The Impact of Information Technology Alignment on Human Resource Development in the Saudi Education Sector: The Mediating Role of Employee Learning Speed

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Abstract:

This study explores the impact of information technology alignment (ITA) on human resource development (HRD) in the Saudi education sector, with a particular focus on the mediating role of employee learning speed (ELS). As Saudi Arabia intensifies its digital transformation efforts in alignment with Vision 2030, higher education institutions are increasingly expected to integrate IT systems strategically to foster employee development and organizational agility. Drawing on a quantitative research design, data were collected from 386 academic and administrative staff members at Imam Abdulrahman Bin Faisal University using a structured questionnaire. The constructs were validated using structural equation modeling (SEM), and the model's reliability and validity were confirmed through measurement model assessments. The findings indicate a significant direct effect of ITA on HRD, highlighting the importance of aligning digital infrastructure with institutional goals. Additionally, ITA demonstrated a strong positive influence on ELS, which in turn significantly mediated the relationship between ITA and HRD. However, ELS alone did not show a significant direct effect on HRD without the support of IT alignment, suggesting that digital integration is a critical enabler of learning agility. These results underscore the strategic importance of digital alignment in shaping effective human resource practices within academic institutions. The study contributes to the understanding of how technology and human capital interact in the context of educational reform and organizational development. It offers practical implications for policymakers and university leaders aiming to enhance staff capabilities through integrated digital strategies and targeted learning interventions.

Keywords: *Information Technology Alignment; Human Resource Development; Employee Learning Speed; Digital Transformation; Saudi Education Sector.*

1. Introduction

The rapid digitalization of global industries has significantly transformed organizational landscapes, demanding new strategies for aligning technological capabilities with human capital initiatives. In this context, Information Technology Alignment (ITA) has emerged as a strategic cornerstone, ensuring that digital systems and tools are effectively integrated into organizational processes, especially within the domain of Human Resource Development (HRD). IT alignment reflects how well technology supports HR practices such as performance management, employee training, knowledge sharing, and career development. It encompasses both the technological infrastructure and the strategic coordination between IT and human resource goals, enabling organizations to achieve operational agility, learning adaptability, and innovation readiness (Pashutan et al., 2022; Meijerink et al., 2021). Within the Saudi Arabian context, educational institutions are undergoing significant digital transformations in alignment with the goals of Saudi Vision 2030, which places human capital development at the core of national growth. The integration of IT into HRD systems across Saudi universities has become crucial for improving institutional performance, service quality, and administrative effectiveness (Alhamami, 2023). These efforts are not merely about digitizing processes but are focused on aligning digital tools with strategic educational outcomes and workforce capabilities. As Alshawan (2023) notes, such alignment is essential for fostering resilient academic institutions capable of navigating uncertainties like pandemics, globalization, and labor market shifts. Similarly, Alharbi (2021) emphasizes that during the COVID-19 pandemic, universities that had successfully integrated IT systems into their HR structures were better able to respond with agility, demonstrating the importance of strategic alignment.

In this transformative landscape, Human Resource Development (HRD) is increasingly viewed through the lens of technology. Traditional notions of HRD, which centered on static training and hierarchical knowledge transfer, are being replaced by dynamic models that involve real-time learning, digital upskilling, and competency-based performance evaluation (Swanson, 2022; Stone et al., 2024). Technological tools such as human resource information systems (HRIS), e-learning platforms, and data analytics now play a central role in workforce development strategies. These systems support faster decision-making, more personalized learning experiences, and efficient tracking of employee progress. As Diawati et al. (2023) and Prastyaningtyas et al. (2023) argue, the effective use of information technology is not just a productivity tool but a strategic enabler of HRD outcomes in both corporate and educational settings. A critical factor that mediates the relationship between IT alignment and HRD outcomes is

Employee Learning Speed (ELS). This construct refers to the capacity and agility of employees to acquire, internalize, and apply knowledge in rapidly changing environments (De Meuse, 2019). In sectors such as education, where digital technologies continuously reshape teaching, administration, and governance, the ability of staff and faculty to learn and adapt quickly is vital. Research by Ghosh et al. (2021) shows that the integration of e-learning systems, coupled with a culture of continuous improvement, significantly enhances learning agility across organizational hierarchies. Similarly, Abdelhamid and Sposato (2019) emphasize that a learning-oriented workforce contributes to institutional agility and resilience, especially in times of technological disruption.

