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Strategy for Human Resource Management Development Based on Digital Transformation to Optimize the Performance of PT Dirgantara Indonesia

Hidayat[1*]
Universitas Jenderal Achmad Yani
Cimahi, Indonesia
E-mail: hidayat@lecture.unjani.ac.id

Gunawan Suhartono[2]
Korpasgat TNI Angkatan Udara
Indonesia
E-mail: gunawan.au97@gmail.com

Yayat Rukayat[3]
Universitas Nurtanio
Bandung, Indonesia
E-mail: yayat@unnur.ac.id

ABSTRACT

PT Dirgantara Indonesia (Persero) is an aerospace industry owned by the state. The accelerating speed of digital transformation nowadays has revolutionised businesses in how they digitally manage their information, automate processes, and enhance human capital productivity. The main aims for PT Dirgantara Indonesia are to reconcile the development strategies of HR and technological progress so that there is professional competence and organisational excellence in its workforce. This study explores the digital transformation principles that underlie HRM strategies in PT Dirgantara Indonesia. The study used a qualitative descriptive design, and the data were collected through field observations, interviews with HR managers, line managers, employees, and stakeholders. Click here for the full article. A semi-structured interview protocol was used in an effort to obtain deep insights from the participants about the process of incorporation digital transformation into HRM practices. The findings indicate that PT Dirgantara Indonesia has made strategic and systematic efforts to develop the human resources based on digital technology. Some of the significant initiatives include digitization of business processes, application of digital integrated databases, and innovation-driven product and service development. It has also introduced hundreds of digital training and empowerment programs, automated manual processes, and changed internal rules to adapt to shifting digital market realities. The organizational leaders applied APS-6 INDI 4.0 Assessment to evaluate the readiness of the organization for digital transformation, implemented immediate actions in areas where gaps were identified, and showed a continued necessity for them to adapt to new technology that will sustain performance at all levels.

Keywords: Digital Transformation; Human Resource Management; Optimization; Performance; Strategy

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INTRODUCTION

With the arrival of the Fourth Industrial Revolution (Industry 4.0), changes in different industries driven by digital technology have been accelerating. This revolution forces businesses, whether they are public or private organisations, to fundamentally restructure through the digitisation of systems and work processes that will improve their competitive edge (Schwab, 2016). From the empirical studies by (Sari *et al.*, 2025) that digital transformation has a positive and significant effect on human resource management (HRM), it can improve effectiveness of employees, develop information systems and adapt to changes. PT Dirgantara Indonesia (PTDI), a state-owned enterprise set to develop national strategic industry along with Ministry of State-Owned Enterprises (BUMN), is the heart of developing Indonesian independence in defense and aerospace. Founded in 1976 by Professor Dr. B.J. Habibie, PTDI has successfully mastered and developed advanced aircraft technologies and the ability to manufacture indigenous aircraft such as N-250 Gatotkaca. The industry players have also participated in the international market by manufacturing fixed-wing aircraft, rotary-wing aircraft as well as Unmanned Aerial Vehicles (UAVs) (IAe, 2019). The swift changes in the digital era has affected PTDI's sustainability, especially in dealing with human resources related to automation and digital industrial ecosystems.

Based on these, we are aware there are too many critical challenges facing PTDI in digitalizing its business process. The first challenge is a digital skill divide between older and younger workers. Second, the low fit between digital inner organizational infrastructures and HRM System also represents a relevant challenge for big data used to make strategic decisions or digital learning concepts in employee development also found scant scope within the current balloons. The third problem is that organizational culture within government is hierarchical and bureaucratic, meaning innovative thinking often gets stifled. The fourth constraint relates to the digital infrastructure modernization that is hampered with limited procurement and maintenance funds. Lastly, obsolete aircraft manufacturing equipment brings technical challenges to fully integrate with the digitalization processes already present in the company. These problems emphasize the need for a complete HRM advancement strategy according to digital transformation in order to increase organizational effectiveness.

Research conducted by Oktaviani *et al.* (2023) and Kirana *et al.* (2023) confirms that implementing *digital transformation* fosters substantial changes by integrating information technology, computing, communication, and connectivity. Likewise, (Barreto *et al.*, n.d.) stress that digitalization not only optimize the operation but also drives innovation, customer engagement and business performance (Nurain et al., 2024). Such HRM strategies to facilitate this are enriching digital work experiences, stimulating innovation, and providing continuous learning and rewarding (Susanto *et al.*, 2024).

Despite this progress, prior research has mostly concentrated on general branches of manufacturing but further exploration into HRM development approaches in the country's aircraft industry which is with a high level of technological complexity and a complex set of regulations seem to have been neglected. This study aims to fill this gap by examining the digital transformation HRM development strategies of PT Dirgantara Indonesia in order to improve the organization's performance.

