

“Digital human resource management and academic performance: Evidence from Indonesian associate professors”

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DIGITAL HUMAN RESOURCE MANAGEMENT AND ACADEMIC PERFORMANCE: EVIDENCE FROM INDONESIAN ASSOCIATE PROFESSORS

Abstract

Digital transformation has changed the way human resource management is organized in higher education. In private universities with strong accreditation demands, digitally supported human resource practices are increasingly relevant for helping academic staff manage teaching, research, publication, and institutional service responsibilities. The study analyzes the relationship between Digital Human Resource Management practices, human resource agility, and self-reported academic staff performance among full-time Associate Professors in Indonesian private universities with "Excellent" accreditation status. A quantitative explanatory approach was used, based on cross-sectional survey data collected from June to December 2025. Of 537 responses collected, 500 valid responses were analyzed using Partial Least Squares Structural Equation Modeling. The results show that Digital Human Resource Management practices are positively associated with self-reported academic staff performance ($\beta = 0.297$, $t = 7.367$, $p < 0.001$) and human resource agility ($\beta = 0.495$, $t = 12.713$, $p < 0.001$). Human resource agility is also positively associated with self-reported academic staff performance ($\beta = 0.422$, $t = 10.463$, $p < 0.001$). Mediation analysis indicates a positive indirect effect of Digital Human Resource Management practices on self-reported academic staff performance through human resource agility ($\beta = 0.209$, 95% Boot CI [0.160, 0.264]), with a total effect of $\beta = 0.506$. The model explains 29.9% of human resource agility and 48.7% of self-reported academic staff performance. The findings suggest that digital human resource practices are positively associated with perceived academic performance when accompanied by agile academic work behavior. Practically, universities should align digital human resource systems with agility-oriented staff development.

Keywords

digitalization, HRM, agility, performance, higher education

JEL Classification

M12, O15, I23

INTRODUCTION

The rapid development of digital technologies has transformed how higher education institutions manage academic work, administrative processes, and human resource functions (Parry & Battista, 2019; Verhoeef et al., 2021; Vrontis et al., 2022). Universities increasingly rely on digital systems to support recruitment, training and development, communication, workload documentation, performance management, HR information access, and institutional decision-making. In this context, Digital Human Resource Management (DHRM) has become an important issue because it reflects the integration of digital technologies into human resource practices that support employees in performing their professional roles more efficiently, transparently, and responsively (Bondarouk et al., 2017; Strohmeier, 2020; Parry & Strohmeier, 2014). Current DHRM research also increasingly addresses algorithmic HRM, artificial intel-

ligence, robotics, and generative AI, which expand the competencies and governance challenges associated with digital HR systems (Deepa et al., 2024; Jiang et al., 2025; Maghsoudi et al., 2025; Meijerink et al., 2021; Vrontis et al., 2022).

The relevance of DHRM is particularly strong in higher education because academic staff perform complex and multidimensional duties (Teichler et al., 2016). Their responsibilities are not limited to teaching, but also include research, publication, student supervision, community service, academic administration, institutional development, and quality assurance activities. These responsibilities have become more demanding as universities face increasing pressure to improve academic quality, strengthen research and publication output, maintain accreditation standards, and adapt to digital transformation (Fernández et al., 2023; Nawaz et al., 2020). Therefore, understanding how digital HR practices are associated with academic staff performance is important for both higher education management and digital HRM literature.

In the Indonesian higher education context, this issue requires particular attention. Indonesian private universities operate in an environment shaped by accreditation requirements, institutional competition, quality assurance demands, and increasing expectations for research productivity and academic accountability. Private universities with “Excellent” accreditation status are expected to demonstrate strong academic governance, effective quality assurance systems, institutional performance, continuous improvement, and reliable documentation of academic activities. In comparable higher education settings, digitally enabled HR systems have been linked to more structured performance support and sustainable institutional practices (Kisahwan et al., 2025; Virmani et al., 2025). These institutional expectations make digital HR systems highly relevant because they may support the management of academic workload, training participation, performance records, institutional communication, and accreditation-related documentation.

Within this context, full-time Associate Professors represent an important academic group. Associate Professors generally occupy a mid-to-senior academic position and are expected to contribute substantially to teaching, research, publication, student supervision, institutional service, academic administration, and accreditation-related activities (Teichler et al., 2016). Their role is different from that of junior lecturers, contract lecturers, full professors, or academic administrative staff because they are often required to balance academic productivity with institutional responsibilities. As a result, full-time Associate Professors in Indonesian private universities with “Excellent” accreditation status provide a relevant and specific setting for examining the relationship between DHRM practices, HR agility, and academic staff performance.

In this study, academic staff performance refers specifically to self-reported academic staff performance. It is understood as respondents’ perceptions of their own performance in relation to teaching effectiveness, research productivity, publication-related performance, and institutional service contribution. This construct does not refer to objectively verified performance indicators such as publication counts, citation records, research grants, teaching evaluation scores, workload reports, student supervision records, or institutional KPI data. This distinction is important because self-reported performance reflects perceived academic performance rather than independently validated academic achievement.