Saudi universities, particularly public institutions like Imam Abdulrahman Bin Faisal University, provide a unique context for studying this triadic relationship between ITA, ELS, and HRD. These institutions face pressures to modernize, globalize, and comply with quality assurance benchmarks, all while managing diverse faculty and administrative staff. In this regard, digital transformation is not only a technical endeavor but a human-centered one, requiring a workforce that can evolve alongside emerging technologies. Studies such as those by Alruwaili (2023) and Alhosani and Ahmad (2024) have shown that digital alignment, supported by effective HR practices and leadership, plays a significant role in enhancing organizational performance and employee outcomes. Moreover, the agility and adaptability of employees, particularly their learning speed, act as accelerators of digital HR transformation. Despite growing interest in digital transformation and HR innovation, empirical research that examines the mediating role of learning speed in the relationship between IT alignment and HRD remains limited, especially in the context of Saudi Arabia's educational institutions. Most existing studies either focus on private sector transformations or treat IT and HR as separate domains (Thite, 2022; Zhang & Chen, 2024). This study seeks to bridge that gap by empirically examining how strategic alignment of information technology contributes to human resource development, with employee learning speed serving as a key mediating variable. Grounded in the theoretical foundations of organizational learning theory (Senge, 2006; Argyris, 1999) and HRD models (Swanson, 2022), this research provides new insights into the mechanisms through which technology and human capital intersect to drive institutional growth.

By conducting this study within a Saudi public university, this research contributes to the broader understanding of how educational institutions can harness IT alignment to foster sustainable HR development. It also offers practical implications for university leaders, HR professionals, and policymakers seeking to enhance organizational readiness in a digital future. Through a robust quantitative approach, the study evaluates the structural relationships among

ITA, ELS, and HRD, providing evidence-based recommendations that can inform digital HR strategies in higher education settings.

2. Literature Review

The role of digital technologies in reshaping organizational operations and workforce development has been extensively emphasized in recent academic discourse. As organizations navigate dynamic environments and embrace innovation, the alignment between information technology (IT) and strategic human resource functions becomes increasingly vital (Pashutan et al., 2022). Information Technology Alignment (ITA) refers to the degree of congruence between IT infrastructure, systems, and strategic business or human resource objectives. In the context of educational institutions, ITA ensures that digital tools are not merely operational utilities but are integral components in enhancing employee development, knowledge sharing, and overall performance (Nicolás-Agustín et al., 2022). For HRD professionals, IT alignment offers the potential to streamline learning processes, automate routine HR tasks, and support evidence-based decision-making, thereby elevating the role of HR from administrative to strategic. In Saudi Arabia, the integration of IT systems within higher education institutions has gained significant traction in recent years. This transformation is closely linked to Saudi Vision 2030, which emphasizes digital transformation as a driver of national progress. Studies have shown that public universities in the Kingdom are investing heavily in smart learning platforms, digital HR systems, and cloud-based infrastructures to modernize administrative and academic services (Alhamami, 2023). However, effective implementation depends on the degree to which these systems are aligned with institutional goals and human capital strategies. Alshawan (2023) suggests that without strategic alignment, technology investments may lead to underutilization, resistance from staff, and poor return on investment. Alharbi (2021) further argues that universities with higher organizational agility, enabled by IT systems aligned with workforce needs, were better able to adapt to crises such as the COVID-19 pandemic.