Hence, the current research seeks to analyze the practices of PT Dirgantara Indonesia's digital transformation based HRM "development" strategy and their effect on organizational performance.

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LITERATURE REVIEW

Digital transformation acts as a driver of organisational change using new technologies intended for operational efficiency and international competitiveness (Valaskova *et al.*, 2025a). As mentioned by Schwab (2016), Industry 4.0 will require organizations to infuse technologies like IoT, AI and robotics into all business operations in order not just to compete but survive. In the same vein, Ashadimas, (2025), finds that digitalization in Human resources management (HRM) radically changes training modes, work structures and organizational approaches by adopting technology that leads to increase in efficiency and innovation.

The progress of HRM, aided by the digital transformation and big data has enabled organizations to improve performance through faster decisions, increased data accuracy and technology-supported learning. Zakaria *et al.* (2025) also emphasize that HRM processes can be both digitized and automated, thereby enhancing operations as well as employees experiences (Efawati, 2024) through Human Resource Information Systems (HRIS), e-learning platforms, and data analytics. Basuki (2023) similarly notes that the deployment of AI and machine learning applications has sped up both recruitment and performance arriving at objective appraisals. In addition, (Heliana & Wahyuni, 2024) show that Big data analytics enables effective workforce management particularly in hiring, selection and employee development. Zakaria *et al.* (2025) have added that successful adoption of digital transformation in HRM needs thorough strategic planning, top management support and stake-holder involvement to overcome challenges like lack of digital skills and organizational resistance.

In an Indonesian setting, Bagas *et al.* (2023) investigate in utilizing digital HRM systems within PT Dirgantara Indonesia (PTDI) they found that the usage of Human Capital Information System (HCIS) and knowledge management system has increased the efficiency of HR department and speed up innovation. However, in between differences of digital skills and acclimatized with technology to be faced are still challenges (Khasan & Soedarto, 2025). The models of Task-Technology Fit (TTF) and Technology Acceptance Model (TAM) introduced by Bagas *et al.* (2023) state that the success of digital HR transformation is correlated with the level of technological fit to job needs and user adoption. In addition, transformational leadership and adaptive organization culture are important predictors for the success of implementing digital human resource management (Septianti, 2014).

Fahiem & Gilang (2020) highlight that a growth towards innovation and sustainability should go hand in hand with the development of digital skills. This is consistent with the position of Vial (2019) that digital transformation should not only imply a technological adaptation but also an adaption in internal processes and way to create the value as well as to stablish relationship with customers in order to increase corporate performance. An adaptive human resources development strategy, supported by a creative organizational culture allow organizations to improve productivity and maintain global competitiveness in the age of digital transformation (Valaskova *et al.*, 2025b; Zakaria *et al.*, 2025).

RESEARCH METHOD

This research used a qualitative descriptive design to explore the phenomenon of various human resource management (HRM) development strategy using digital transformation for improving the performance PT Dirgantara Indonesia. This qualitative one was chosen to understand the processes, meanings and social-cultural dynamics that are into the HRM strategies within the organization itself (Sugiyono, 2019).

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The data from the primary as well as secondary sources. The main data (primary data) was obtained through direct observation at PT Dirgantara Indonesia and in-depth interviews with HRD managers, employees, and related parties. The data were obtained through semi-structured interview by selecting a standard theme guided by the researcher for uniformity in responding to typical responses either yes or no (Mufidah *et al.*, 2021). Observation was conducted to get actual views of work behaviors, ways of interacting with others, and the use of digital technologies in organizations (Rahayu, 2020).

Secondly, secondary data referred to the documents, reports, and literature of previous researchers or other institutions that had been produced as supporting materials complementing the primary data. This type of data is any information that was collected or recorded previously by others (Nasrudin, 2018). The analysis of the content used the following interactive model analysis a la Miles and Huberman as cited by (Sugiyono, 2018), Systematically: (1) Data reduction, (2) Data display, and Conclusion drawing/Verification. The research process included three consecutive stages: (1) the initiation stage, (2) the application stage, and (3) the withdrawal of conclusion's stage.

Source triangulation was implemented to establish the credibility and trustworthiness of findings, namely by cross-checking data taken from interviews, observation and documentation (Creswell, 2016). This triangulation also aided in the reliability and validity of our research findings. By means of this methodological approach, the study explores a comprehensive, systematic and in-depth analysis of HRM development strategies formulation, implementation and problem at PT Dirgantara Indonesia which is based digital transformation.