The use of self-reported performance is relevant in this study because the research examines how academic staff perceive the relationship between digital HR practices, agility, and their own academic work outcomes. However, it also requires cautious interpretation. Since DHRM practices, HR agility, and academic staff performance are measured through cross-sectional self-administered questionnaires, the relationships examined in this study should be interpreted as statistical associations rather than causal effects. In addition, self-reported data may be influenced by respondents’ perceptions, motivation, confidence, institutional culture, and social desirability.

Despite the growing relevance of digital transformation in higher education, the relationship between DHRM practices, HR agility, and academic staff performance has not been sufficiently examined in the specific context of Indonesian private universities with “Excellent” accreditation status (Contreras et al., 2024; Kisahwan et al., 2025; Malik et al., 2023). Existing studies often discuss digital HRM in broad organizational or higher education settings without clearly distinguishing academic rank, employment status, institutional type, accreditation context, or the nature of performance measurement (Contreras et al., 2024; Kisahwan et al., 2025; Malik et al., 2023). This creates an important research gap because full-time Associate Professors may experience DHRM systems differently from other academic or administrative groups.

Accordingly, the research problem addressed in this study is the limited understanding of how DHRM practices are associated with HR agility and self-reported academic staff performance among full-time Associate Professors in Indonesian private universities with “Excellent” accreditation status. The study also responds to the need for a more precise and cautious interpretation of DHRM-performance relationships, particularly when academic staff performance is measured through cross-sectional self-reported survey data rather than objective institutional performance records.

1. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Digital Human Resource Management (DHRM), human resource (HR) agility, and academic staff performance have received increasing scholarly attention in the context of digital transformation (Contreras et al., 2024; Harney & Collings, 2021). However, these constructs require more specific interpretation when examined in Indonesian private higher education. Private universities in Indonesia operate within an institutional environment characterized by accreditation demands, quality assurance requirements, academic documentation, research productivity expectations, publication pressure, and institutional competition. These conditions make human resource management not only an administrative function but also a strategic mechanism for supporting academic accountability and institutional performance (Bissola & Imperatori, 2018; Bondarouk & Brewster, 2016).

This issue is particularly relevant for private universities with “Excellent” accreditation status. Institutions with this accreditation level are expected to demonstrate strong governance, systematic quality assurance, continuous improvement, and reliable documentation of academic activities. In this setting, digital HRM systems may support academic work by facilitating workload documentation, training records, performance monitoring,

institutional communication, academic reporting, and accreditation-related evidence (Kisahwan et al., 2025; Nawaz & Gomes, 2019; Stachová et al., 2024). Therefore, DHRM should be understood not merely as the digitalization of HR administration, but as a set of digital HR practices that may help academic staff respond to institutional and professional demands.

The academic rank of Associate Professor also requires explicit consideration. Full-time Associate Professors occupy a mid-to-senior academic position and are generally expected to maintain teaching quality, conduct research, publish scholarly work, supervise students, contribute to institutional service, participate in academic administration, and support accreditation-related activities (Teichler et al., 2016). These responsibilities may expose Associate Professors more directly to digital HR systems and institutional performance expectations. At the same time, their experiences may differ from those of junior lecturers, contract lecturers, full professors, or academic administrative staff. Therefore, the relationship between DHRM practices, HR agility, and academic staff performance should be interpreted within this specific academic rank and institutional context.

In this study, academic staff performance refers specifically to self-reported academic staff performance. It reflects respondents’ perceptions of their own teaching effectiveness, research productivity, publication-related performance, and institutional

service contribution. It does not refer to objectively verified indicators such as publication counts, citation records, research grants, teaching evaluation scores, workload reports, student supervision records, or institutional key performance indicators. This distinction is important because self-reported performance captures perceived academic achievement rather than independently validated academic outcomes.

The use of self-reported performance has both theoretical and methodological implications. Theoretically, it allows the study to examine how academic staff perceive the relationship between digital HR practices, agility, and their own academic work outcomes. Methodologically, however, self-reported performance may be influenced by respondents' perceptions, confidence, motivation, institutional culture, social desirability, and personal interpretation of performance expectations. Therefore, the relationships examined in this study are formulated as statistical associations among perceived constructs rather than causal claims based on objective performance evidence.

Digital Human Resource Management refers to the integration of digital technologies into human resource management practices, including recruitment, training and development, performance management, HR information systems, communication, HR analytics, and decision-making (Bondarouk & Brewster, 2016; Bondarouk et al., 2016; Strohmeier, 2020). Earlier discussions of digital HRM often used related terms such as electronic HRM or technology-supported HRM, emphasizing the role of information systems in improving the efficiency and accessibility of HR services (Bondarouk et al., 2017; Parry & Strohmeier, 2014). More recent perspectives place DHRM within broader organizational digital transformation, in which digital technologies are used not only to automate administrative processes but also to support employee development, organizational responsiveness, and strategic decision-making (Bissola & Imperatori, 2018; Verhoef et al., 2021). HR analytics and data-related competencies further strengthen the strategic use of digital HR information, although their value depends on credible data, analytical capability, and responsible interpretation (Calvard & Jeske, 2018; Marler & Boudreau, 2017; Minbaeva, 2018).

