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# The Mediating Role of Higher Education Pillars in the Effect of Digital Transformation on Lecturer Performance

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**Abstract.** This study examines the impact of digital transformation on lecturer performance in higher education institutions (HEIs), with a specific focus on the mediating role of the three fundamental higher education pillars: teaching, research, and community service. It aims to assess how the integration of digital technologies enhances academic productivity and institutional effectiveness while identifying potential challenges in the adoption process. A quantitative research design was employed, utilizing survey data collected from 355 lecturers at private universities in Indonesia. Structural equation modeling (SEM) was applied to analyze the relationships between digital transformation, the higher education (HE) pillars, and lecturer performance. The results indicate that digital transformation positively influences lecturer performance, primarily through its impact on teaching quality, research output, and community engagement. The higher education pillars serve as a significant mediator, reinforcing the indirect effects of digitalization on academic performance. However, challenges such as digital literacy gaps, adaptation difficulties, and technological barriers hinder the full realization of digital transformation's benefits.

**Keywords:** Digital Transformation; Higher Education Pillars; Lecturer Performance; Higher Education Institutions; Indonesia

## 1. Introduction

The rapid development of Fourth Industrial Revolution (4IR) technologies, such as the Internet of Things (IoT), robotics, 3D printing, nanotechnology, big data, and artificial intelligence (AI), has created a pressing need for universities to cultivate leadership with strong digital competencies (Prabowo & Bandur, 2022). The emergence of Industry 4.0 and Society 5.0 has significantly reshaped organizational structures by necessitating the adoption of digitalized business

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processes, innovative product development, and improved service delivery (Rodríguez-Abitia & Bribiesca-Correa, 2021). Higher education institutions (HEIs) are not exempt from these transformations, as technological advancements have become integral to their operational and pedagogical frameworks (Chauca et al., 2021). The COVID-19 pandemic has further underscored the urgency of digital transformation in HEIs, positioning it as a strategic necessity rather than an optional enhancement (Deja et al., 2021; Garcez et al., 2022). Scholars widely recognize digital transformation as a defining characteristic of modern higher education, with significant acceleration in adoption over the past decade (Rodríguez-Abitia & Bribiesca-Correa, 2021; Tømte et al., 2020).

However, despite the growing recognition of the importance of digital transformation, universities have been slow to adapt compared to other industries. This lag is attributed to inadequate leadership, resistance to cultural change, and a lack of comprehensive digital strategies (Cabero-Almenara et al., 2021). To bridge this gap, HEIs must develop strong leadership and human capital management strategies that foster digital capabilities, ensuring that faculty, administrators, and students are equipped to navigate and leverage digital technologies effectively.

The successful implementation of digital transformation in higher education relies heavily on leadership dimensions such as organizational support, change management, and the engagement of institutional stakeholders (Rodríguez-Abitia & Bribiesca-Correa, 2021). Scholars emphasize that a top-down approach, with strong administrative backing and a well-defined digital leadership strategy, is critical to overcoming existing barriers and enabling sustainable digital transformation in HEIs (Bond et al., 2018; Chauca et al., 2021).

While institutional leadership and digital transformation are critical factors in shaping the future of higher education, understanding how these dynamics influence lecturer performance across different university contexts remains essential, particularly in diverse educational landscapes such as Indonesia. Previous research by Nelly et al. (2024) has examined lecturer performance in private universities within the Greater Jakarta area. However, the scope of their study was limited to institutions classified as top-tier private universities, specifically those with an A ranking.

While such studies provide valuable insights into lecturer performance at high-ranking institutions, they do not capture the full spectrum of variations that may exist across universities with different accreditation levels. Given that private universities in Indonesia vary significantly in terms of resources, institutional support, student demographics, and academic expectations, focusing exclusively on high-ranking institutions presents only a partial view of the overall landscape.

To address this gap, this study incorporates both high-ranking and lower-ranking private universities. By doing so, it aims to provide a more comprehensive understanding of lecturer performance that accounts for diverse institutional contexts. Lower-ranking universities often face distinct challenges, such as limited

funding, fewer research opportunities, and constrained professional development programs, all of which can influence faculty performance and overall educational quality. Including both categories of universities allows for a comparative analysis that highlights disparities, identifies potential areas for improvement, and ensures that findings are applicable to a wider range of institutions.

Several studies highlight the impact of digital transformation on lecturer performance, emphasizing its role in enhancing teaching effectiveness and digital competency. Arifin and Sukmawidjaya (2020) found that, despite initial gaps in technological knowledge, lecturers who adopted digital tools improved their instructional effectiveness. Similarly, Tripathi and Urkude (2022) noted that the success of digital transformation during the COVID-19 pandemic depended on instructors' willingness and digital proficiency, stressing the need for technical resources and training. Zhu and Jin (2023) further revealed that strong digital leadership enhances lecturers' technological capabilities, facilitating better integration of digital tools in teaching. These findings underscore the importance of institutional support and leadership in optimizing digital transformation in higher education.

A review of the Scopus database revealed a lack of studies examining the mediating role of higher education pillars—education, research, and community service—in the relationship between digital transformation and lecturer job performance. Consequently, one of the key objectives of this study is to investigate how these fundamental pillars mediate the impact of digital transformation on the job performance of lecturers in private universities.