Human Resource Development (HRD) has undergone a paradigm shift, especially in response to digitalization and global talent competitiveness. Traditionally focused on training and performance evaluation, HRD now incorporates digital technologies that facilitate learning agility, career progression, and real-time performance feedback (Swanson, 2022). Digital HRD tools, such as learning management systems (LMS), digital credentialing, and performance analytics, enable organizations to design more targeted development interventions that are responsive to individual employee needs (Stone et al., 2024). Research by Prastyaningtyas et al. (2023) illustrates how digital platforms can accelerate

career development and foster employee engagement. In Saudi educational institutions, these technologies have been critical in managing hybrid teaching models, monitoring faculty performance, and delivering remote professional development. While IT alignment provides the infrastructure, the success of HRD initiatives also hinges on individual capacities, particularly Employee Learning Speed (ELS). Learning speed is defined as an individual's ability to absorb, internalize, and apply new knowledge efficiently within dynamic organizational settings (De Meuse, 2019). ELS is especially crucial in sectors like higher education, where technological innovation is constant and academic practices evolve rapidly. Ghosh et al. (2021) found that organizations that invest in e-learning and cultivate a strong learning culture experience enhanced learning agility among employees. In the Gulf context, Abdelhamid and Sposato (2019) demonstrated that workforce agility, facilitated by fast learning, was essential in enabling institutions in Dubai to navigate technological and cultural shifts. Similarly, in the Saudi setting, Alruwaili (2023) highlighted that employees with higher learning agility were more adaptable to digitized work processes and contributed significantly to organizational innovation.

The mediating role of ELS between ITA and HRD is increasingly gaining attention. While IT alignment provides access to tools and platforms for learning, the degree to which employees utilize and benefit from these systems is often moderated by their learning agility (Thite, 2022). Employees who can quickly adapt to new digital tools and assimilate knowledge are better positioned to take advantage of IT-aligned HRD programs. Abbas and Salameh (2023) argue that learning-oriented cultures amplify the impact of digital transformation on performance outcomes, especially in knowledge-intensive sectors. Anwar and Abdullah (2021) also emphasize that IT-based HR practices lead to enhanced employee outcomes when learning mechanisms are built into the system. However, despite the theoretical relevance of these constructs, there remains a noticeable gap in empirical studies that explore their interconnectedness, particularly within higher education institutions in Saudi Arabia. The majority of existing research either examines IT alignment and HRD as separate domains or focuses on private-sector transformations (Diawati et al., 2023; Zhang & Chen, 2024). Few studies consider the role of learning speed as a psychological and behavioral mediator that explains how ITA translates into meaningful developmental outcomes. In this regard, Senge's (2006) theory of organizational learning offers valuable insight, suggesting that institutions thrive when they nurture systems thinking, team learning, and mental models. Similarly, Argyris (1999) posits that learning is central to adaptive organizational behavior and that

barriers to learning, such as resistance to technology, must be addressed to realize developmental potential.

The present study addresses this empirical and theoretical gap by exploring how employee learning speed mediates the relationship between information technology alignment and human resource development within Saudi universities. Drawing on frameworks from organizational learning theory (Senge, 2006; Argyris, 1999) and digital HR literature (Meijerink et al., 2021; Swanson, 2022), this study provides a holistic perspective on how strategic IT integration and employee adaptability coalesce to support workforce growth. The findings are expected to contribute to the evolving discourse on digital HRD, offering practical implications for educational leaders, HR professionals, and policymakers seeking to build resilient and future-ready institutions.

3. Methodology

This study adopts a quantitative research approach to examine the relationship between Information Technology Alignment (ITA), employee learning speed, and Human Resource Development (HRD) in the Saudi education sector, with a specific focus on Imam Abdulrahman Bin Faisal University. The quantitative approach was selected for its capacity to produce objective, generalizable, and statistically verifiable results. It allows the testing of complex theoretical models using structured instruments and statistical modeling techniques such as Structural Equation Modeling (SEM), which is particularly effective in analyzing both direct and indirect relationships among latent constructs (Hair et al., 2022). The research instrument used in this study was a structured questionnaire designed to measure the key latent variables: ITA, employee learning speed, and HRD. The items were adapted from established and validated scales found in prior literature to ensure content validity. For instance, the ITA construct focused on the strategic alignment of information technology systems with organizational goals, systems integration, and digital responsiveness in higher education institutions. Employee learning speed was conceptualized as an individual's capacity to acquire and apply new knowledge rapidly, while HRD was measured in terms of training effectiveness, career development opportunities, and skill enhancement practices. All items were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire items were contextualized for the Saudi higher education environment, emphasizing elements such as digital infrastructure, staff adaptability, and institution-led training and development initiatives. The instrument was further guided by theoretical frameworks such as Swanson's (2022) HRD model, Organizational Learning Theory (Senge, 2006), and strategic

alignment theory (Venkatraman, 1994), all of which underscore the importance of aligning technology, learning, and human capital development.

