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STRATEGIC ALIGNMENT FOR HIGHER EDUCATION'S DIGITAL TRANSFORMATION JOURNEY

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Abstract

This study investigates the role of digital transformation strategy (DTS) and enterprise architecture program (EAP) in enhancing the performance of private higher education institutions (PTS) in LLDIKTI Region IV, West Java, and Banten. Key factors analyzed include university ranking requirements (URR), government regulation (GR), emerging technology (ET), and university governance capability (UGC). Data were collected from 200 PTS leaders using probability sampling and analyzed with Structural Equation Modeling. Findings indicate that URR, GR, ET, and UGC positively influence DTS. DTS significantly strengthens EAP but does not directly impact institutional performance. The study emphasizes the synergy between DTS and EAP to optimize resource management and improve Tridharma activities, ultimately enhancing institutional performance. This research contributes to understanding the strategic alignment necessary for effective digital transformation in higher education.

Keywords: *digital transformation strategy; enterprise architecture program; higher education institution; strategic management*

INTRODUCTION

Research in the field of digital transformation related to higher education institution performance is a new field in the second decade of the 21st century 21 (Castro Benavides et al., 2020). Several studies specifically discuss digital transformation in higher education institutions in Indonesia, such as (Ardiansyah, 2023) discussed the use of SMART Education principles. While the research from (Marina & Yendra, 2022; Nugroho & Hasibuan, 2023; Putri et al., 2021; Suni Astini, 2020; Walilu et al., 2021)discussed digital transformation during the COVID-19 pandemic by examining the importance of using technology to improve students' interest and learning achievement. In addition, there are challenges and opportunities for universities to face the era of technological disruption (Hamdani, 2023; Muchsin, 2021), learning innovation (Firmansyah et al., 2020; Setiawan et al., 2024; Siti Fitriana, 2019; Susanty, 2020), the influence of culture in implementing digital transformation in universities (Hamdani et al., 2021), and various obstacles and challenges in implementing digital transformation in higher education (Aditya et al., 2022; Budiyanto et al., 2024). in addition to the above, several studies discuss the readiness of leaders and strategies of higher education institutions to implement digital transformation (Msila, 2022; Niță & Guțu, 2023; Strielkowski et al., 2022; Wang et al., 2023), Student perspectives on digital transformation in higher education (Bećirović & Dervić, 2023; Thi et al., 2023), as well as various challenges and obstacles to

implementing digital transformation in higher education environments (Aditya et al., 2022; Coral & Bernuy, 2022; Fleaca et al., 2022; Gkrimpizi et al., 2023; Gkrimpizi & Peristeras, 2022).

It is necessary to regulate the digital transformation process in an organization, so the term DTS emerged as a comprehensive strategy and has a cross-functional character so that alignment is needed both with business strategy and with other functional strategies and operational strategies to act as a link between different levels of strategy in the company (Hess et al., 2016; Ismail et al., 2017; Kaufman & Horton, 2015; Matt et al., 2015).

To implement DTS in the performance of higher education institutions, a program called the Enterprise Architecture Program is needed which can accommodate the ever-changing business landscape and trends, support fast and accurate decision-making, and reduce bureaucracy with governance automation (Palvinder Singh, 2019), and manage organizational change comprehensively and be able to describe the key components and relationships of an organization starting from strategy, business processes, information systems, to technology (Yu et al., 2006). This is in line with higher education institutions as organizations that offer services by utilizing the digital technology ecosystem, new tools, and best business practices as their business approach (Mathew et al., 2021).

Business transformation, as explained above, is a challenge faced by higher education institutions. Enterprise architecture is an expression of the main strategy in terms of business, applications, and technology, as well as its impact on processes and functions. Thus, higher education institutions can utilize Enterprise Architecture planning as a tool for implementing broader digital transformation, not limited to the digitalization of lecture content and opening access to online-based educational modules, furthermore, Enterprise Architecture can provide an important contribution to efforts to implement DTS (Sandkuhl & Lehmann, 2017).