This study provides a valuable contribution to the discourse on private universities, particularly within the Indonesian context. Despite a growing commercial interest in higher education, with private institutions comprising 96% of all universities in the country, these institutions have faced persistent challenges related to weak governance, substandard educational quality, and inadequate accreditation (Hidayat et al., 2023). The low certification rates among faculty members have been associated with deficiencies in lecturer performance, particularly in terms of research output. Compared to public universities, the majority of private institutions in Indonesia struggle with reputational issues (Rajagukguk, 2023). In response to these concerns, the Ministry of Education, Culture, and Technology of the Republic of Indonesia mandated the merger of 692 private higher education institutions between 2020 and 2022 (Nua, 2022).

The Government of Indonesia, through the Ministry of Education and Culture, has undertaken continuous efforts to enhance the quality and autonomy of both public and private universities. In line with these efforts, the Ministry recently introduced Regulation No. 53/2023 on Higher Education Quality Assurance, serving as an operational framework for the implementation of Law No. 14/2005 on teachers and lecturers and Law No. 12/2012 on higher education. These legal provisions define Indonesian lecturers as professional educators and researchers responsible for advancing, developing, and disseminating knowledge in science, technology, and the arts through education, research, and community service.

Against this regulatory backdrop, this study aims to examine (1) the direct effect of digital transformation on lecturer performance; and (2) the mediating role of the three core pillars of higher education – education, research, and community service – in this relationship.

## **2. Literature Review**

### *2.1. Digital Transformation in Higher Education*

Digital transformation has emerged as a pivotal force in higher education, reshaping institutional structures and academic practices. Unlike digitalization, which focuses on automating existing processes, digital transformation represents a more profound shift, redefining business models, operational strategies, and institutional cultures (Kääriäinen et al., 2020). Studies highlight the role of digital competencies, leadership, and institutional infrastructure as critical determinants of successful digital shift in academia (Deja et al., 2021).

However, challenges such as governance inefficiencies, resource constraints, and varying levels of technological readiness persist, particularly in developing nations (Rueckel et al., 2020). Furthermore, research suggests that while digital adoption enhances institutional efficiency and innovation, its implementation often suffers from high failure rates due to unrealistic expectations, weak governance, and misaligned strategic planning (Wade & Shan, 2020). Achieving sustainable digital transformation, therefore, necessitates a balanced approach that incorporates strong leadership, institutional adaptability, and comprehensive digital strategies to enhance lecturer performance and overall institutional success.

The conceptualization of digital transformation in higher education has been examined through various theoretical frameworks, emphasizing the importance of key pillars such as digital literacy, information empowerment, and information culture (Deja et al., 2021). Empirical findings suggest that while information management alone does not directly influence information use, digital literacy and self-efficacy significantly contribute to institutional transformation. Additionally, scholars view digital transformation as an evolutionary process that leverages advanced technologies to drive institutional modernization across teaching, research, and administration (Rodríguez-Abitia & Bribiesca-Correa, 2021).

This transformation fosters value creation by improving academic workflows, facilitating innovative pedagogies, and enhancing institutional decision-making (Rof et al., 2020). However, despite its potential benefits, the success of this transformation in higher education depends on the extent to which institutions align digital initiatives with broader strategic goals, ensuring that technological advancements translate into meaningful academic and operational improvements.

Beyond its technological implications, digital transformation redefines organizational structures and socioeconomic interactions in higher education. Scholars emphasize its impact on institutional culture, governance frameworks,

and operational mechanisms, positioning it as both a technological shift and an institutional transformation (Hinings et al., 2018). As part of the Fourth Industrial Revolution, digital reform necessitates the adoption of new competencies, requiring universities to rethink their roles in a digitally driven academic landscape (Abad-Segura et al., 2020). It is a multidimensional process that influences technological, organizational, and social aspects of higher education, shaping business models and academic interactions (Reis et al., 2018).

Digital transformation reshapes how teaching, research, and community service are delivered in higher education: its success directly influences lecturer performance by enabling innovation, improving efficiency, and aligning academic roles with evolving institutional goals.

### *2.2. Lecturer Performance*

Lecturer performance is a multidimensional construct that encompasses task performance, productivity, and discipline. Task performance pertains to the execution of essential academic responsibilities, including curriculum development, instructional delivery, and student assessment (Khaeroni et al., 2023). Lecturers who consistently meet institutional deadlines and uphold high-quality standards are often acknowledged by their supervisors and peers for their efficiency and effectiveness. Prior research indicates that self-regulatory competencies, such as effective time management and goal-setting abilities, serve as significant predictors of task performance, thereby enhancing instructional quality (Yu et al., 2022). Furthermore, empirical findings suggest that intrinsic motivation and job satisfaction contribute positively to lecturers' performance, as individuals who derive fulfillment from their professional roles demonstrate greater dedication and engagement in their academic responsibilities (Suryaman, 2018).

Productivity within the academic sector extends beyond instructional duties to encompass research output, scholarly publications, and broader contributions to academic discourse (Harahap et al., 2020). Academics who maintain a commitment to high-quality work within constrained timeframes and optimize the use of institutional resources without compromising standards are often regarded as highly productive. The capacity to efficiently prioritize tasks to enhance output while minimizing inefficiencies is fundamental to academic success (Saragih et al., 2020). Empirical evidence further suggests that transformational leadership, effective communication, and motivational factors significantly influence lecturer productivity, with communication emerging as a predominant determinant (Andriani et al., 2020). Moreover, the integration of technological advancements into academic workflows has been found to enhance productivity by streamlining administrative functions and facilitating research endeavors (Sugandini et al., 2021).