The literature suggests that DHRM may be associated with employee and organizational outcomes by improving the speed, consistency, transparency, and accessibility of HR practices (Malik et al., 2023; Zhou et al., 2022). Digital HR platforms can help employees access training opportunities, performance feedback, institutional information, and administrative services more efficiently. However, the benefits of DHRM are not automatic, because digital transformation may introduce implementation, governance, and user-adoption challenges (Heavin & Power, 2018; Nicolás-Agustín et al., 2022; Troshani et al., 2018). Their usefulness depends on organizational readiness, digital infrastructure, leadership support, user acceptance, data quality, and employees' digital competence. For this reason, DHRM should be understood as a set of organizational resources that may support employee outcomes, rather than as a direct or guaranteed cause of improved performance.

In higher education, DHRM has specific relevance because universities are knowledge-based organizations in which academic staff perform complex and multidimensional roles (Kamalakkannan, 2024; Baptista Nunes et al., 2017). Academic staff are expected to engage in teaching, research, publication, student supervision, community service, academic administration, and institutional development. Digital HR systems may support these responsibilities by simplifying administrative procedures, improving access to professional development, supporting workload documentation, facilitating performance reporting, and strengthening institutional communication (Kisahwan et al., 2025; Stachová et al., 2024). Nevertheless, higher education differs from many corporate settings because academic work is shaped by professional autonomy, disciplinary differences, research expectations, publication pressure, and institutional quality assurance requirements.

The Indonesian private higher education context further strengthens the relevance of DHRM. Private universities with "Excellent" accreditation status are expected to maintain strong institutional governance, academic quality, quality assurance systems, research performance, and accreditation-related documentation. In this setting, DHRM may support the coordination and documentation of academic workload, training participation, per-

formance records, and institutional service activities. However, prior literature has not sufficiently explained how DHRM is associated with academic staff outcomes in this specific context, particularly among full-time Associate Professors.

For Associate Professors, DHRM may be especially relevant because this academic rank involves substantial responsibilities in teaching, research, publication, supervision, institutional service, and accreditation-related work. Digital HR systems may assist this group by providing more accessible HR information, structured performance documentation, online training, and more efficient administrative support. Prior studies and reviews generally report positive relationships between digital or electronic HRM practices and employee-level performance, innovation, engagement, or organizational outcomes (Gupta et al., 2024; Malik et al., 2023; Wang et al., 2024; Wang et al., 2022). However, because the present study uses cross-sectional self-reported survey data, the relationship between DHRM and performance is interpreted as a statistical association rather than a causal effect.

HR agility refers to employees' capability to adapt to change, respond quickly to work demands, learn continuously, and act proactively in dynamic work environments (Alavi et al., 2014; Muduli & Pandya, 2018; Sherehiy et al., 2007). Agility is related to, but distinct from, adaptability, flexibility, and resilience, and it is also connected to the broader strategic capacity to renew and respond rapidly to environmental change (Doz & Kosonen, 2010). Adaptability emphasizes adjustment to new conditions, flexibility refers to the ability to modify work methods or roles, and resilience concerns recovery from disruption. HR agility combines responsiveness, learning orientation, proactive behavior, and the ability to remain effective under changing conditions.

In digitally transforming organizations, HR agility has become increasingly important because employees are required to work with new technologies, changing procedures, data-based systems, and evolving performance expectations (Alqarni et al., 2023; Bauwens & Cortellazzo, 2024; Potosky & Azan, 2023). Digital transformation requires not only technological infrastructure but also em-

ployees who are able to learn, adapt, and respond to organizational change. Thus, HR agility can be understood as a human capability that may help employees use digital systems more effectively.

In higher education, HR agility is particularly relevant because academic staff face simultaneous changes in teaching delivery, research management, publication systems, administrative procedures, accreditation requirements, and digital reporting platforms. Academic staff increasingly use learning management systems, online administrative systems, digital research databases, performance reporting platforms, and accreditation documentation systems. These changes require not only technical competence but also responsiveness, continuous learning, and proactive adjustment.

For full-time Associate Professors in Indonesian private universities with "Excellent" accreditation status, HR agility may be especially important. Technology-related responses may also differ across career stages and aging-related work contexts, reinforcing the need to examine this specific academic group rather than assume uniform responses among all lecturers (Pak et al., 2023). This group often occupies a position between junior academics and full professors, carrying substantial academic responsibilities while also being expected to demonstrate productivity in research, publications, student supervision, institutional service, and accreditation-related activities. Because of these responsibilities, Associate Professors may be particularly sensitive to the effectiveness of DHRM practices and to the need for agility in responding to institutional expectations.

DHRM may be associated with HR agility because digital HR systems can provide faster access to training, institutional information, performance documentation, and communication channels (Alavi et al., 2014; Alqarni et al., 2023). These systems may support employees' learning, responsiveness, and proactive behavior. However, digital systems alone do not guarantee agility. Academic staff must be willing and able to use digital HR resources effectively. Therefore, the relationship between DHRM and HR agility should be examined empirically rather than assumed.

Academic staff performance is a multidimensional construct that may include teaching effectiveness, research productivity, publication output, student supervision, community service, academic administration, and institutional contribution (Teichler et al., 2016). In higher education research, academic performance is difficult to measure because it may involve both objective outputs and subjective evaluations. Objective indicators may include publication counts, citation records, indexed journal publications, research grants, teaching evaluation scores, workload reports, student supervision records, and institutional key performance indicators. Subjective indicators, by contrast, rely on respondents' perceptions of their own performance.