The field of Enterprise Architecture in strategic management research has not yet developed rapidly, this can be seen from the utilization of Enterprise Architecture in digital transformation which is still under-explored, especially in improving higher education institution performance (Alamri et al., 2018; Gomes et al., 2020), and the still dominant domain of information systems and technology in Enterprise Architecture research, this can be seen from several studies, such as (Buchory et al., 2019; Martuti et al., 2020; Primadewi & Hanafi, 2020; Umaroh et al., 2020). Thus, the field of digital transformation and Enterprise Architecture in improving the performance of higher education is a very interesting research novelty to conduct further in-depth studies.

The location of the research object chosen was private higher education institution (PTS) in the Higher Education Services Institutes (LLDIKTI) Region IV of West Java and Banten, with the consideration that in addition to being a barometer of Indonesian higher education with the region having the largest number of PTS (439 PTS), it is also based on empirical data that it still requires the best handling and strategies to improve the quality of its institutional performance. The purpose of this study is to obtain the following findings: 1) An overview of URR, GR, ET, UGC, DTS, and EAP, and their impact on the private higher education institution performance (HEIP) in the LLDIKTI Region IV environment, 2) the influence of URR, GR, ET, and UGC on DTS on the HEIP in the LLDIKTI Region IV environment, and 3) the influence of DTS on the HEIP in LLDIKTI Region IV, both directly and through the EAP.

METHODS

This research is conducted using a strategic management approach (Wheelen et al., 2018), with 4 (four) variables resulting from environmental scanning, consisting of external factors university ranking requirement (X_1), government regulation (X_2), and internal factors emerging technology (X_3), university governance capability (X_4), the formulation strategy is represented by the digital transformation strategy variable (X_5, Y_1), and the implementation strategy is the enterprise architecture program variable (M). Meanwhile, evaluation and control are the performance variables of higher education institutions (Y_2). The unit of analysis that will be used as respondents in this study is the heads of a private university in the LLDIKTI Region IV of West Java and Banten.

This research uses the Dynamic Capability theory approach initiated by David J. Teece in 1997 (Situmorang, 2018; Teece et al., 2009), This theory emphasizes that to achieve competitive advantage, one should not only rely on the company's internal resources as the Resources Based View (RBV) theory, but should be directed at producing, obtaining, integrating and disseminating knowledge to reconfigure internal and external competencies to face rapid environmental changes (Murschetz et al., 2020) to achieve new, innovative and agile competitive advantages.

The reason for using the Dynamic Capability theory in this research is that the world of education today must accommodate a rapidly changing external environment (Haarhaus & Liening, 2020). in addition, the impact of the COVID-19 pandemic requires the world of education to adapt to the environment and change their education mode (Fenech et al., 2021; Tomé & Gromova, 2021), Environmental changes and increasing social demands require universities to organize and implement change processes, practice continuous improvement and excellence. Dynamic capability theory helps universities through the change process to achieve their own unique goals and strategies in a dynamic environment, thus there is a need to rethink existing strategies and implement new ones (Fenech et al., 2020).

Based on the variables studied, the type of research used is descriptive and verification research. Descriptive research is conducted to describe something, usually the characteristics of a relevant group, such as consumers, salespeople, or organizations (Vohra, 2014). Through descriptive research, an important picture will be obtained (Crabbe, 1961) regarding respondents' assessments of URR, GR, ET, UGC, DTS, EAP, and the overview of private HEIP in LLDIKTI Region IV. Meanwhile, the data collection method used in this study is the explanatory survey method which is carried out by collecting information using a questionnaire to find out the opinions of some of the population studied regarding the research.

Based on the research variables above, the research paradigm can be described in Figure 1.