Discipline, defined as consistent adherence to institutional norms and proactive engagement in professional responsibilities, has been positively associated with perceived teaching effectiveness and the cultivation of institutional trust (Ismail, 2021; Puspita et al., 2024). Lecturer performance is increasingly shaped by digital

transformation, which affects how tasks are performed, research is produced, and services are delivered. Understanding this link is key to enhancing academic effectiveness across all higher education pillars.

### 2.3. Higher Education Pillars

*Tridharma*, or the Three Pillars of Higher Education, serves as the foundation for academic responsibilities in Indonesia, encompassing *education, research, and community service* (Sartima, 2021). Mandated by Law No. 14 of 2015, these pillars define the role of lecturers as both scholars and professionals, ensuring the advancement and dissemination of knowledge, technology, and the arts (Muhajirin et al., 2023). Education remains the primary responsibility of higher education institutions, with national accreditation bodies such as *Badan Akreditasi Nasional Perguruan Tinggi* (BAN-PT) overseeing curriculum development and quality assurance. Continuous improvements in academic standards and pedagogical methods ensure that universities align with national development goals and global benchmarks (Rodríguez-Abitia & Bribiesca-Correa, 2021).

Research plays a critical role in fostering scientific and technological advancements, with strong government support for funding, industry partnerships, and international collaboration (Deja et al., 2021). Lecturers are assessed based on research output, journal publications, and participation in academic conferences. Universities emphasize scholarly contributions to national and international journals, as research productivity directly impacts institutional rankings such as SINTA (Science and Technology Index) (Garcez et al., 2022). However, challenges such as limited funding, publication pressures, and weak interdisciplinary collaboration persist (Tømte et al., 2020). Reforms continue to address these issues by strengthening research capacity, increasing funding allocations, and improving institutional research policies to enhance global competitiveness (Bond et al., 2018).

Community service ensures that universities contribute beyond academia by engaging with society through training programs, policy contributions, and collaborations with government and non-governmental organizations (Gómez-Hurtado et al., 2021). Lecturers participate in public outreach initiatives, community development projects, and expert consultation, ensuring practical application of academic knowledge for societal benefit (Chauca et al., 2021). Performance assessment in this domain measures the societal impact of these initiatives. However, challenges such as funding constraints and lack of institutional support require policy refinements to ensure the sustainability of community engagement (Rodríguez-Abitia & Bribiesca-Correa, 2021). Indonesian universities enforce a lecturer workload system, known as *Beban Kerja Dosen* (BKD) as a structured evaluation system to balance education, research, and community service contributions.

The pillars of education, research, and community service are deeply affected by digital transformation. Its integration redefines lecturer roles, making digital readiness essential for effective performance across these core academic functions.

### 3. Hypothesis Development

#### 3.1. Digital transformation and higher education pillars

Digital transformation has emerged as a pivotal force in reshaping higher education, profoundly influencing the higher education pillars - education, research, and community service (Paños-Castro et al., 2024). As the education sector experiences disruptions driven by Industry 4.0, higher education institutions (HEIs) must integrate digital technologies to enhance pedagogical methodologies, curriculum development, and faculty professional growth. The proliferation of e-learning platforms, virtual classrooms, and artificial intelligence-driven educational tools has revolutionized traditional pedagogical approaches, fostering a more flexible, adaptive, and student-centered learning environment (Martin & Xie, 2022).

In Indonesia, the *Merdeka Belajar Kampus Merdeka* (MBKM) initiative underscores the imperative of digital shift by advocating for an education system that is more closely aligned with industry requirements while promoting experiential learning beyond conventional classroom settings (Vhalery et al., 2022). By leveraging digital technologies, universities can enhance accessibility, facilitate interactive learning experiences, and equip faculty members with the necessary pedagogical competencies to deliver high-quality instruction in a digitally mediated environment (Manurung et al., 2023). This paradigm shift is essential not only to prepare graduates for an increasingly dynamic labor market but also to uphold the fundamental objectives of higher education, ensuring the cultivation of critical thinking, problem-solving abilities, and interdisciplinary expertise (Deja et al., 2021).

In addition to education and research, digital transformation is redefining the way HEIs engage with communities, reinforcing the *Tridharma's* emphasis on societal service and impact. The expansion of digital platforms has enabled universities to extend their outreach beyond traditional community engagement initiatives, facilitating virtual public lectures, online skill development programs, and digital-based community empowerment projects (Tømte et al., 2020). These initiatives allow HEIs to play a more proactive role in addressing societal challenges, such as reducing educational disparities, expanding remote learning opportunities for underserved populations, and fostering knowledge exchange with industry and government stakeholders (Vhalery et al., 2022).

