition, if reviewed using the RBT theory, this study shows that digital orientation, digital capabilities, and IT and business synergy are resources that can provide competitive advantages for HEIs. This enriches the theory by emphasizing the importance of integrating human resources, technological resources, and organizational strategies in digital transformation.

This study has limitations, such as using the email questionnaire method in data collection. This method creates availability bias, where only HEIs that actively use email fill out the questionnaire. This causes the number of questionnaires returned small, so the questionnaire is issued twice to respondents who have not answered the questionnaire to meet the minimum amount of data processed. Further, researchers can use offline questionnaires with in-house methods so that data shortages do not occur, and can add interviews to discuss more deeply. Then, further researchers can also explore leadership styles, funding models, and culture as additional variables. Different leadership styles and cultures can shape human resources' attitudes toward digital transformation. Likewise, funding models may have different influences on digital transformation.

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Appendix

Research Instrument

Part I: Respondent Identity

1. Email:
2. Gender
 - Man Woman
3. Age
 - 21 - 30 years old 41 - 50 years old
 - 31 - 40 years old > 50 years old
4. Last Education
 - Senior high school Bachelor's degree
 - Diploma 1 Master degree
 - Diploma 2 PhD degree
 - Diploma 3
5. Position
 - Head of Information System or Information Technology Division
 - Deputy Head of Information System or Information Technology Division
 - Staff of the Information System or Information Technology Division
 - Other

Part II: Yes or No Question

Digital transformation is a significant organizational change towards using digital technology to make the organization bigger. Examples of digital transformation carried out by colleges include changing conventional teaching and learning processes to online, optimizing the use of digital technology in every operation carried out by colleges (student admissions systems, payments, licensing/academic letters), and coordinating or collaboration between students, lecturers, staff/employees, industry, parents, and the government by utilizing digital technology.

Has the college where you work done digital transformation since the COVID-19 pandemic?

- Yes No

Part III: Questionnaire

Please choose one of the answers to these questions seriously and follow reality. Information:

- SD** = Strongly Disagree
D = Disagree
N = Neutral
A = Agree
SA = Strongly Agree

Code	Indicator	SD	D	N	A	SA
DO1	<i>Our college is very committed to using digital technology in developing educational programs.</i>					
DO2	<i>The educational programs used by our colleges are based on the latest and most superior digital technology.</i>					
DO3	<i>New digital technologies available in our colleges are readily accepted and utilized by students, faculty, and staff.</i>					
DO4	<i>Our college always tries to use digital technology to innovate.</i>					
DC1	<i>Personnel in our college have sufficient competence and skills related to the use of digital technology.</i>					
DC2	<i>Personnel in our colleges can manage and use the latest digital technology, such as online platforms for teaching and learning processes (Google Classroom, Zoom, Google Meet, Webex, and others).</i>					
DC3	<i>Personnel within our colleges can identify new digital opportunities that colleges can take advantage of.</i>					
DC4	<i>Personnel in our college have the competence and skills to follow the dynamics of the development of the required educational program.</i>					
IBS1	<i>Our team of college educators engage in IT projects and operations effectively.</i>					
IBS2	<i>IT projects can be completed promptly according to the strategy and needs of our colleges' educational programs and services.</i>					
IBS3	<i>IT projects and operations are aligned with the goals of our college programs.</i>					
IBS4	<i>IT projects and operations produce solutions and services that benefit the education function and its users.</i>					
DT1	<i>Digital-based educational programs have been successfully launched and can be used optimally.</i>					
DT2	<i>The use of digital technology can optimize our college's operational processes.</i>					
DT3	<i>The digital business model that our college has chosen can be carried out effectively.</i>					
DT4	<i>All users of digital technology in our colleges (students, lecturers, and staff) can collaborate and coordinate effectively through digital platforms, such as Google Classroom, Zoom, Google Meet, Webex, and others.</i>					

Code	Indicator	SD	D	N	A	SA
CP1	<i>Our college has created a new curriculum (online curriculum) that can replace the offline system and meet our college's needs.</i>					
CP2	<i>Our college's online system can improve the quality of educational programs for students.</i>					
CP3	<i>Our college can optimally prepare and maintain the goals and results of the teaching and learning process.</i>					
CP4	<i>Our college maintains student satisfaction with the teaching and learning process.</i>					
CP5	<i>Our college maintains a level of student satisfaction concerning infrastructure.</i>					