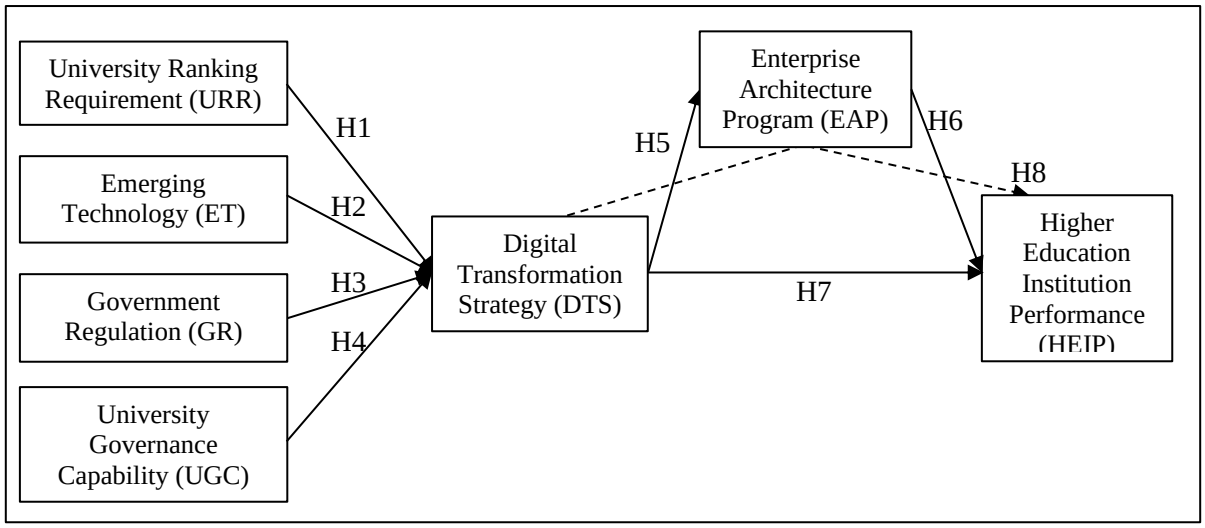

Figure 1. Research Paradigm of Digital Transformation Strategy on the Higher Education Institution Performance

Hypothesis:

1. University Ranking Requirement Positively Affects Digital Transformation Strategy on Higher Education Institution Performance.
2. Emerging Technology Positively Affects Digital Transformation Strategy on Higher Education Institution Performance.
3. Government Regulation Positively Affects Digital Transformation Strategy on Higher Education Institution Performance.
4. University Governance Capability Positively Affects Digital Transformation Strategy on Higher Education Institution Performance.

5. Digital Transformation Strategy Positively Affects Enterprise Architecture Program on Higher Education Institution Performance.
6. Enterprise Architecture Program Positively Affects Higher Education Institution Performance.
7. Digital Transformation Strategy Positively Affects Higher Education Institution Performance.
8. Digital Transformation Strategy Positively Affects Higher Education Institution Performance Through Enterprise Architecture Program.

The population in this study were the heads of PTS in the LLDIKTI Region IV environment, totaling 439 PTS, of which 325 PTS had the characteristic of having their institutions accredited. This study uses probability sampling techniques. The method used is simple random sampling; with these techniques and methods, each element is selected independently from each other element, and the sample is taken randomly from the sampling frame. By the analysis technique used, namely Structural Equation Modeling (SEM), then from 325 PTS, a minimum sample of 200 respondents will be taken.

RESULTS

Higher education in Indonesia plays a strategic role in advancing national intelligence, science, and technology while upholding human values. According to Law No. 12 of 2012, higher education includes diploma, undergraduate, master's, doctoral, professional, and specialist programs. Indonesia has 4,451 higher education institutions, with 64.03% being Private Higher Education Institutions (PTS), 2.81% State Higher Education Institutions (PTN), 29.32% Religious Higher Education Institutions (PTA), and 3.84% Other Ministry/Institution-managed Higher Education Institutions (PTK/L). Of these, 2,975 universities fall under the Directorate General of Higher Education (Ditjen Dikti), comprising 125 PTN and 2,850 PTS. Given the large number of PTS, they are expected to enhance educational services and contribute to producing high-quality graduates. Until 2024, there are 439 PTS managed by LLDIKTI Region IV (source: direktori.lldikti4.id, accessed on July 7, 2024), with the distribution based on the following form: Universities (122), Institutes (24), Colleges (168), Academies (72), Polytechnics (48), Community Academies (3), not yet recorded (2).