However, the efficacy of such digital community service programs is contingent upon faculty members' ability to integrate technology into their outreach efforts and the institutional commitment to providing adequate resources and policy support (Garcez et al., 2022). As HEIs continue to evolve in response to digitalization, embedding technology into education, research, and community service will be crucial for sustaining institutional relevance, enhancing global competitiveness, and maximizing societal contributions. Therefore, the integration of digital transformation into HEIs is hypothesized to positively influence the effectiveness and sustainability of the higher education three pillars, reinforcing universities' roles as centers of knowledge production and drivers of social progress (UNESCO, 2024). Thus, the following hypothesis is proposed:

*Hypothesis 1. Digital transformation positively affects higher education pillars.*

### 3.2. Higher education pillars and lecturer performance

Higher education institutions operate on three fundamental pillars: teaching, research, and community service, collectively known as *Tridharma Perguruan Tinggi* in Indonesia. These pillars define the academic roles of lecturers and serve as the foundation for institutional success and lecturer performance (Lubis et al., 2022). Teaching ensures the effective dissemination of knowledge, research drives intellectual advancement, and community service strengthens the societal impact of academic institutions. The integration of these three components plays a crucial role in shaping lecturer effectiveness, professional growth, and institutional excellence (Retnowati et al., 2021). Studies indicate that HEIs that support balanced engagement across teaching, research, and community service demonstrate higher lecturer productivity, motivation, and job satisfaction (Tannady & Zami, 2020). Consequently, these three pillars positively affect lecturer performance by fostering a holistic approach to academic responsibilities.

Teaching is a primary responsibility of lecturers, ensuring students receive quality education that aligns with evolving industry and societal needs. Effective teaching, therefore, requires lecturers to stay updated on new developments in their respective fields, often necessitating engagement with research and professional learning (Dumiyati & Yusuf, 2021). Research suggests that integrating research findings into teaching practices enhances curriculum relevance, critical thinking skills, and student engagement, ultimately benefiting both lecturers and learners (Samosir, 2020). Furthermore, technological advancements and digital transformation in HEIs facilitate innovative teaching methodologies, allowing lecturers to optimize their instructional effectiveness (Lubis et al., 2022).

Research and community service play complementary roles in supporting lecturer performance. Research activities expand academic knowledge and improve lecturers' analytical skills, which directly enhance their teaching and institutional contribution (Retnowati et al., 2021). In addition, publishing scholarly work and engaging in research collaborations elevate a lecturer's professional standing, improving job satisfaction and institutional recognition (Lubis et al., 2022). Meanwhile, community service enables lecturers to apply their expertise in real-world settings, fostering deeper connections between academia and society (Dumiyati & Yusuf, 2021). Participation in community programs not only enhances societal impact but also enriches research opportunities and strengthens professional competencies (Samosir, 2020). Therefore, the HE pillars collectively contribute to lecturer performance by integrating theoretical knowledge with practical applications, fostering academic innovation, and strengthening institutional engagement. Thus, the following hypothesis has been developed:

*Hypothesis 2. Higher education pillars positively affect lecturer performance.*

### 3.3. *Mediating role of higher education pillars*

Digital transformation has become a pivotal force in reshaping higher education institutions), profoundly influencing the core pillars of education, research, and community service. The integration of digital technologies into academic environments has been shown to enhance lecturer performance by fostering innovation and efficiency across these three domains (Martin & Xie, 2022). This perspective underscores the necessity for HEIs to embrace digital transformation as a strategic approach to remain competitive in the global education landscape (Morgan, 2024).

The educational pillar benefits significantly from this transformation through the adoption of e-learning platforms, virtual simulations, and digital collaboration tools, which collectively enrich teaching methodologies and enhance student engagement (Liferay, 2024). However, the successful integration of these technologies is contingent upon lecturers' digital proficiency and their ability to navigate and adapt to the dynamic transformations in educational paradigms. (Allouche, 2024). Research indicates that while digital tools offer new avenues for instructional delivery, their effectiveness is contingent upon educators' proficiency and comfort with these resources.

In the realms of research and community service, digital transformation streamlines processes and fosters greater collaboration. The automation of administrative tasks and the utilization of digital research tools allow lecturers to allocate more time to scholarly activities and community engagement (Reporter, 2024). Moreover, digital platforms facilitate access to global research networks, enabling collaborative projects that transcend geographical boundaries (Morgan, 2024). This interconnectedness not only amplifies research productivity but also enhances the societal impact of academic endeavors. However, to fully realize these benefits, HEIs must invest in robust digital infrastructures and cultivate an organizational culture that embraces technological advancements (Budenberg, 2024). By doing so, the HE pillars can effectively mediate the positive effects of digital transformation on lecturer performance, leading to improved educational outcomes and societal contributions. Therefore, a hypothesis is proposed:

*Hypothesis 3. Higher education pillars positively mediate the effect of digital transformation to lecturer performance.*

### 3.4. *Digital transformation and lecturer performance*

Digital transformation has a significant positive effect on lecturer performance by optimizing teaching methodologies, increasing efficiency, and enhancing engagement in higher education institutions. As digital tools become more integrated into academic settings, lecturers can leverage innovative platforms such as e-learning, virtual simulations, and digital collaboration tools to improve instructional delivery and student learning outcomes (Rafiq et al., 2024). However, while technology facilitates new ways of teaching, its effectiveness depends on lecturers' ability to adapt and utilize digital resources effectively. The 2013 Indonesian curriculum reform emphasized the importance of integrating digital tools into teaching practices to foster innovation and creativity among educators. Despite this mandate, the adoption of digital technology in education

has, however, not yet reached its full potential due to skill gaps and institutional limitations (Santoso et al., 2020). Thus, training programs and digital competency development are essential to ensure that lecturers can effectively integrate technology into their teaching processes.