In this study, academic staff performance refers specifically to self-reported academic staff performance. It is measured through questionnaire indicators related to perceived teaching effectiveness, research productivity, publication-related performance, and institutional service contribution. Therefore, this construct should not be interpreted as objectively verified academic performance. The study does not use publication records, citation data, research grants, teaching evaluation scores, institutional KPI data, workload reports, or other administrative records to verify actual performance outcomes.

This distinction is central to the interpretation of the study. Self-reported performance may be influenced by respondents' perceptions, confidence, motivation, social desirability, institutional culture, and personal interpretation of performance expectations. Moreover, because DHRM practices, HR agility, and academic staff performance are measured using the same self-administered questionnaire, common method bias may be a potential concern. For this reason, the findings should be interpreted as perceived relationships among constructs rather than evidence of objectively verified performance improvement.

Despite these limitations, self-reported academic staff performance remains relevant because the study aims to examine how Associate Professors perceive the relationship between digital HR support, agility, and their own academic work outcomes. In the context of digital HR systems, respondents' perceptions are important because

they reflect how academic staff experience and evaluate the usefulness of digital HR practices in relation to their professional responsibilities. However, the results should be understood as statistical associations among perceived constructs, not as proof that DHRM objectively improves academic performance.

HR agility may be positively associated with self-reported academic staff performance because agile academic staff may perceive themselves as more capable of responding to digital platforms, institutional policies, teaching demands, research expectations, publication pressure, and service responsibilities (Alavi et al., 2014; Muduli & Pandya, 2018). In universities with strong accreditation expectations, agile Associate Professors may be better able to manage multiple academic responsibilities and report stronger perceived performance.

The relationship between DHRM and academic staff performance requires further explanation because digital HR systems may not directly translate into stronger perceived academic outcomes. DHRM can provide digital infrastructure, access to information, training opportunities, performance documentation systems, and communication platforms. However, academic staff still need adaptive capabilities to use these digital resources effectively. This suggests that HR agility may function as a mechanism that helps explain the association between DHRM practices and self-reported academic staff performance.

From a resource-based and dynamic capability perspective, DHRM can be understood as an organizational resource, while HR agility can be understood as an employee capability that supports the effective use of that resource (Doz & Kosonen, 2010; Teece, 2018). For example, digital training platforms may be more useful for academic staff who are willing to learn continuously. Digital performance systems may be more meaningful for staff who respond proactively to feedback. Digital communication systems may be more effective for staff who adapt quickly to institutional changes.

In the context of full-time Associate Professors in Indonesian private universities with "Excellent" accreditation status, this mediating mechanism is particularly relevant. Associate Professors are

expected to perform various academic roles while responding to institutional demands for quality assurance, accreditation documentation, research productivity, publication output, student supervision, and institutional service. DHRM may provide digital support for these activities, but HR agility may determine whether academic staff can use such support to strengthen their perceived academic performance. This mechanism is consistent with research linking e-HRM systems to organizational agility and with studies positioning digital HRM as a resource for sustainable or performance-oriented organizational outcomes (Alqarni et al., 2023; Virmani et al., 2025).

However, the mediation tested in this study should be interpreted as statistical mediation rather than causal mediation. Because the study uses cross-sectional self-reported survey data, it cannot demonstrate that DHRM causes HR agility or that HR agility causes higher academic performance over time. The analysis can only show whether the indirect relationship among the variables is statistically significant within the observed data.

The reviewed literature indicates that DHRM is increasingly important in organizations undergoing digital transformation and that HR agility is a relevant employee capability in dynamic work environments (Contreras et al., 2024; Malik et al., 2023; Zhou et al., 2022). However, several gaps remain. First, much of the DHRM literature focuses on general organizational settings, while fewer studies examine DHRM in higher education institutions (Kisahwan et al., 2025; Sakib et al., 2025). Second, existing studies on academic staff performance often examine broad academic populations without distinguishing academic rank, employment status, institutional type, accreditation level, or national higher education context. Third, limited attention has been given to full-time Associate Professors in Indonesian private universities with “Excellent” accreditation status, even though this group carries substantial responsibilities in teaching, research, publication, student supervision, institutional service, academic administration, and accreditation-related activities. Fourth, previous studies often discuss academic staff performance without clearly distinguishing between objectively verified performance and self-reported perfor-

mance. Fifth, the mediating role of HR agility in the relationship between DHRM practices and self-reported academic staff performance remains insufficiently explained.

Based on these gaps, this study aims to examine the relationships among Digital Human Resource Management practices, HR agility, and self-reported academic staff performance, including the statistical mediating role of HR agility, among full-time Associate Professors in Indonesian private universities with “Excellent” accreditation status.

Based on the literature review, the hypotheses are as follows:

- H1: DHRM practices are positively associated with self-reported academic staff performance.*
- H2: DHRM practices are positively associated with HR agility.*
- H3: HR agility is positively associated with self-reported academic staff performance.*
- H4: HR agility statistically mediates the relationship between DHRM practices and self-reported academic staff performance.*

2. METHODS

This study employed a quantitative explanatory research design using a cross-sectional survey approach. The design was selected to examine statistical relationships among DHRM practices, HR agility, and self-reported academic staff performance.