RESEARCH RESULTS

This research critically analyzes the execution of human resource management (HRM) development strategies in the context of digital transformation at PT Dirgantara Indonesia (PTDI). The analysis zooms in on four key areas: human resources management (HRM), facilities and office management, ICT management, as well as the company's efforts towards digital transformation. Each component encapsulates PTDI's systematic approach toward addressing the challenges and opportunities of Industry 4.0 to improve efficiency, innovation, and competitiveness.

Human Resource Management Development in PT Dirgantara Indonesia

HRM is fundamental for developing strategic (organizational) capabilities through its workforce. To develop employee competence, productivity and ability to adapt to technology innovation, PT Dirgantara Indonesia has conducted various programs. These consist of formal training courses, workshops, and empowerment activities to reinforce digital literacy and innovation capabilities. The HRM practice of the company recognizes that sustainable digital transformation is not merely about having an advanced technology infrastructure but also a workforce who are adaptive, able to build digital capability, and drive innovation (Ashadimas, 2025; Zakaria *et al.*, 2025). By means of professional design and focused development, the HR management guarantee that employees are capable to response for demand changes at the market requirements and operational level. "Training modules are linked with e-learning platforms so that the learning of digital skills becomes continuous and in addition to this, competency-based assessments are done every 6/8 weeks to assess the impact during the course of digitising a group. These initiatives combined allow the company to simultaneously invest in workforce while transforming the organization.

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The workforce profile and education background of PT Dirgantara Indonesia, as shown in Table 1 and Table 2 are foundation for developing the focused HRM policy due to digital transition:

Table 1. Employee composition of PT Dirgantara Indonesia (2025)

No	Rank/Position	Position Code	Number
1.	Board of Directors	BOD-0	4
2.	Division Head/Equivalent	BOD-1	25
3.	Managers	BOD-2	133
4.	Supervisors	BOD-3	340
5.	Staff/Employees	BOD-4	2.391
	Total		2.893

Source: HR Management and Learning Organization Division, PT Dirgantara Indonesia (2025).

Company manpower consists of 2,893 personnel that are disbanded in various layers and reflect a well- imbalanced organisation. The somewhat high percentage of staff and supervisory employees is indicative of PTDI's focus on technical and managerial excellence, plant-wide in production or engineering areas. An audience of this type will support digital transformation-enabling HRM strategies, as digital integration necessitates a workforce with complementary managerial supervision and operational specialisation (Zakaria *et al.*, 2025).

Table 2. Employee education level and gender at PT Dirgantara Indonesia

No	Gender	Level of Education				
		SMA	D-III	S-1/ D-4	S-2/S-3	Total
1.	Male	223	329	788	98	2438
2.	Female	62	118	247	28	455
	Total	1285	447	1035	126	2893

Source: HR Management and Organizational Development Division, PT Dirgantara Indonesia (2025).

We see that the work force structure is diverse in education, majority of them have undergraduate and diploma. This would make for a strong foundation of digital transformation, since these employees already have the cognitive and technical ability to use new systems. Secondly, gender diversity fosters innovation because it gives rise to different points of view and collaborative problem-solving factors which are quite important for contemporary HR strategies (Heliana & Wahyuni, 2024).

Facilities and Office Management

Facility and office management is key for digitals structures and operational readiness (Chaniago, 2023). PT Dirgantara Indonesia has 8 types of aircraft hangars that can accommodate a variety of aircraft user, from transport (C-130J-30 Super Hercules and Boeing 737-200) to mid-size transport (like CN295, NC-212i, and small size transport like N-219) both heavy or light fighter planes such as Sukhoi SU27/30, F16 Fighting Falcon and Rafale. Helicopter capabilities also are available with NAS330 Puma, H225M and Super Puma models. Some 70% of these buildings are already open for business and 30% are currently in the process of being revamped towards smart infrastructures and digital maintenance/monitoring systems. Office buildings, including the main management building as well as presentation and meeting rooms, operations units, have been completed 80 per cent in terms of overall readiness, modernized to become energy efficient while being equipped with digital means of communication (Efawati, 2020). The enhancement is in line with the PTDI's vision to realize a paperless, energysaving and collaborative workspace that is fulldigitized (Industry 4.0) transformation of work space (Basuki, 2023; Heliana & Wahyuni, 2024).

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Information and Communication Technology (ICT) Management

PTDI's digital strategy has included not only info-communication systems but the turning of such into one of core strategic matters. Gradually, the company has advanced from manual systems through full digital basis data (basis data digital) and communications technologies. The aims are to store, query and analyse the data for a better decision-making system and automation. Today, customers can also enjoy PTDI services online – from enquiry and ordering products to payments and monitoring the status of deliverables - without physical transactions. So now it's easier to reach out to consumers, delight them and be more agile with operations, since we are all connected in a digital world. However, this advancement is accompanied by actively developing cybersecurity and digital risk challenges that require effective risk management, resilient planning, constructive efforts of employee awareness for hardening the company's digital environment (Lysenko *et al.*, 2024; Serac, 2023).