Beyond enhancing instructional effectiveness, digital transformation improves overall lecturer performance by streamlining administrative tasks, facilitating research activities, and improving collaboration with colleagues and students. The automation of academic processes, such as grading systems, online assessments, and digitalized student management, allows lecturers to focus more on pedagogical development and research (Loonam et al., 2018). Furthermore, digital platforms provide new opportunities for professional growth, enabling lecturers to access global research networks, attend virtual conferences, and collaborate with international institutions (Garcez et al., 2022). The integration of digital tools in research enhances productivity by improving access to academic resources and data analytics, which contributes to higher-quality research output. However, challenges remain in ensuring that lecturers receive adequate institutional support, infrastructure, and training to fully leverage technological transformation in their professional roles (Tømte et al., 2020).

Moreover, digital transformation positively influences lecturer job satisfaction and motivation, which are critical factors in performance outcomes. Organizational research highlights that job satisfaction is shaped by factors such as technological infrastructure, working conditions, and opportunities for professional growth (Purwanto et al., 2021). By reducing administrative burdens, increasing flexibility, and promoting innovative teaching and research methods, digital integration enhances lecturers' overall work experience and career satisfaction. Therefore, it is hypothesized that digital transformation positively affects lecturer performance by enhancing teaching effectiveness, research productivity, and job satisfaction, ultimately contributing to the overall improvement of higher education institutions. Based on these theoretical and empirical insights, the following hypothesis has been formulated:

*Hypothesis 4. Digital transformation positively affects lecturer performance.*

## **4. Methods**

### *4.1. Research design and sample*

The research design adopted for this study was an empirical quantitative survey. The target population comprised both high-ranking and lower-ranking private universities under the Higher Education Service Body for Greater Jakarta, formally recognized as *Lembaga Layanan Pendidikan Tinggi (LLDIKTI) Wilayah III Jakarta*. The sample was drawn from 30 private universities in Jakarta. The target population consisted of lecturers from both high-ranking and lower-ranking private universities affiliated with *LLDIKTI III*. These institutions were selected based on their performance evaluations in the domains of teaching, research, and community service, ensuring that the sample reflected a diverse range of institutional capacities and academic environments.

To analyze the collected data and evaluate the validity of the theoretical framework and hypotheses, structural equation modeling (SEM) was employed. Widely utilized for validating causal models and theoretical relationships (Altikriti & Anderson, 2020), this analytical approach enables the simultaneous assessment of complex relationships, including both direct and indirect effects among latent variables. SEM is primarily a confirmatory technique rather than an exploratory one, ensuring the rigor of hypothesis testing.

The sampling frame comprised 9,634 lecturers, representing the total population across the 30 selected private universities. A stratified random sampling technique was employed to ensure proportional representation from institutions with differing accreditation levels. To determine the required sample size, Slovin's formula was applied with a 95% confidence level and a 5% margin of error, resulting in a target of approximately 370 respondents. However, to account for potential non-response and incomplete submissions, a total of 850 questionnaires were distributed via institutional email lists and professional networks. Among the 406 questionnaires returned, 51 were excluded due to missing data, leaving 355 valid responses for further analysis. The demographic characteristics of the respondents are summarized in Table 1.

**Table 1: Sample demographic profiles**

Variable	Category	Frequency	Percentage (%)	N
Gender	Male	190	53.5	355
	Female	165	46.5	
Age	28-31 year old	38	10.7	355
	32-35 year old	58	16.3	
	36-39 year old	129	36.4	
	40-43 year old	130	36.6	
Education	Master's	271	76.3	355
	PhD	84	23.7	
Academic rank	Assistant professor ( <i>Asisten Ahli</i> )	207	58.3	355
	Senior lecturer ( <i>Lektor</i> )	148	41.7	

The demographic analysis results indicate that 53.5% of the respondents were male, while 46.5% were female. Regarding age distribution, 10.7% of the participants were between 28 and 31 years old, 16.3% fell within the 32–35 age group, 36.4% were aged 36–39, and the remaining 36.6% were between 40 and 43 years old. These figures suggest that the lecturers surveyed in this study predominantly comprised individuals with established career trajectories (Robbins et al., 2013). In terms of educational qualifications, 23.7% of the lecturers held a PhD degree, whereas the majority (76.3%) had obtained a master's degree. With respect to academic rank, 58.3% of the respondents were *Asisten Ahli* (Assistant professor), while 41.7% held the title of *Lektor* (Senior lecturer).

#### 4.2. Measures

As previously mentioned, this study primarily utilized a survey questionnaire as the primary data collection instrument. The questionnaire was structured into two sections. The first section focused on demographic variables, including gender, age, highest educational qualification, academic position, and academic rank. The second section contained items designed to assess the latent variables examined in this study. These variables included digital transformation, which consists of information management, information culture and digital literacy. It also measured higher education's three pillars, encompassing education, research and publication, and community service, as well as lecturer performance, which was evaluated through task performance, productivity, and discipline. The measurement scales for these constructions are well-established in existing academic literature, and this study adopted them with necessary modifications to align with the research objectives.