This study was conducted from June to December 2025 in Indonesian private higher education institutions with “Excellent” accreditation status. These institutions were selected because they are expected to have relatively established quality assurance systems, accreditation-related documentation, digital infrastructure, and formal HR management practices. The target respondents were full-time Associate Professors who had experience using DHRM systems in their institutions.

The focus on Associate Professors was intentional because this academic rank represents a mid-to-senior career stage in higher education. Associate Professors are generally expected to balance teaching responsibilities, research productivity, publication requirements, student supervision, academic administration, institutional service, and accreditation-related activities. These responsibilities may make them particularly exposed to digital HR systems and more sensitive to the role of HR agility in responding to institutional and technological change. However, because the sample only includes Associate Professors, the findings should not be generalized to all academic staff, including junior lecturers, assistant professors, full professors, contract lecturers, or academic administrative staff.

Respondents were required to meet three inclusion criteria: they had to be full-time academic staff, hold the academic rank of Associate Professor, and have experience using digital HRM systems in their institutions. A total of 537 responses were collected. After data screening and the removal of incomplete or invalid questionnaires, 500 valid responses were retained for analysis. Thus, 37 responses were excluded, and the valid response proportion of collected responses was 93.11%.

The number of individuals who received the survey invitation was not recorded; therefore, the response rate cannot be calculated. In addition, the dataset did not provide complete information on the number of participating universities, their regional distribution across Indonesia, the selection process for each institution, or the distribution of responses across institutions. This limitation is important because academic staff may be nested within universities with different digital infrastructures, HR systems, leadership practices, quality assurance systems, and accreditation management processes. If responses are clustered within institutions, single-level PLS-SEM may underestimate standard errors because institutional-level dependency is not explicitly modeled. Therefore, the findings should be interpreted cautiously, and future studies should record institutional identifiers and apply multilevel or clustered analytical approaches when institutional grouping information is available.

Data were collected using structured self-administered online questionnaires distributed through institutional communication channels and academic professional networks. Respondents were informed about the purpose of the study, the voluntary nature of participation, and the confidentiality of their responses. The questionnaire was completed anonymously, and no personally identifiable information was used in the analysis.

Because the study relied on self-administered online questionnaires, the data may be influenced by respondents' subjective perceptions, social desirability, and common method bias (Podsakoff et al., 2003). Procedural remedies were applied by ensuring anonymity, using neutral wording, and separating construct sections in the questionnaire, consistent with commonly recommended approaches for reducing method-related response bias (Podsakoff et al., 2003). Nevertheless, because the study did not include multi-source data or objective performance records, this limitation should be considered when interpreting the findings.

All constructs were measured using a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. DHRM practices were measured using five indicators related to digital HR administration, digital performance management, online training and development, digital HR information access, and responsiveness of HR technology. HR agility was measured using five indicators related to adaptability, responsiveness, learning capability, flexible prioritization, and cross-unit collaboration. Self-reported academic staff performance was measured using five indicators related to perceived teaching effectiveness, research productivity, publication-related performance, institutional service contribution, and overall perceived academic performance.

Because academic staff performance was measured through respondents' self-assessments, it should be interpreted as self-reported academic staff performance rather than objectively verified academic performance. The study did not use publication records, citation data, teaching evaluation scores, workload reports, research grants, or institutional KPI data to validate actual academic performance.

Table 1. Measurement items

Code	Construct	Measurement Item	Scale
DHRM1	DHRM practices	The digital HR system in my university facilitates academic and HR administration	1-5 Likert
DHRM2	DHRM practices	Lecturer performance appraisal is supported by a transparent and easy-to-use digital platform	1-5 Likert
DHRM3	DHRM practices	Training and competence development for lecturers are facilitated through digital systems or online platforms	1-5 Likert
DHRM4	DHRM practices	Information related to workload, career, and HR services can be accessed quickly through digital systems	1-5 Likert
DHRM5	DHRM practices	The use of HR technology helps the university respond more effectively to lecturers' needs	1-5 Likert
HRA1	HR agility	I can adjust my academic work practices when policies or technologies change	1-5 Likert
HRA2	HR agility	I quickly learn new digital applications or procedures that support academic work	1-5 Likert
HRA3	HR agility	I can flexibly prioritize teaching, research, publication, and institutional service responsibilities	1-5 Likert
HRA4	HR agility	I can work effectively despite changing academic demands	1-5 Likert
HRA5	HR agility	I can collaborate across units or study programs to complete academic tasks	1-5 Likert
ASP1	Self-reported academic staff performance	I perceive that my teaching effectiveness has improved in the recent period	1-5 Likert
ASP2	Self-reported academic staff performance	I perceive that my research productivity is progressing well according to personal or institutional targets	1-5 Likert
ASP3	Self-reported academic staff performance	I perceive that my publication performance is adequate according to academic rank expectations	1-5 Likert
ASP4	Self-reported academic staff performance	I actively contribute to institutional service, committees, or study program development	1-5 Likert
ASP5	Self-reported academic staff performance	Overall, I assess my academic performance as good	1-5 Likert

Because DHRM practices, HR agility, and self-reported academic staff performance were measured using the same self-administered questionnaire, common method bias was assessed using both procedural and statistical remedies. Procedurally, respondents were assured of anonymity and confidentiality; the questionnaire used neutral wording, and the items were organized into separate construct sections to reduce evaluation apprehension and response pattern bias (Kock, 2015).