Strategic Digital Transformation Initiatives

Digital transformation and the development of HRM focus on a range of measurements directed towards the harmonisation of personnel management with the pace technology evolution. PT Dirgantara Indonesia (PTDI) is strategically operating the tools of Technology in integrating Artificial Intelligence, Internet of Things 0 (IOT), Big Data analytics and Enterprise Resource Planning (ERP) system for its capable efficacy, transparency, innovativeness in stately organization functioning. These are in line with the growing consensus among scholars that digital transformation is a means to improve operational excellence, data-driven decision-making and long-term competitiveness in manufacturing and aerospace (Liu *et al.*, 2022; Olubunmi Adeolu Adenekan *et al.*, 2024). For the optimisation of its internal processes, PTDI utilise digital tools and systems with four basic frameworks that are frequently cited in literature on enterprise transformation, such as follows.

1. Supply Chain Management System (SCMS): Utilizes Artificial Intelligence algorithms and Predictive Analytics for responsive supply chain decision-making with respect to supplier coordination, demand prediction and production scheduling.
2. CRM System (CRMS): Collects customer interaction information through cloud-based AI technology, completes a real-time feedback loop and assists in raising customer satisfaction.
3. ERP (Enterprise Resource Planning): Consolidates processing of manufacturing, finance, human resources and logistics operations through shared data and reporting.
4. Threads KMS: Enhancing organizational learning and innovation through AI driven information discovery, workflow automation and semantic knowledge navigation.

The deployment of these four systems is helping PTDI to achieve the transition from paper-based operation to digital eco-system, improving agility and predictability while fostering cross-functional cooperation. In addition, the firm participates in advanced analytics initiatives and digital upskilling so that their employees are prepared for industry 4.0, including results studying that digital transformation of HR processes can enhance creativity, collaboration and efficiency (Vedernikov *et al.*, 2022). AI has been the core of PTDI digital HR architecture adopting an automated recruitment analytics, performance review and predictive workforce planning (Zhuang, 2024) with

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monitor machines within IoT based for machine monitoring, energy optimisation and real-time asset management across production site (Li, 2024). Central to these areas is a well-advanced digital base driving increased productivity while creating more sustainable and safer operations. Applying these frameworks and their stakeholder ratified viewpoints, the following section provides detailed PT Dirgantara Indonesia‟s HRM and IT adaptation scores (Table 3).

Table 3. Information technology program implementation at PT Dirgantara Indonesia second quarter

Field	Program Title	Impact Category	% Weighting	% Realization
PT Dirgantara Indonesia	Preparation & Implementation of IT Strategic Plan	*Regulatory*	1.20%	65.00%
	ITML Improvement per IT Assessment Recommendations	*Regulatory*	1.20%	50.00%
	Follow-up on IT Audit and/or Management Evaluation	*Regulatory*	1.20%	50.00%
	Evaluation & Revision of Enterprise IT Architecture (EITA)	*Process Improvement*	1.20%	10.00%
	IT HR Capability Enhancement	*Others*	1.20%	50.00%
	IT Risk Management	*Others*	1.20%	50.00%
	IT Service Management (ITSM) Implementation	*Process Improvement*	1.20%	50.00%
	Helpdesk Service Enhancement & Reliability Measurement	*Process Improvement*	1.20%	50.00%
	License Compliance, Capacity Planning & Tech Refresh	*System Improvement*	1.20%	50.00%
	Agile & DevOps Framework Development Implementation	*System Improvement*	1.20%	37.00%
	Digital Sales & Marketing Business Process	*Process Improvement*	1.20%	50.00%
	Digital Human Capital & Production Business Process	*Process Improvement*	1.20%	55.00%
	Data Warehouse & Data Visualization Implementation	*Process Improvement*	1.20%	50.00%
	e-Office Holding	*Process Improvement*	1.00%	30.00%
	Digital Talent Collaboration with Human Capital	*Regulatory*	1.00%	40.00%
	Cybersecurity Enhancement	*System Improvement*	1.20%	40.00%
	INDI 4.0 Gap Fulfillment per Digital Transformation Roadmap	*Regulatory*	1.20%	50.00%

Source: IT Division, PT Dirgantara Indonesia (2025). Data compiled and modified by the author.

Table 3 showing that realization of PT Dirgantara Indonesia (PT DI) IT program development during quarter II year 2025 has been conducted with a result achieved varied from one pro- gram to another start from 10% to maximum at level of 65%. These numbers suggest that leading edge work remains to be done in areas like IT Strategic Planning and regulatory compliance, some has got lots of traction (registration, communication), and other building blocks are little ways off (Enterprise IT Architecture assessment, Agile-DevOps works). The variation in the pace of transition is due to the difficulty and multi-dimensionality of moving from older, familiar structures to digital transformation environments that are fully integrated - notably in a knowledge-intensive sector such as aerospace manufacturing.