The 439 PTS are distributed across West Java (347) and Banten (92). By 2024, the number of PTS with outstanding accreditation has increased from 7 to 8. This improvement is a result of collaborative efforts between LLDIKTI Region IV and BAN-PT to accelerate Higher Education Institution Accreditation (AIPT). These efforts include mentoring programs, recognition through awards during Coordination Meetings, and corrective coaching for institutions that have not yet improved their accreditation status.

LLDIKTI Region IV still faces challenges, with 115 PTS (26.20%) remaining unaccredited. In 2024, the number of Excellent Study Program accreditations increased from 98 to 117, driven by efforts such as accreditation improvement assistance and coaching for study programs with expired or unmet BAN-PT ranking requirements.

There are 226 unaccredited study programs (7.91%) and 444 expired study programs (15.55%), highlighting the need for LLDIKTI Region IV to strengthen guidance and mentoring efforts. According to the 2023 Performance Report, significant progress has been made in lecturer development, with 150 new Full Professors, 216 Associate Professors, and 1,328 Assistant Professors added since 2022. However, a notable issue remains as many Teaching Staff have not submitted proposals to advance to the Assistant Professor level. LLDIKTI Region IV addresses this through initiatives such as coaching clinics for Academic Positions (JAD), assistance in improving academic ranks, and socialization sessions focused on credit accumulation (Table 1).

Table 1. Academic Position of Lecturer

No	Academic Position	Year		
		2021	2022	2023
1	Full Professor	115	137	287
2	Associate Professor	953	1,045	1,261
3	Lektor (Assistant Professor)	5,659	6,823	8,151
4	Asisten Ahli (Assistant Professor)	8,574	9,853	8,613
5	Lecturer	10,567	10,890	10,882
Total		25,868	28,748	29,194

The respondent profile includes university leadership information such as work period, education, academic and current position, leadership experience, age, and gender. Longer work periods are expected to yield more accurate responses due to a better understanding of organizational dynamics. The work period profile is presented in Table 2.

Table 2. Respondents' Work Period

Working Period	Number of Respondents	Percentage (%)
<5 Years	22	11%
5-9 Years	33	16.5%
10-14 Years	44	22%
15-19 Years	27	13.5%
20-24 Years	35	17.5%
>25 Years	39	19.5%
Total	200	100%

Meanwhile, most respondents positions are deputy lecturers/vice chairman/deputy directors. The complete positions/job titles of respondents are presented in Table 3.

Table 3. Respondent's Position/Job Title

Position/Job Title	Number of Respondents	Percentage (%)
Assistant Professor	33	16.5%
Chairman	18	9%
Director	23	11.5%
Deputy Lecturer	46	23%
Vice Chairman	28	14%
Deputy Director	9	4.5%
Head of SPMI	30	15%
Others	13	6,5%
Total	200	100%

The respondents' last education are Master's degree (S2) as many as 51.5% and a Doctoral degree (S3) 48.5%, this is by the provisions of Law Number 14 of 2005 concerning Teachers and Lecturers, which states that lecturers must have a minimum academic qualification of Master's degree (S2) for diploma or undergraduate programs, and Doctorate graduates (S3) for postgraduate programs. The academic positions of university leaders are dominated by Assistant Professors at 54%, followed by Assistant Experts (Assistant Professor) (27.5%), Associate Professor (14%), and Full Professors (4.5%). This also illustrates that based on data (sister.kemdikbud.go.id, accessed July 11, 2024).