Statistically, Harman's single-factor test and full collinearity VIF were applied. Harman's single-factor test showed that the first unrotated factor explained 54.56% of the total variance. This value is slightly above the commonly used 50% threshold, suggesting that common method bias may be a potential

concern. Therefore, an additional full collinearity VIF assessment was conducted. The full collinearity VIF values were 1.469 for DHRM practices, 1.616 for HR agility, and 1.640 for self-reported academic staff performance. Because all values were below the conservative threshold of 3.3, the results indicate that severe common method bias is unlikely.

Although the Harman single-factor result suggests that common method bias cannot be fully dismissed, the full collinearity VIF results indicate that the bias is not severe enough to invalidate the structural relationships. Nevertheless, because all main constructs were measured from the same respondents at one point in time, the findings should still be interpreted as statistical associations rather than causal effects.

Table 2. Common method bias assessment

Test	Statistic	Value	Criterion	Decision
Harman's single-factor test	First unrotated factor variance	54.56%	Preferably below 50%	Potential concern
Full collinearity VIF	DHRM practices	1.469	Below 3.3	No severe concern
Full collinearity VIF	HR agility	1.616	Below 3.3	No severe concern
Full collinearity VIF	Self-reported academic staff performance	1.640	Below 3.3	No severe concern

The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM), following established measurement- and structural-model assessment procedures (Hair et al., 2022). The analysis consisted of two stages: measurement model assessment and structural model assessment. The measurement model was evaluated using composite reliability, average variance extracted, and the Heterotrait-Monotrait ratio, with HTMT used as the principal discriminant-validity criterion (Hair et al., 2022; Henseler et al., 2015). The structural model was assessed using path coefficients, t-values, p-values, R², f², Q², and mediation analysis through bootstrapping with 5,000 resamples.

3. RESULTS

3.1. Data screening and valid responses

Table 3. Response summary

Description	Frequency	Percentage
Initial responses collected	537	100.00%
Valid responses retained	500	93.11%
Excluded responses	37	6.89%

3.2. Respondent profile

All valid respondents in this study were full-time Associate Professors working in Indonesian private higher education institutions with “Excellent” accreditation status. Therefore, the sample is specific and should not be interpreted as represent-

ing all academic staff in Indonesia. The available sample information is presented in Table 4.

The dataset used in this study did not include detailed demographic and institutional characteristics such as gender, age, years of academic experience, academic discipline, institutional region, number of participating universities, distribution of respondents across universities, years of DHRM system use, or level of digital competence. This is an important limitation because these characteristics may shape how Associate Professors perceive DHRM practices, HR agility, and self-reported academic staff performance.

Because the distribution of respondents across institutions was not available, the study could not assess whether responses were evenly distributed across participating universities. The analysis also could not account for the possible nested structure of the data, in which academic staff are grouped within universities. Consequently, the results should be interpreted as individual-level associations based on available survey responses, not as institution-level evidence or as findings that are necessarily generalizable across all Indonesian private universities.

3.3. Descriptive statistics and correlation matrix

Table 5 presents descriptive statistics and correlations among the main constructs. The mean values indicate that respondents reported moderate-to-high perceptions of DHRM practices, HR agility, and academic staff performance. The correlations among constructs were positive, indicating

Table 4. Respondent profile based on available data

Characteristic	Category	Frequency	Percentage
Academic rank	Associate Professor	500	100.00%
Employment status	Full-time academic staff	500	100.00%
Institution type	Private higher education institution	500	100.00%
Accreditation status	“Excellent” accreditation	500	100.00%
Experience using DHRM systems	Yes	500	100.00%

Table 5. Descriptive statistics and correlations

Construct	Mean	SD	Minimum	Maximum	1	2	3
1. DHRM practices	3.497	1.114	1.000	5.000	1.000		
2. HR agility	3.431	1.120	1.000	5.000	0.495	1.000	
3. Self-reported academic staff performance	3.516	1.098	1.000	5.000	0.506	0.569	1.000

Table 6. Reliability and convergent validity

Construct	Items	Cronbach's Alpha	Composite Reliability	AVE	Decision
DHRM practices	5	0.941	0.955	0.808	Accepted
HR agility	5	0.938	0.953	0.801	Accepted
Self-reported academic staff performance	5	0.933	0.949	0.789	Accepted

that higher perceived DHRM practices were associated with higher HR agility and stronger self-reported academic staff performance.

3.4. Measurement model

The measurement model was assessed using Cronbach's alpha, composite reliability, average variance extracted, outer loadings, and outer VIF values. The results show that all constructs met the recommended reliability and convergent validity thresholds.

All Cronbach's alpha and composite reliability values exceeded 0.70, indicating satisfactory internal consistency reliability. AVE values exceeded 0.50, indicating adequate convergent validity under commonly applied PLS-SEM assessment guidelines (Hair et al., 2022).

All outer loadings exceeded 0.70, supporting indicator reliability. The outer VIF values were within

an acceptable range, indicating that item-level collinearity was not severe.