To measure digital transformation this study adapted a scale from Deja et al. (2021). The scale encompasses three key dimensions of digital transformation: information management, information culture, and digital literacy. The sample items were (1) information management (I utilize technology to monitor and enhance my performance in real time; I am skilled in handling the complexities of new technology implementation; I efficiently address challenges in the digitalization of academic operations; The technology I use ensures transparency in reporting and data management); (2) information culture (I actively integrate technology to enhance student interaction; I routinely use digital platforms to facilitate internal and external communication; I am committed to adopting new technologies that improve operational efficiency; I continuously follow technological trends to remain competitive); (3) digital literacy (I incorporate digital technology into my daily teaching and learning activities; I leverage digital tools to optimize the lecture process). Respondents rated their agreement with these statements using a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

The scale of higher education's three pillars in this study was adapted from Purba (Purba, 2015). HE pillars were measured using 15 items, categorized into three dimensions: (1) teaching (I have mastery over the subject matter I teach; I excel in classroom management during lectures; I apply effective teaching strategies and methods; I design and develop course materials; I collaborate with colleagues in team teaching); (2) research and publication (I actively engage in conducting both individual and group research; I consistently publish scholarly articles in national and international journals; I continuously study research methodologies to improve my research skills; I regularly read recent academic journals in my field; I provide critical reviews of others' research findings.); and (3) community services (I actively participate in community outreach activities; I develop research outcomes that benefit society; I hold intellectual property rights for my work; I have published articles related to community service activities; I conduct campaigns to raise public awareness about environmental protection). Responses were collected using a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

The lecturer's performance scale utilized in this study was adapted from previous research conducted by Nyoto (2021). This scale comprised 12 indicators, divided into three dimensions: (1) task performance (I consistently complete tasks within the university's designated deadlines; I frequently receive additional assignments due to my efficiency in completing tasks; My work consistently meets established quality standards; My performance is recognized by both supervisors and colleagues); (2) productivity (I strive to produce high-quality work, even within limited time constraints; I efficiently complete tasks using minimal resources without compromising quality; I effectively prioritize tasks to maximize productivity and minimize wasted time; I achieve work targets by optimizing time and energy); (3) discipline (I am always punctual and adhere to designated working hours; I comply with all workplace regulations and procedures; I follow instructions from supervisors with discipline and accuracy; I proactively seek ways to enhance my performance, even without direct guidance). Participants responded to these statements using a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

## 5. Results of Analysis and Hypothesis Testing

### 5.1. Measurement model (validity and reliability)

For this study, covariance-based structural equation modeling (SEM) was employed rather than component-based or partial least squares (PLS) modeling. In the field of management research, covariance-based SEM is often preferred due to the latent variable nature of the research constructs and its strong theoretical foundation (Johansson, 2018). Before testing the structural model, it was necessary to first evaluate the measurement model. A first-order confirmatory factor analysis (CFA) model was assessed to determine the best fit for the data.

Figure 1 presents the validity test using CFA with AMOS v.25, where only loading factors above the acceptable threshold of 0.50 were considered valid (Byrne, 2016; Hair Jr. et al., 2019). Initially, 10 items were used to measure digital transformation, but three items were found to be invalid. Similarly, 15 items were used to measure three higher education pillars, yet only seven were retained after validity testing. Regarding lecturer performance, 12 original items were included, but five were removed due to issues with validity.

To further assess the statistical significance of the measurement model, Table 2 provides an analysis of the factor loadings. According to previous research (Surucu et al., 2021), t-values exceeding 1.96 indicate a statistically significant measurement model. The results of the CFA analysis in this study demonstrated that the standardized factor loadings for the observed variables exceeded 0.50, while the t-values were greater than 1.96, confirming the strong factorability and validity of the model.

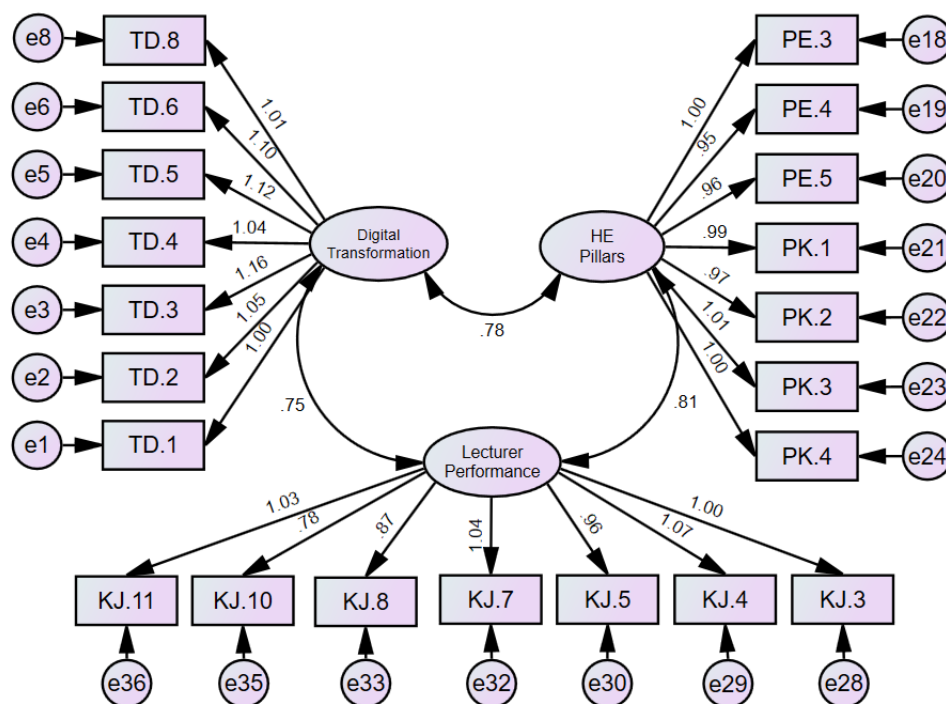


Figure 1: Validity measure using confirmatory factor analysis (Source: Authors' own creation/work)

### 5.2. Measurement model (model fit)

It is important to note that the loading factor values alone are insufficient to determine the acceptability of the research model, as the goodness-of-fit indices must also be considered. Therefore, following the recommendations of statistical experts (Byrne, 2016; Hair Jr. et al., 2019; Whittaker & Schumacker, 2022), the goodness-of-fit assessment was conducted using AMOS v.25.