The respondents' experience in holding positions as Assistant Professor/Chairman/Director, Deputy Lecturer/Vice Chairman/Deputy Director/Head of SPM/Others, is the highest in the range of <5 years (29%), and 5-9 years (23%), followed by a period of 10-14 years as many as 19.5%, then 15-19 years as many as 10.5%. There are respondents occupying leadership positions 20-24 years as many as 9.5%, even >25 years as many as (7.5%). With work experience >5 years, it is expected that mastery of understanding and leadership strategies to manage the organization will be better.

Respondents are dominated by the male gender at 68%, while the female gender is 32%. In this study, the dominance of male respondents does not indicate that their leadership is better at implementing digital transformation strategies. Meanwhile, the respondents' ages are dominated by productive ages, namely 31-40 years old as many as 15.5%, 41-51 years old as many as 37.5%, 52-60 years old as many as 36%, addition there are leaders with a fairly young age, namely <30 years old as many as 3%, and entering retirement age >61 years as many as 8%. With this age range, the understanding and maturity of leading a university can be relied upon.

Operational variables are a definition given to a variable and/or construct by providing meaning, specifying activities or providing an operation needed to measure the construct or variable (Sangaji & Sopiah, 2010). Based on the research objects that have been presented, it is known that the variables used in this study are university ranking requirements (X_1), government regulation (X_2), emerging technology (X_3), university governance capability (X_4), digital transformation strategy (X_5, Y_1), and enterprise architecture program (M), as well as the private higher education institution performance (Y_2). Table 4 displays the variables to be measured, as follows:

Table 4. Variables to be measured

Variables	Items	References
University ranking requirement	8	(Altbach, 2005; Aula & Tienari, 2011; Bulut-Sahin et al., 2023; Murdowo, 2018; Nazarzadeh Zare et al., 2016; Robinson, 2015; Ruby, 2014)
Government regulation	10	(Minniti, 2008; Rosdiyani et al., 2021)
Emerging technology	8	(Fisher & Baird, 2020; Li et al., 2018; Mbunge et al., 2021; Saib et al., 2023; Visvizi et al., 2019)
University governance capability	10	(Liu & Lim, 2024; Minkevics & Kampars, 2018; Muhsin et al., 2020; Mulya et al., 2023; Wahyudin et al., 2017)
Digital transformation strategy	10	(Anh et al., 2024; Castro Benavides et al., 2020; Leal Filho et al., 2024; Trevisan et al., 2024)
Enterprise architecture program	16	(Alamri et al., 2018; Amin et al., 2024; Palvinder Singh, 2019; Sandkuhl & Lehmann, 2017; Sararuch et al., 2023)
Higher education institution performance	13	(Hidayat et al., 2023; Jufriadi et al., 2022; Kemdikbudristek, 2023; Kiri & Atti, 2021; Kurniadi et al., 2023; Nurhaida et al., 2023; Rahmayani et al., 2024; Soelaiman & Margaretha, 2021; Syah et al., 2023)

Validity testing assesses the extent to which an instrument accurately measures a variable. In this study, Confirmatory Factor Analysis (CFA) using the AMOS program is employed to evaluate whether the questionnaire indicators effectively represent their corresponding variables. An indicator is deemed valid if its loading factor is equal to or exceed 0.50.