The study population consisted of academic faculty, administrative staff, and IT professionals from across 21 colleges within Imam Abdulrahman Bin Faisal University. With an estimated workforce of approximately 4,000 individuals, the setting provided a robust and diverse environment to investigate the dynamics between IT alignment and workforce development. To ensure representation across key roles, a stratified random sampling technique was employed. The workforce was divided into strata based on job roles (e.g., teaching, IT, HR), and participants were randomly selected within each group. Using Krejcie and Morgan's (1970) formula, a minimum sample of 350 respondents was targeted, which exceeds the threshold for SEM and provides strong statistical power for hypothesis testing. A pilot study was conducted to ensure the validity and reliability of the questionnaire. Thirty respondents from various departments participated in this phase. Feedback from the pilot informed the refinement of question wording, flow, and clarity. Reliability analysis using Cronbach's alpha showed strong internal consistency across all constructs: ITA ($\alpha = 0.84$), HRD ($\alpha = 0.87$), and employee learning speed ($\alpha = 0.89$). Minor adjustments were made to enhance the clarity of items and align them with local linguistic and cultural contexts.

Data collection was conducted electronically using online survey tools and disseminated through the university's internal communication channels. All participants were provided with a consent form detailing the purpose of the study, anonymity, and confidentiality assurances. Participation was entirely voluntary, and data was anonymized before analysis. The dataset was cleaned to address missing values, cases with more than 10% missing data were excluded, while minor gaps were treated using mean substitution or predictive imputation techniques. The data analysis process followed the SEM-PLS approach using SmartPLS 4.0. This technique was chosen due to its ability to model complex relationships between latent variables, including mediation analysis. The process began with a Confirmatory Factor Analysis (CFA) to test the measurement model, including assessments of construct validity, indicator reliability, convergent validity, and discriminant validity using metrics like Composite Reliability (CR), Average Variance Extracted (AVE), and Fornell-Larcker criterion.

Once the measurement model was confirmed, the structural model was evaluated to test the proposed hypotheses. This included estimating path coefficients (β), t-values, and p-values to determine the significance of relationships between constructs. The mediating effect of employee learning speed between ITA and HRD was examined using bootstrapping with 5,000

samples, and Sobel tests were applied to assess the strength and significance of mediation. Model fit indices such as SRMR (<0.08), CFI (>0.90), and RMSEA (<0.08) were used to confirm the adequacy of the model. Additionally, effect size (f^2) was calculated to assess the contribution of each predictor, while the coefficient of determination (R^2) was used to evaluate the explanatory power of the model for HRD. By employing SEM, this study provides a rigorous framework to understand how strategically aligned IT systems and digital infrastructure contribute to workforce agility and capacity building in Saudi educational institutions. The findings are expected to inform institutional policies aimed at synchronizing digital transformation initiatives with human capital development strategies, particularly in the context of Saudi Vision 2030.

4.Findings

This section presents the results of the empirical analysis conducted to assess the impact of Information Technology Alignment (ITA) on Human Resource Development (HRD) in the Saudi education sector, with a particular focus on the mediating role of Employee Learning Speed (ELS). The analysis includes descriptive statistics, measurement model evaluation, reliability and validity testing, structural model analysis, and hypothesis testing using Structural Equation Modeling (SEM) with SmartPLS. Descriptive statistics offer preliminary insights into participants' perceptions of the constructs under investigation. As shown in Table 1, all constructs demonstrated relatively high mean values. Employee Learning Speed (ELS) scored the highest average at M = 4.107, suggesting that employees perceive themselves to be agile and adaptable in acquiring new knowledge and skills. Information Technology Alignment (ITA) followed with a mean of 4.028, indicating a strong agreement that technological systems and processes are aligned with organizational goals. Human Resource Development (HRD) showed a slightly lower mean of 3.986, still reflecting a positive perception regarding the development and utilization of human capital. These findings imply a generally favorable institutional climate in terms of technological readiness and employee development within the studied Saudi educational institution.