A relatively strong performance in Preparation and Implementation of IT Strategic Plan (65%) indicates the firm’s readiness to ensure digital activities are effectively

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aligned with corporate objectives, as well as with governance protocols. This strategic commitment to digitalization will no longer permit digitalization to be a separate technical department, but will be an integral part of corporate growth and efficiency. As recent studies suggest, both structured IT governance and EA frameworks facilitate organizations to realize digital maturity by collaboratively reconciling agility with control (Pingilili *et al.*, 2025; Sararuch *et al.*, 2023), ensuring compliance while also promoting innovation. The fact that all categories are at a 50% penetration threshold including Risk Management, IT Service Management (ITSM) and Data Warehouse Implementation reinforced development over time on the standardization of processes, data integrity and efficiency in internal communication (AL-Zahran, 2020).

However, the achievements supported by these successes with reach below 30 percent highlight challenges in the areas of digital infrastructure readiness, budget allocation, and organizational culture alignment. Analogous barriers have been found in research on agile enterprise architecture; technological innovation requires adaptability of human capital and commitment by leadership (Dragičević & Bošnjak, 2020; Fuentes-Quijada *et al.*, 2023). Addressing both is vital if full digital maturity and sustainable outcomes of transformation are to be reached.

In general, the findings support that programs of IT implementation PT Dirgantara Indonesia are running as per best international practices of a digital transformation governance. The well-organized prioritization of regulatory, process improvement and system enhancement buckets demonstrates a recognition that transformation is sustainable if it combines top-down direction with bottom-up innovation as manifested by the dual-loop governance model detailed in the latest Digital Transformation Strategy and Execution framework (Cockburn, 2024). Table 4 Strategic Information Technology Plan PT Dirgantara Indonesia in 2025 (Scale Integrated Framework (SIF) Level 2 Governance and Management Processes, Risk Management Process, System Implementation Supporting Digital Transformation of Companies):

Table 4. Strategic IT plan PT Dirgantara Indonesia

No	Domain	Area of Improvement Plan 2025	Realization of Achievements in 2025	%
PT Dirgantara Indonesia				0%
1	EDM	EDM01 Percentage of governance policies that have been reviewed and updated as scheduled. EDM02 Conducting periodic evaluations and reviews by stakeholders including the Board of Directors (BOD), representatives from related business units (BPO), members of the IT Steering Committee, and IT managers to ensure that the IT strategy remains relevant to the company's goals, covering investment, services, and asset management.	1. Procedure Evaluation Report has been prepared 2. Compliance List is in the review process	50.0 0%
2	APO	APO03 Identifying risks and developing risk mitigation plans related to changes in implementing the designed Enterprise Architecture (EA). APO09 Establishing procedures for reviewing and improving Service Level Agreements (SLA) and Operational Level Agreements (OLA) as anticipation in case SLAs/OLAs are not met.	APO09: 1. SLA Monitoring Report has been prepared APO10: 1. Risk analysis has been conducted for each service or product fulfillment	65.0 0%

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		APO10 Establishing methods and performing risk identification related to service/product fulfillment that vendors must meet. APO13 Defining the design and development of information security based on input from accredited external parties, according to standards and best practices. APO14 Establishing strategies for evaluating data quality and systematically monitoring data management.	required from vendors 2. Vendor evaluation report has been prepared APO13: 1. KAMI index assessment is currently underway 2. Policies related to SMKI are being developed	
3	BAI	BAI02 Creating project quality planning documents to ensure that systems meet all functional and security requirements. BAI03 Adding information related to current infrastructure capacity and the impact of further infrastructure needs. BAI04 Analyzing monitoring results of current capacity. Preparing procedures for Business Impact Analysis (BIA) testing and conducting regular BIA evaluations to ensure all possible failures are up to date, identified, and mitigated. BAI05 Identifying and establishing quick-win programs that can bring about organizational change. BAI06 Preparing regular reports on application service requests including analysis of change implementation timelines. BAI09 Conducting inventory and audit of non-physical assets such as software licenses on an organization-wide scale. BAI10 Requiring the establishment of policies on Configuration Items (CI) input into applications. Requiring the establishment of regulations regarding Configuration Item parameters, including procedures for establishing, managing logical models for configuration management, as well as procedures for change, monitoring, and evaluation.	BAI05: 1. Mapping and prioritization of quick-win programs will be conducted BAI06: 1. The Progress Report of Application Development (PMO) will be completed with: ▪ Analysis of change implementation timing ▪ Priority identification BAI10: 1. Procedures related to Configuration Management Database (CMDB) are under development	30%
4	DSS			0%
5	MEA			-

Source: IT Division, PT Dirgantara Indonesia (2025). Adapted from internal governance and enterprise architecture reports.