3.5. Discriminant validity

Discriminant validity was assessed using the Heterotrait-Monotrait ratio with bootstrapped confidence intervals (Henseler et al., 2015). HTMT confidence intervals were obtained using percentile bootstrapping with 1,000 resamples. All HTMT values and their upper confidence limits were below 0.85, indicating adequate discriminant validity.

3.6. Structural model

The structural model was assessed using bootstrapping. The results show that DHRM practices were positively associated with self-reported academic staff performance and HR agility. HR agility was also positively associated with self-reported academic staff performance.

Table 7. Outer loadings and outer VIF

Indicator	Construct	Outer Loading	Outer VIF	Decision
DHRM1	DHRM practices	0.899	3.447	Accepted
DHRM2	DHRM practices	0.888	3.115	Accepted
DHRM3	DHRM practices	0.900	3.431	Accepted
DHRM4	DHRM practices	0.908	3.694	Accepted
DHRM5	DHRM practices	0.899	3.408	Accepted
HRA1	HR agility	0.885	3.026	Accepted
HRA2	HR agility	0.895	3.279	Accepted
HRA3	HR agility	0.905	3.577	Accepted
HRA4	HR agility	0.895	3.256	Accepted
HRA5	HR agility	0.896	3.310	Accepted
ASP1	Self-reported academic staff performance	0.890	3.123	Accepted
ASP2	Self-reported academic staff performance	0.890	3.167	Accepted
ASP3	Self-reported academic staff performance	0.891	3.132	Accepted
ASP4	Self-reported academic staff performance	0.879	2.881	Accepted
ASP5	Self-reported academic staff performance	0.891	3.167	Accepted

Table 8. HTMT discriminant validity with bootstrapped confidence intervals

Construct pair	HTMT	2.5% CI	97.5% CI	Decision
DHRM practices – HR agility	0.527	0.456	0.599	Accepted
DHRM practices – Self-reported academic staff performance	0.540	0.470	0.603	Accepted
HR agility – Self-reported academic staff performance	0.608	0.546	0.668	Accepted

Table 9. Path coefficients and hypothesis testing

Hypothesis	Relationship	Effect Type	β	t-value	p-value	2.5% Boot CI	97.5% Boot CI	Result
H1	DHRM practices → Self-reported academic staff performance	Direct effect	0.297	7.367	< 0.001	0.213	0.379	Supported
H2	DHRM practices → HR agility	Path a	0.495	12.713	< 0.001	0.418	0.568	Supported
H3	HR agility → Self-reported academic staff performance	Path b	0.422	10.463	< 0.001	0.344	0.501	Supported

Because the study uses cross-sectional self-reported data, these results should be interpreted as statistical associations rather than causal effects.

3.7. Coefficient of determination (R^2)

The explanatory power of the model was assessed using R^2 values. As shown in Table 10, DHRM explains a substantial proportion of variance in HR agility, while DHRM and HR agility jointly explain a meaningful proportion of variance in academic staff performance.

Table 10. Coefficient of determination (R^2)

Endogenous Construct	R^2	Interpretation
HR Agility	0.299	Moderate
Academic Staff Performance	0.487	Moderate

DHRM explains 29.9% of the variance in HR agility. DHRM and HR agility jointly explain 48.7% of the variance in academic staff performance. These values indicate moderate explanatory power.

3.8. Mediation analysis

The mediating role of HR agility was assessed using bootstrapping. The indirect association between DHRM practices and self-reported academic staff performance through HR agility was positive and statistically significant, as the bootstrapped confidence interval did not include zero.

Because both the direct and indirect effects were significant, HR agility can be interpreted as a par-

tial statistical mediator. However, this mediation should not be interpreted as causal mediation because the data are cross-sectional and self-reported.

4. DISCUSSION

The findings of this study show that Digital Human Resource Management practices are positively associated with self-reported academic staff performance among full-time Associate Professors in Indonesian private universities with “Excellent” accreditation status. The structural model indicates that Digital Human Resource Management practices have a positive direct association with self-reported academic staff performance ($\beta = 0.297$, $t = 7.367$, $p < 0.001$). This result suggests that Associate Professors who perceive stronger digital human resource practices also tend to report better academic performance in teaching, research, publication-related activities, and institutional service. The direction of this relationship is consistent with prior reviews and empirical studies connecting digital HRM with employee performance, innovation, and broader performance outcomes (Malik et al., 2023; Wang et al., 2024; Wang et al., 2022).

This finding is relevant to the context of highly accredited private universities, where academic staff are expected to meet teaching, research, publication, administrative, and accreditation-related responsibilities. Digital human resource systems may support these responsibilities by improving

Table 11. Mediation analysis

Relationship	Effect Type	β	t-value	p-value	2.5% Boot CI	97.5% Boot CI	Decision
DHRM practices → Self-reported academic staff performance	Direct effect	0.297	7.367	< 0.001	0.213	0.379	Significant
DHRM practices → HR agility → Self-reported academic staff performance	Indirect effect	0.209	Not applicable	Not applicable	0.160	0.264	Significant
DHRM practices → Self-reported academic staff performance	Total effect	0.506	Not applicable	Not applicable	0.434	0.578	Positive

access to human resource information, online training, performance documentation, workload-related data, and institutional communication. However, because the study uses cross-sectional self-reported data, this result should be interpreted as a statistical association rather than evidence that digital human resource practices directly cause academic performance improvement.