Table 1: Descriptive Analysis

Construct	N	Mean	Std. Deviation
HRD	386	3.986	0.768
ITA	386	4.028	0.760
ELS	386	4.107	0.721

HRD = Human Resource Development; ITA = Information Technology Alignment; ELS = Employee Learning Speed.

To ensure measurement reliability, Cronbach's Alpha and Composite Reliability (CR) were computed. As shown in Table 2, all constructs exceeded the recommended threshold of 0.70, with alpha and CR values above 0.96 for HRD and 0.98 for both ITA and ELS. These results indicate excellent internal consistency, confirming that the measurement items are reliably capturing the underlying constructs.

Table 2: Reliability Test

Construct	Items	Cronbach's Alpha	Composite Reliability
HRD	16	0.966	0.969
ITA	21	0.986	0.986
ELS	20	0.986	0.986

This strong reliability reinforces the robustness of the data collection instrument and provides a solid foundation for subsequent SEM analysis.

To assess normality, both skewness and kurtosis values were examined (Table 3). The skewness values for all three constructs were slightly negative (between -0.844 and -0.890), indicating a mild leftward skew. Kurtosis values ranged from 1.411 to 1.624, indicating moderate peakedness.

Table 3: Normality Test

Construct	N	Skewness	Kurtosis
HRD	386	-0.844	1.411
ITA	386	-0.866	1.515
ELS	386	-0.890	1.624

Furthermore, the Kolmogorov–Smirnov and Shapiro–Wilk tests were conducted to statistically assess the normality of the data (Table 4). The significance levels for all constructs were less than 0.001, indicating a violation of the normality assumption. As a result, non-parametric bootstrapping procedures were employed during SEM analysis.

Table 4: Kolmogorov–Smirnov and Shapiro–Wilk Tests

Construct	K-S Statistic	df	Sig.	S-W Statistic	df	Sig.
HRD	0.099	386	<.001	0.925	386	<.001
ITA	0.135	386	<.001	0.902	386	<.001
ELS	0.143	386	<.001	0.893	386	<.001

The measurement model was evaluated to assess the reliability, convergent validity, and discriminant validity of the constructs used in the study. This process ensures that the observed variables appropriately reflect the underlying latent variables and are consistent with theoretical expectations. Structural Equation Modeling (SEM) with SmartPLS was employed to assess both first-order and second-order constructs.

Figure 1 illustrates the initial measurement model, which includes the factor loadings of all observed items on their respective latent constructs: Information Technology Alignment (ITA), Employee Learning Speed (ELS), and Human Resource Development (HRD). As seen in the diagram, most indicators demonstrated high loadings, reflecting a strong association with their respective constructs.