Table 4 Integration of PT Dirgantara Indonesia s 2025 Strategic IT Plan showing the entire city's implementation achievement was at between 30% to a maximum of 65%

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in each GRC domain. Align, Plan and Organize (APO) and Evaluate, Direct and Monitor (EDM) show the highest rates of attainment which could be indications of strong IT governance structures established as well as managerial check over their operations. These results support similar findings emphasizing governance maturity as antecedent to successful digital transformation in Indonesian SOEs (Tangka *et al.*, 2025).

Particularly, the BAI domain makes the less headway, because of technical and economic limitation to improving infrastructure conditions and integrating systems. But the process of establishing CMDB practices and quick-win digital project mapping shows forward momentum up the IT project management maturity. Analogous transitional problems were also reported in enterprise architecture governance works, specifically concerning alignment of capability and prioritizing investment (Cuatanto & Sutomo, 2023; Solikhah *et al.*, 2024). It is found that the results show that PT Dirgantara Indonesia's development of its Enterprise IT Architecture (EITA) encompasses international best practices, more specifically in COBIT 2019 governance model. Research has proven that the implementation of COBIT 2019 in Indonesian companies will improve IT process, risk and strategic alignment (Perdana *et al.*, 2024; Viamianni *et al.*, 2023). Also, the risk-based planning and audit follow up; and capacity building is a demonstration of commitment to adaptive governance and continuous improvement in the digitalization agenda (Monica *et al.*, 2024).

In short, the Strategic IT Plan indicates that PT Dirgantara Indonesia has established a firm digital governance platform with transparency, risk oversight and measurable assessment. Such structured governance is not only necessary for holding accountable all relevant parties, but also as strategy aligned to the company's vision and long-term transformation direction (Hidayat *et al.*, 2024). After completing the Strategic IT Plan, PT Dirgantara Indonesia performed a full assessment of digital maturity using the APS-6 INDI 4.0 (Indonesia Industry 4.0 Readiness Index) model. Constructed by the Ministry of Industry, Republic of Indonesia this audit gauges corporate readiness in embracing Industry 4.0 materials & methods with five pillars being: (1) Management & Organization, (2) People & Culture, (3) Products & Services, (4) Technology and (5) Operations (Prakosa *et al.*, 2024; Sayekti *et al.*, 2023a).

The INDI 4.0 report gives diagnostic details and benchmarks that help L&D in finding digital capabilities gaps and strategic areas for improvement. As an internal benchmark tool, PTDI can use to measure its level of digital transformation compared with national industry standard so as to stay competent and sustainable (Sulistyo *et al.*, 2025). PTDI strengthens its technology strategy, HR and governance standards by utilising the APS-6 INDI 4.0 The adoption of the APS-6 INDI 4.0 enables PTDI to ensure that its technology programmes are aligned with human resourcing strategies and governance protocols. This embedding represents the principles of COBIT 2019 and SPBE that the digital transformation should be structured, measurable and consistent (Mambu *et al.*, 2022). The outcome of this readiness assessment is documented in Table 5, which illustrates PTDI's readiness as well as the digital gaps closing strategy towards becoming an Industry 4.0 exemplary.

Table 5. APS-6 INDI 4.0 assessment and GAP fulfillment (2025)

No	Pillar	Plan Area of Improvement in 2025	Realization of Achievements in 2025	%
	PT Dirgantara Indonesia			23%
1	Management and Organization	Preparation of the 2025–2028 Strategic Information Technology Plan (RSTI) Preparation of Investment Feasibility Study related to INDI 4.0	• Procurement related to the Data Warehouse is in the vendor selection stage. • Procurement related to the Security Technology	50%