Table 2: Validity and reliability of the scales

Construct	Items	Loading factor	t-value	$\alpha$	CR	AVE
Digital Transformation	TD.1	0.737	15.075	0.905	0.906	0.579
	TD.2	0.753	15.123			
	TD.3	0.789	15.926			
	TD.4	0.751	15.075			
	TD.5	0.776	15.634			
	TD.6	0.772	15.547			
	TD.8	0.745	14.944			
	Higher Education Pillars	PE.3	0.801			
PE.4	0.749	16.464				
PE.5	0.767	17.004				
PK.1	0.766	16.968				
PK.2	0.760	16.800				
PK.3	0.782	17.476				
PK.4	0.765	16.947				
Lecturer Performance	KJ.3	0.765	16.252	0.893	0.893	0.545
	KJ.4	0.785	16.356			

KJ.5	0.741	15.268
KJ.7	0.773	16.058
KJ.8	0.686	13.933
KJ.10	0.623	12.491
KJ.11	0.779	16.203

Source(s): Authors' own creation/work

As shown in Table 3, the model fit results indicate that the model achieves an acceptable fit based on the recommended statistical criteria (Byrne, 2016; Hair Jr. et al., 2019; Whittaker & Schumacker, 2022).

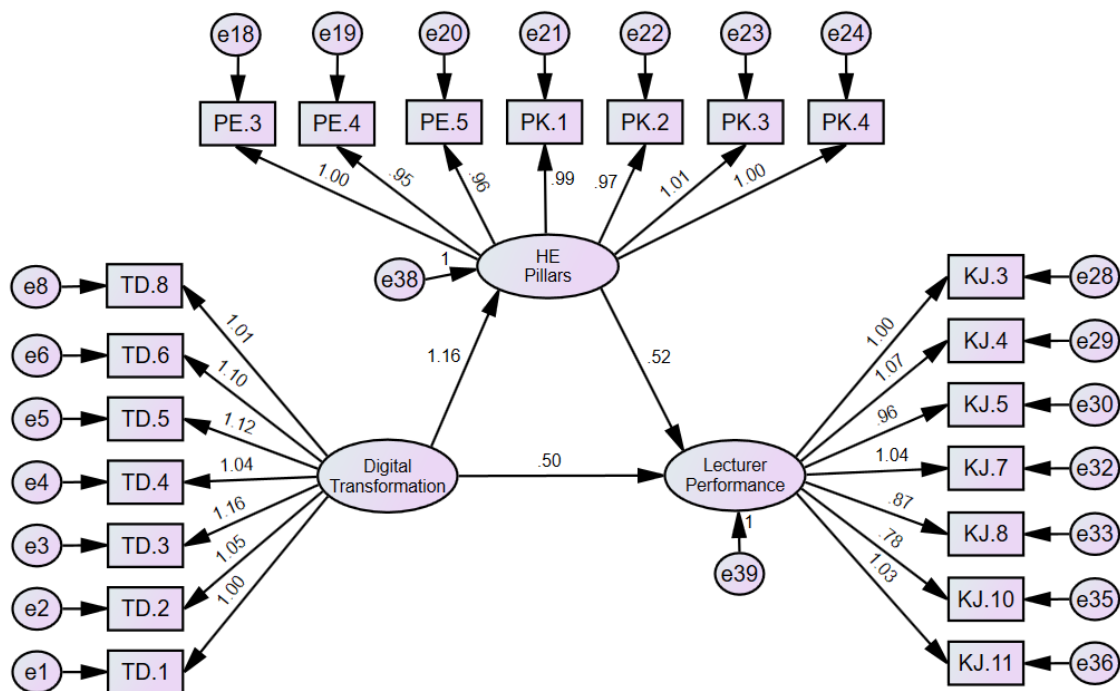
### 5.3. Structural model

A structural equation modeling approach, incorporating both a structural model and confirmatory factor analysis (CFA) (Figure 2), was employed to assess the relationship between observed variables (indicators) and their corresponding latent variables (constructs). Additionally, a path coefficient analysis was conducted to examine the statistical significance of the proposed hypotheses. These analytical procedures represent a specialized application of SEM aimed at evaluating the covariance among latent variables.