The results also show that Digital Human Resource Management practices are positively associated with human resource agility ($\beta = 0.495$, $t = 12.713$, $p < 0.001$). This indicates that stronger perceived digital human resource practices are related to higher levels of adaptability, responsiveness, continuous learning, and proactive work behavior among Associate Professors, which is consistent with studies linking electronic HRM, organizational learning, and digital transformation to workforce or organizational agility (Alavi et al., 2014; Alqarni et al., 2023; Nicolás-Agustín et al., 2022). In digitally transforming higher education institutions, these agile capabilities are important because academic staff must respond to changing teaching systems, digital reporting platforms, accreditation documentation, publication expectations, and institutional procedures.

Furthermore, human resource agility is positively associated with self-reported academic staff performance ($\beta = 0.422$, $t = 10.463$, $p < 0.001$). This result suggests that Associate Professors who perceive themselves as more agile also tend to report stronger academic performance, supporting the broader view that workforce agility is associated with more effective responses to changing work demands (Alavi et al., 2014; Muduli & Pandya, 2018). Agility may help academic staff adjust to new technologies, manage multiple academic responsibilities, respond to institutional changes, and maintain productivity in teaching, research, publication, and service activities.

The mediation analysis confirms that human resource agility statistically mediates the relationship between Digital Human Resource Management practices and self-reported academic staff performance. The indirect effect is positive ($\beta = 0.209$, 95% Boot CI [0.160, 0.264]), while the total effect of Digital Human Resource Management practices on self-reported academic staff perfor-

mance is also positive ($\beta = 0.506$, 95% Boot CI [0.434, 0.578]). These findings indicate that digital human resource practices are associated with perceived academic performance both directly and indirectly through human resource agility. This interpretation is consistent with a dynamic-capability view in which digital HR resources create value when employees possess the adaptive capability to use them effectively (Alqarni et al., 2023; Teece, 2018).

The results further show that the model explains 29.9% of the variance in human resource agility and 48.7% of the variance in self-reported academic staff performance. These values indicate that Digital Human Resource Management practices and human resource agility provide meaningful explanatory power for understanding perceived academic performance in the studied context. Nevertheless, other factors not included in the model, such as digital leadership, organizational culture, digital competence, academic discipline, institutional support, and technological readiness, may also influence academic staff performance.

Theoretically, this study contributes to the digital human resource management literature by showing that human resource agility is an important behavioral capability that helps explain the relationship between digital human resource practices and self-reported academic staff performance. The findings suggest that digital human resource systems should not be viewed only as administrative tools, but also as organizational resources associated with adaptive academic work behavior.

Practically, the findings imply that universities should not only implement digital human resource systems, but also strengthen agility-oriented staff development. Training programs, responsive digital platforms, adaptive leadership, clear performance documentation, and continuous learning opportunities may help academic staff use digital human resource systems more effectively (Bauwens & Cortellazzo, 2024; Potosky & Azan, 2023). For private universities with “Excellent” accreditation status, aligning digital human resource practices with human resource agility may support academic staff in managing institutional demands more effectively.

Overall, the findings demonstrate positive statistical associations among Digital Human Resource Management practices, human resource agility, and self-reported academic staff performance. However, the results should be interpreted cau-

tiously because the study is limited to full-time Associate Professors, uses cross-sectional survey data, and relies on self-reported performance rather than objective institutional performance records.

CONCLUSION, LIMITATIONS AND FUTURE RESEARCH

This study analyzed the relationship between Digital Human Resource Management practices, human resource agility, and self-reported academic staff performance among full-time Associate Professors in Indonesian private universities with “Excellent” accreditation status. The study also examined whether human resource agility statistically mediates the relationship between Digital Human Resource Management practices and self-reported academic staff performance.

The study concludes that Digital Human Resource Management practices are positively associated with perceived academic staff performance when accompanied by agile academic work behavior. Human resource agility appears to be an important behavioral capability that connects digital human resource practices with self-reported academic staff performance. Therefore, universities should align digital human resource systems with agility-oriented staff development, including continuous digital learning, adaptive leadership, responsive communication, and user-friendly digital platforms.

Despite these contributions, several limitations should be acknowledged. First, the sample is limited to full-time Associate Professors in Indonesian private universities with “Excellent” accreditation status, so the findings should not be generalized to all academic staff or all higher education institutions. Second, the study uses cross-sectional data, which limits causal interpretation. Third, academic staff performance is measured through self-reported indicators and not through objective records such as publication counts, citation data, teaching evaluation scores, research grants, workload reports, or institutional key performance indicators. Fourth, because the main variables were collected from the same respondents using the same questionnaire, common method bias may still be a potential concern.

Future research is encouraged to use longitudinal designs, objective performance indicators, broader academic samples, and multilevel data across universities. Further studies may also examine digital leadership, organizational culture, digital competence, technological readiness, and institutional support as additional factors that may explain the relationship between Digital Human Resource Management practices, human resource agility, and academic staff performance.

AUTHOR CONTRIBUTIONS

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