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		Preparation of the 2025–2028 Long-Term Development Plan (RJPP)	Refreshment has reached the tender stage. • Preparation of the RSTI is still underway.	
2	People and Culture	Implementation of AKHLAK Survey Engagement Employee Survey (EES) Preparation of the Draft Innotech Competition 2025	• The second quarter of the AKHLAK Survey is currently underway. • The innovation competition is currently in the top 10 selection stage.	60%
3	Products and Services	Joint Venture Development of Smart Products such as Advanced Air Mobility (AAM), Vela Air Taxi, CBT Rafale Enhancement of After-Sales CRM Application	• Joint Venture Development of Smart Products such as Advanced Air Mobility (AAM) and Vela Air Taxi, in early discussion stage • Development of Raffale's CBT has begun • Enhancement of the After-Sales CRM Application is in progress	40%
4	Technology	Assessment of IT Maturity Level Refreshment of Technology Security Establishment of the Security Operations Center (SOC) Digitalization of Human Capital Business Processes	• ITML Assessment Implementation with a score of 3.13 • Security Technology Refreshment procurement process at the tender stage • Performance Management digitalization has been completed in development	50%
5	Operations	Preparation of Feasibility Study for DRC SAP Dashboard Monitoring of Material Status Preparation of Feasibility Study for CATS and Robotic Drilling & Riveting System (RDS) Optimization of RCM (Reliability Centered Maintenance) and FMEA (Failure Mode Effect Analysis) Systems	• The SAP Refreshment Technology Feasibility Report (DRC) has been approved and is in the procurement process. • Dashboard Monitoring the Status of Material Requirements for a Project • Feasibility Studies for CATS and Robotic Drilling & Riveting System (RDS) have been approved. • Continuous Improvement of the RCM & FMEA concept for Priority Machine Maintenance Jobs, Craft, and CMS Routers	50%

Source: IT Division, PT Dirgantara Indonesia (2025). Adapted from APS-6 INDI 4.0 Assessment and Digital Transformation Gap Fulfillment Report.

The final result of INDI 4.0 APS-6 is PT Dirgantara Indonesia's status towards digital transformation and the level of physical appearance, between 40% - 60%, which reflects very good condition in both human resources and technology application. The organisation has made some interesting strides around the management of it, skill digitalisation and operation bolstering. The People and Culture contributed to a greater level with innovation-led initiatives like Innotech Competition and Employee Engagement Survey (EES). The programs have contributed to the reinforcement of corporate innovation, collaboration and continuous learning culture.

Progress as % of rollout was at 50% in Technology and Operations with progress noted on digitisation of processes, security operations, automation (RDS) Robotic Drilling and Riveting Systems and SAP DRC Feasibility Studies. The Products and Services pillar achieved 40% realization due to early-stage cross-divisional effort on

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Advanced Air Mobility (AAM) and Vela Air Taxi two strategic initiatives as part of the company's strategy to expand its aerospace innovation portfolio in time. However, despite efforts made to date, assessment did identify a number of cybersecurity vulnerabilities that present potential risks to organisational resilience. The report identified three main risk trends: digitising the entrance doors, as systems and devices become interconnected; growing loss potential in the form of data breaches and cyber incidents leading to financial losses such as lost income or regulatory fines; and complex attacks on integrated systems. These vulnerabilities highlight the need for enterprise-wide cyber-resilience, continuous monitoring and standardization of digital risk governance to international standards like ISO/IEC 27001. Enhancing employee digital awareness training is also vital to safeguard the company and maintain compliance (Sulastri & Methasari, 2025).

Synthesis of Findings

The empirical evidence in general implies that the journey of digital transformation pursued by PT Dirgantara Indonesia is a strategic, humanizing and technology-led process to cater for being readied toward readiness of Industry 4.0. The company has an all-encompassing strategy which is built on marrying state of the art digital capabilities across HR and operations, balancing technology advances with empowering its workforce, fostering an innovation culture. This harmonized integration ensures the digital transformation not only updates infrastructure, but also changes HRTM to state-of-the-art communication and decision-making in agile data warm•, gated operations' (Bahri *et al.*, 2025).

PT Dirgantara Indonesia is possible State-Owned Enterprises (BUMN) in Indonesia have the spirit of digital transformation integrated business effort not only technology improvement individually). Combined with the convergence of digital technologies such as Artificial Intelligence (AI), and Big Data Analytics; Internet of Things (IoT) to workforce development efforts, these organizations achieve enhanced agility, transparency and performance. This mix promotes healthy competition, enhances employee loyalty and prepares the profession for the future. In conclusion, the example of PT Dirgantara Indonesia shows that a successful digital transformation is built on three key pillars: technological innovation, human resources capacity building and governance reforms. By continuing to invest capital in these areas, PTDI doesn't just lead operational excellence; it is positioned to take the lead in Indonesia's aerospace industry model led by other SOEs which are looking to transformation themselves for good on a more sustainable basis of this pandemic and beyond.

DISCUSSION

The HRM strategy patterns being developed by PT Dirgantara Indonesia which is developed based on the five strategic perspectives of customer, competition, data innovation and value is in full support to the argument that HRM is becoming one critical instrument for enabling organizations agility in the era of digitalization. Digital transformation enables organizations to achieve agility, and greater transparency and efficiency in decision-making by combining humans with technological capabilities (Dwivedi & Gupta, 2024a). Optimization of four digital systems ((SCMS), (CRMS), ES and KMS is an indication how digitalization can automate routine process, improve production quality also operational integration and customer satisfaction (Nyathani, 2022).