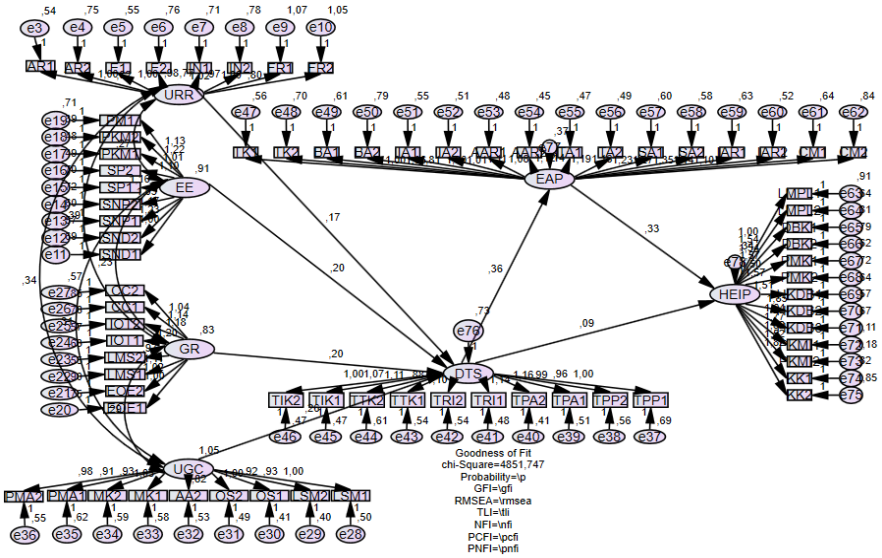

Figure 2. Structural Model

Table 5. Goodness of Fit Result

Goodness of Fit Indexes	Cut Off Value	Model Result	Note
Cmin/df	≤ 2.00	1.909	Fit
RMSEA	≤ 0.08	0.068	Fit
GFI	≥ 0.90	0.627	Marginal Fit
AGFI	≥ 0.90	0.603	Marginal Fit
TLI	≥ 0.90	0.798	Marginal Fit
CFI	≥ 0.90	0.805	Marginal Fit
PCFI	≥ 0.50	0.779	Fit
PNFI	≥ 0.50	0.643	Fit

Based on Figure 2 and Table 5, the goodness of fit test results show that the model accurately represents the relationships among observed variables and explains data variations. This confirms that the model meets the basic assumptions and provides valid insights. Hypothesis testing can be conducted using the Critical Ratio (CR) value in the analysis output, where a high CR value indicates a significant relationship between variables, supporting the proposed hypotheses.

In summary, while the model shows a relatively good fit, further refinements are needed to improve TLI, CFI, GFI, and AGFI values, ensuring a more accurate representation of variable relationships and reliable results.

Table 6. Hypothesis Test Result

Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
DTS	<---	URR	0,168	0,078	2,161	0,031	Supported
DTS	<---	ET	0,201	0,076	2,649	0,008	Supported
DTS	<---	GR	0,197	0,085	2,324	0,02	Supported
DTS	<---	UGC	0,26	0,073	3,549	***	Supported
EAP	<---	DTS	0,363	0,057	6,408	***	Supported
HEIP	<---	EAP	0,329	0,085	3,884	***	Supported
HEIP	<---	DTS	0,087	0,052	1,666	0,096	Not Supported

Based on Table 6, it can be explained that the URR variable has a significant positive effect on DTS. This shows that the higher the university ranking requirements, the better the digital transformation strategy implemented. The ET variable also shows a significant positive effect on DTS, indicating that the implementation of new technology can effectively improve DTS. GR contributes significantly positively to DTS, indicating that supportive government regulations can strengthen digital transformation efforts in higher education institutions. UGC shows a very significant influence on DTS, indicating that this relationship is very strong and reliable. The influence of DTS on EAP is also significant, indicating that a good digital transformation strategy can strengthen enterprise architecture programs in higher education institutions. In addition, EAP shows a significant positive effect on HEIP, indicating that strong EAP contributes to better HEIP.

However, the effect of DTS on HEIP is not significant. This shows that although there is a positive relationship between DTS and HEIP, the relationship is not strong enough to be supported by the existing data, so further research is needed to understand other factors that may affect higher education institution performance.

Table 7 indicates that the relationship between DTS and HEIP is significantly mediated by EAP, as evidenced by the t-statistic value exceeding the t-table.

Table 7. Specific Indirect Paths

Path	T-Statistic	T-Table	Decision
DTS→EAP→HEIP	2,9758	1.9722	supported

Based on Table 7, there is a significant influence between DTS and HEIP mediated by the EAP variable. This shows a positive and significant relationship between DTS and EAP. This finding indicates that both factors support each other in efforts to improve the higher education institution performance. Effective implementation of DTS contributes to the strengthening of EAP, thus enabling institutions to optimize existing processes and structures. The synergy between these two factors plays a vital role in creating an environment that supports the improvement of teaching quality and resource management, which in turn has implications for achieving better performance in the context of higher education.