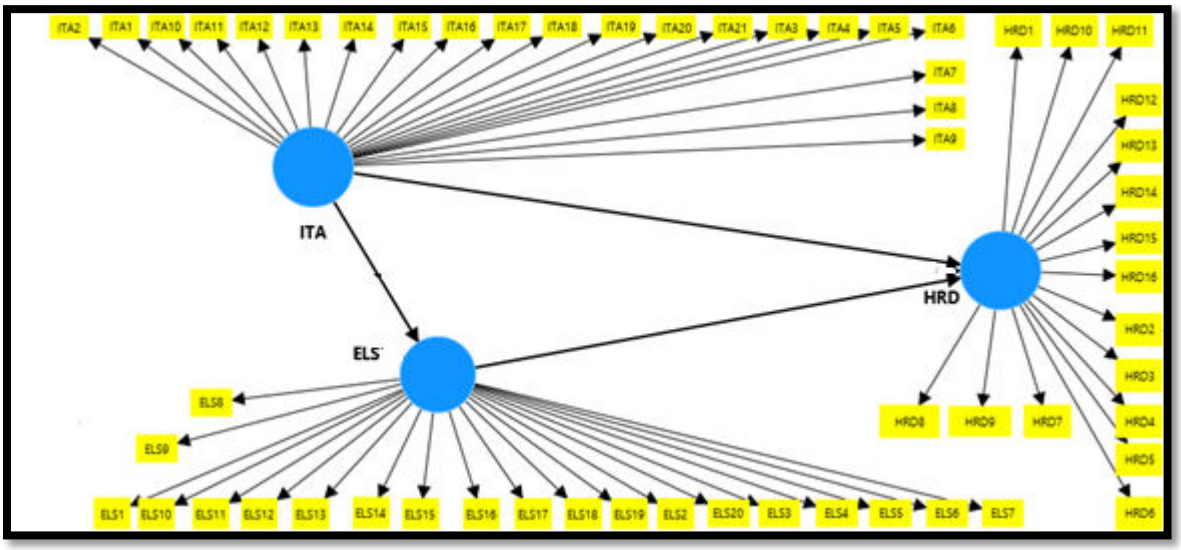

Figure 1: Measurement Model

To refine the model, weak or redundant indicators were evaluated and adjustments were made as necessary. Figure 2 presents the final, optimized version of the measurement model after validating the factor structure. This evaluation confirms the structural integrity and strength of the relationships between latent variables and their indicators, thus supporting further structural model testing.

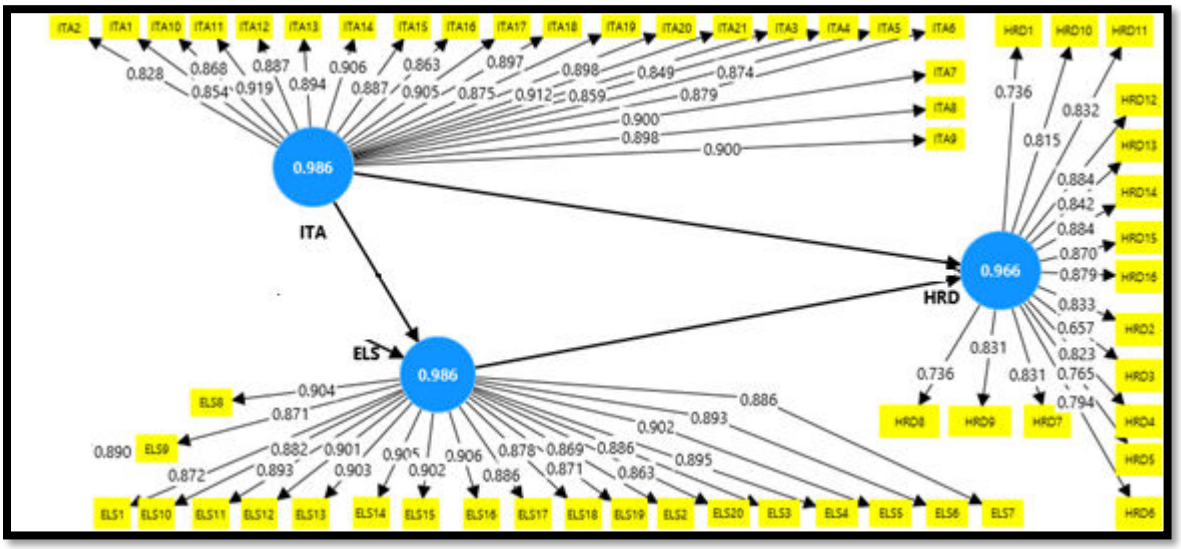

Figure 2: Evaluation of Model Measurements (First and Final Order)

Table 5 summarizes the key metrics of the measurement model: item loadings, Cronbach's alpha, Composite Reliability (CR), and Average Variance Extracted (AVE). All item loadings exceeded the recommended threshold of 0.70, indicating strong indicator reliability. Cronbach's alpha values for all constructs were above 0.96, signifying excellent internal consistency. In terms of composite reliability, ITA, ELS, and HRD all scored 0.986 or higher, confirming the robustness of the measurement. The AVE values ranged from 0.665 (HRD) to 0.789 (ELS), well above the 0.50 threshold, indicating satisfactory convergent validity, that is, each set of items explains more than half of the variance of their respective latent construct.