**Table 3: Model fit statistics summary**

No	Goodness of fit test	Recommended	Obtained	Conclusion
1.	Root Mean Square Residual (RMR)	$\leq 0.05$	0.037	Good Fit
2.	Goodness of fit index (GFI)	$\geq 0.90$	0.912	Good Fit
3.	Comparative fit index (CFI)	$\geq 0.90$	0.965	Good Fit
4.	Tucker-Lewis's index (TLI)	$\geq 0.90$	0.961	Good Fit
5.	Incremental fit index (IFI)	$\geq 0.90$	0.965	Good Fit
6.	Normed fit index (NFI)	$\geq 0.90$	0.935	Good Fit
7.	Root-mean-square error of approximation (RMSEA)	$< 0.08$	0.055	Good Fit
8.	Parsimony Goodness-of-Fit Index (PGFI)	0-1	0.735	Good Fit

Source(s): Authors' own creation/work



**Figure 2: Result of SEM structural model analysis (Source: Authors' own creation/work)**

The findings of the data analysis demonstrate that digital transformation has a positive and statistically significant impact on higher education pillars ( $\beta = 1.156$ ,  $p = 0.000$ ), providing empirical support for the first hypothesis. Additionally, the results indicate a significant positive path coefficient between HE pillars and lecturer performance ( $\beta = 0.523$ ,  $p = 0.000$ ), confirming the second hypothesis. Furthermore, the analysis reveals a statistically significant mediating effect of HE pillars in the relationship between digital transformation and lecturer performance ( $\beta = 1.156 \times 0.523 = 0.605$ ), thereby supporting the third hypothesis. These findings suggest that, within the study population, the influence of digital shift on the lecturer performance of private university lecturers occurs exclusively through an indirect effect, mediated by HE pillars.

Moreover, digital transformation has a positive and statistically significant effect on lecturer performance ( $\beta = 0.499$ ,  $p = 0.000$ ), providing strong empirical support for the fourth hypothesis. However, these findings suggest that the direct relationship coefficient is lower than the coefficient of indirect effects. In other words, a comparison of direct and indirect effects indicates that while digital transformation influences university lecturers' job performance, its direct impact is not as substantial as the effect mediated by higher education (HE) pillars.

These findings, based on strong model fit and statistically significant path coefficients, reinforce the central role of higher education pillars in mediating the relationship between digital transformation and lecturer performance. Given the study's diverse sample of 355 lecturers from 30 private universities under *LLDIKTI Wilayah III Jakarta*, the results may be generalized to similar private

higher education settings in urban Indonesian contexts. The sample's demographic diversity and institutional variation enhance the external validity of the model, making the conclusions relevant to other developing higher education systems undergoing digital integration.

## 6. Discussion

This study contributes to the existing body of literature by examining both the direct and mediating effects of digital transformation on lecturer performance. First of all, the result that digital transformation has a significant positive effect on HE pillars supports previous studies (Deja et al., 2021; Garcez et al., 2022; Rodríguez-Abitia & Bribiesca-Correa, 2021). This underscores the importance of digital transformation at the faculty and study program levels in enhancing lecturers' teaching, research and community service. The results suggest that HE pillars development among private university lecturers is a crucial determinant of improved job performance. Furthermore, the significant direct effect of digital transformation on HE pillars highlights its role as a strong predictor of desirable performance outcomes in higher education. Consequently, digital integration initiatives aimed at fostering individual and organizational performance should prioritize addressing lecturers' specific needs while motivating and encouraging them to achieve their career aspirations.

This study also indicates that digital transformation has a positive direct impact on lecturer's job performance, although not as substantial as the effect of higher education pillars. Instead, it exerts a significant positive indirect effect on job performance through HE pillars. This mediating effect aligns with prior studies (Asbari et al., 2019; Martin & Xie, 2022). The study highlights the critical role of teaching, research, and community service in shaping university lecturers' job performance. These findings reinforce the notion that the positive and significant mediating effect of HE pillars in the relationship between digital transformation and job performance underscores the necessity of the development teaching, research and community development among lecturers. The results suggest that digital transformation alone is insufficient to directly enhance lecturers' performance.

Furthermore, the findings support prior research on the relationship between the HE three pillars and lecturers (Lubis et al., 2022; Retnowati et al., 2021). Specifically, Lubis et al. (2022) demonstrated that these pillars define the academic roles of lecturers and serve as the foundation for institutional success and lecturer performance. These findings also provide empirical evidence suggests that lecturers who actively engage in research and community service demonstrate higher performance levels, as these activities provide them with valuable experiences that enhance their academic and pedagogical expertise (Tannady & Zami, 2020).

## 7. Conclusion

This study provides robust empirical evidence demonstrating the significant role of digital transformation in enhancing lecturer performance within higher education institutions (HEIs). Crucially, the impact of digital transformation is

most pronounced when mediated through the three core pillars of higher education—teaching, research, and community service (*Tridharma*). The integration of digital technologies has been shown to foster more interactive, student-centered pedagogical approaches, streamline research workflows, and expand the reach and effectiveness of community engagement activities. These outcomes underscore the transformative potential of digital tools in supporting academic innovation and excellence.

However, the findings also reveal that digital transformation is not without its challenges. Issues such as limited digital literacy, resistance to change, and the emergence of technostress among academic staff can undermine the intended benefits of technological adoption. The study emphasizes that the mere presence of digital infrastructure or tools is insufficient to produce meaningful improvements in lecturer performance. Instead, successful digital integration requires a holistic and strategic approach that includes institutional support mechanisms, continuous professional development, and targeted capacity-building initiatives.

In light of these findings, several targeted interventions are recommended. Higher education institutions should prioritize the implementation of comprehensive digital training programs aimed at enhancing lecturers' digital competencies, pedagogical adaptability, and research capacity in technology-enriched environments. In parallel, strategic investments in digital infrastructure - including reliable internet connectivity, learning management systems, research databases, and virtual collaboration platforms - are essential to ensure equitable access and usability. These efforts must be tailored to the varying capacities and needs of institutions, particularly those operating under resource constraints.

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