DISCUSSION

Based on the results of the hypothesis test in this study, the four variables were proven to have a direct influence on DTS. URR serves as a tool to evaluate the quality of universities worldwide and has a direct impact on the implementation of DTS. In line with previous studies such as those conducted by (Fernández et al., 2023; Kaputa et al., 2022; Sannikova et al., 2021), reputation reflected in the institution's ranking can encourage the implementation of DTS in higher education. In addition, GR also plays an important role in influencing the implementation of DTS, as expressed by (Capano et al., 2020; Tungpantong et al., 2022; Wildan Zulfikar et al., 2018). This regulation facilitates the availability of resources, funding, and digitalization policies, which in turn improves the quality of DTS implementation in higher education institutions.

ET also contributes significantly to DTS, as supported by research from (Fernández et al., 2023; Turcu & Turcu, 2021). New technologies help higher education institutions cope with significant changes, as discussed by (Miranda et al., 2021; Visvizi et al., 2019), and enable universities to optimize operations and take advantage of market opportunities (Mohamed Hashim et al., 2022). the presence of innovative technology facilitates the digital transformation process at universities.

From an internal organizational perspective, UGC also has a significant impact on the success of DTS. Transparent, accountable, and participatory management (Øvrelid, 2022; Rusdi et al., 2023) It is important to ensure the readiness of human resources and refinement of the governance framework by the demands of the digital era, thus enabling a more effective implementation of DTS in higher education. In short, UGC has been shown to have a significant direct influence on the implementation of DTS.

DTS plays a significant role in supporting growth and increasing the competitiveness of organizations (Cervinka & Novak, 2022). HEIP as an entity with a high level of competition in the academic realm is also affected by the implementation of DTS (Anh et al., 2024; Castro Benavides et al., 2020; Leal Filho et al., 2024; Trevisan et al., 2024), especially in supporting sustainable development goals. However, the results of the hypothesis testing indicate that there is no direct influence between DTS and HEIP. The influence of DTS on HEI performance will only be significant if mediated by EAP. This finding is consistent with several studies (Mathew et al., 2021; Palvinder Singh, 2019; Sandkuhl & Lehmann, 2017; Sararuch et al., 2023; Yu et al., 2006), which confirms that EAP plays a key role in supporting DTS implementation in HEIP. To ensure effective DTS implementation, an adaptive EAP is needed to help institutions deal with changing business environments, accelerate decision-making, reduce bureaucracy, and support organizational transition through the optimization of strategies, processes, information systems, and technologies. This approach is in line with HEIP's role as a service provider that integrates digital technologies, innovative tools, and more efficient and effective business methodologies.

CONCLUSIONS

This study concludes that institutional factors significantly influence digital transformation strategies and higher education performance. University Ranking Requirements (URR), Emerging Technology (ET), Government Regulation (GR), and University Governance Capability (UGC)

positively impact the Digital Transformation Strategy (DTS), highlighting their crucial role in advancing digital initiatives within higher education. Private institutions in LLDIKTI Region IV must effectively leverage environmental scanning to develop strategies that integrate digital technology and innovation into teaching, research, community service, and administration. These efforts aim to enhance education quality, efficiency, accessibility, and student readiness for the digital era.

Additionally, DTS significantly strengthens the Enterprise Architecture Program (EAP), which positively impacts Higher Education Institution Performance (HEIP). However, the direct effect of DTS on HEIP is not significant, underscoring EAP's role as a mediator. EAP enables alignment among strategies, processes, systems, and technology, ensuring institutional components work cohesively to achieve their goals.

The findings underline the critical synergy between DTS and EAP in fostering an environment conducive to institutional excellence. This synergy enhances resource management efficiency, the quality of higher education's Tridharma, and overall institutional performance. By aligning digital strategies with enterprise architecture, institutions can effectively navigate the digital era while maintaining competitiveness and delivering impactful education.

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