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Attention to digitization of Sofková *et al.*: HRM integration and performance in MNCs 453of HRM is positively related to its influence on performance. Digital workflows reduce overhead and enable collaboration among departments by improving communication and knowledge-sharing. Secondly, it makes organizations more agile in adapting to volatile market conditions, and results into high standard of quality service delivery that increases employee retention and loyalty (Rekha, 2025). Establishing HRM systems and tactics based on digital revolution is a strategic stepping stone into an era in which technological supremacy and human centered management converge. Effective adaptation depends on blending automation and human–machine partnership, the so-called human-in-the-loop model which emphasizes collective intelligence and ongoing learning (Vogt, 2021). Examples of strategic principles such as Engage Your Customers, Empower Your Employees, Optimize Your Operations and Transform Your Products are vital mechanisms for ensuring a sustainable digital transformation (Aryanto *et al.*, 2023).

In context of HRM, application of AI, IOT and big data analytics leads to smart workplaces which enhance the speed flexibility as well as employee involvement (Yadav *et al.*, 2023). Studies show that AI powered HR 2 Smith and Galavan analytics help smoothen hiring processes, offer a solid platform for supervising the periodic work performance of an employee´s, and predict on staff requirements which brings productivity level up and decrease in turnover rate (Purwaamijaya & Prasetyo, 2022). Another form of sustainability through digital innovations is eco efficiency, due to less use (savings) of paper, connected data technologies and energy efficient processes (Margaretha *et al.*, 2024).

But PT Dirgantara Indonesia's journey of change is not without its challenges. Objections to change, lack of digital skills and resource constraints remain obstacles still to be conquered. As illustrated in studies about adaptive firms, digital transformation requires an inclusive culture that promotes transparency, cross functional cooperation, and learning (Prakosa *et al.*, 2024). The company's HRM practices focusing on digital empowerment, employee learning & development and recognition signal the will to create an organization that learns openly to technology innovation (Sambak *et al.*, 2025).

These results shed light on the fact that it is indeed the case, digital HRM is positively linked to employee experience and organizational resilience. In line with prior studies, digital HR systems support agility decision making, better governance processes and accountability (Nurrohmat *et al.*, 2024). The implementation of industry 4.0 at PT Dirgantara Indonesia indicates that technology alone is not sufficient without concomitant transformation of human resources particularly in improving the digital literacy, creative problem-solving skills, and adaptive leadership (Ghani, 2024). In short, the digital transformation has become a driving force and foundation for HRM under the fourth industrial revolution to couple leading-edge technologies with human capital development in making such value that is both sustainable and competitive in the long run. PT Dirgantara Indonesia is a great example of what you can do when you mix innovation, leadership and digital capability to compete in an environment where industrial markets are disappearing.

CONCLUSIONS

The Human Resource Management (HRM) Strategy which is facilitated by digital transformation has become a proposed factor on competitiveness in the era of industry 4.0, including at PT Dirgantara Indonesia (PTDI). According to the performance management, a good business process system has been developed and data is digitized

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as well as varieties of product innovation have been introduced. This captures the essence that digital transformation in the HRM functions as an enabler to organizational agility, productivity, and sustainability. Roa, a Group of Douglas College a part of a research paper HRM literature review on digital transformation. The deployment of digital learning platforms, administrative process automation and especially data driven decisions make it a more agile and collaborative place already. In addition, the combination of HR policies, technological advancement and business strategy renders digitalization as an integrated aspect of organizational development process rather than a stand-alone program.

To achieve full levels of digital maturity, PT Dirgantara Indonesia still requires to develop leadership commitment, digital literacy and infrastructure. The firm's ability integrates technology with human empowerment underpins operational and strategic superiority. At the same time, it also realizes that digital transformation is not all of a sudden kind of thing rather an iterative re-evaluation cycle which needs to be improved and refined in order to stay relevant in ever changing industrial landscape. There is a long way to go, including the threat of cyber security and limited resources, but their proactive approach and the structured approach to governance and risk management will give you protection. Kirk: Implementation of Facilitation process-so take stock through the digital implementation we have found that structured pursuit of digital strategies not only made implementation effective but has strengthened up transparency, responsibility and being innovative at every nook and corner of the Groups. In conclusion, the PT Dirgantara Indonesia case shows how successful digital transformation is not just a technological implementation but rather an integrated and ongoing change in technology, processes and people. The company maintains the infusions of technology and human resources, thus moving to be an innovative adaptive world-classized aerospace enterprise. This contact thing-technology-human contact chain is a sustainable groove to the future of excellence in Industry 4.0.

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