Table 5: Construct Reliability and Validity – Initial and Final Model Measurements

Construct	Cronbach's Alpha	Composite Reliability	AVE
ELS	0.986	0.986	0.789
HRD	0.966	0.969	0.665
ITA	0.986	0.986	0.781

This high level of internal consistency and convergent validity across constructs affirms that the scales are both psychometrically sound and theoretically appropriate for use in the Saudi education context. The constructs used in this study reliably capture the intended domains of technology alignment, employee learning agility, and human resource development. Together, these results validate the use of the measurement model for further analysis of the structural relationships among the constructs. With strong reliability, convergent validity, and clean model structure, the measurement model provides a firm foundation for hypothesis testing and path analysis in the subsequent sections.

Discriminant validity assesses the extent to which a construct is truly distinct from other constructs in the model, both conceptually and statistically. This is crucial in ensuring that each latent variable measures a unique dimension of the theoretical model. To establish discriminant validity, two widely accepted methods were employed: the Fornell-Larcker criterion and the Heterotrait-Monotrait ratio (HTMT). The Fornell-Larcker criterion compares the square root of the Average Variance Extracted (AVE) for each construct with its correlations with other constructs. For discriminant validity to be confirmed, the square root of AVE should be greater than the corresponding inter-construct correlations. As shown in Table 7, the diagonal elements (square roots of AVE) are consistently higher than the off-diagonal elements (inter-construct correlations). For example, the square root of AVE for ITA is 0.884, which exceeds its correlation with ELS (0.758) and HRD (0.756). Similarly, ELS has a square root of AVE of

0.888, greater than its correlation with HRD (0.656). These results satisfy the Fornell-Larcker criterion, indicating that each construct is empirically distinct.

Table 7: Latent Variable Correlations (Fornell-Larcker Criterion)

Construct	ELS	HRD	ITA
ELS	**0.888**		
HRD	0.656	**0.815**	
ITA	0.758	0.756	**0.884**

In addition, the HTMT ratio was calculated to provide a more stringent test of discriminant validity. HTMT values below 0.90 are considered acceptable for conceptually distinct constructs, with more conservative thresholds suggested at 0.85. As shown in Table 6, all HTMT values fall well below the upper limit of 0.90. The HTMT between ITA and HRD is 0.773, between ITA and ELS is 0.768, and between ELS and HRD is 0.676. These results further confirm that the constructs demonstrate adequate discriminant validity and do not overlap conceptually or empirically.

Table 6: Heterotrait-Monotrait Ratio of Correlations (HTMT)

Construct Pair	HTMT Value
ELS – HRD	0.676
ITA – ELS	0.768
ITA – HRD	0.773

Together, the results from the Fornell-Larcker and HTMT assessments provide strong evidence of discriminant validity among the constructs. This supports the structural integrity of the measurement model and ensures that the relationships tested in the structural model are not confounded by construct redundancy. As such, the constructs can be confidently used in subsequent hypothesis testing and path analysis.

After validating the measurement model, the structural model was assessed to examine the hypothesized relationships among the constructs: Information Technology Alignment (ITA), Employee Learning Speed (ELS), and Human Resource Development (HRD). This analysis aimed to evaluate both the direct and indirect effects of ITA on HRD, with ELS acting as a mediating variable. The model was evaluated using SmartPLS 4, employing bootstrapping (5,000 resamples) to test the significance of the hypothesized paths.

The structural model is presented in Figure 3, illustrating the standardized path coefficients between constructs, as well as the significance levels derived from the bootstrapping procedure. As shown, several hypothesized relationships achieved statistical significance, while others did not.

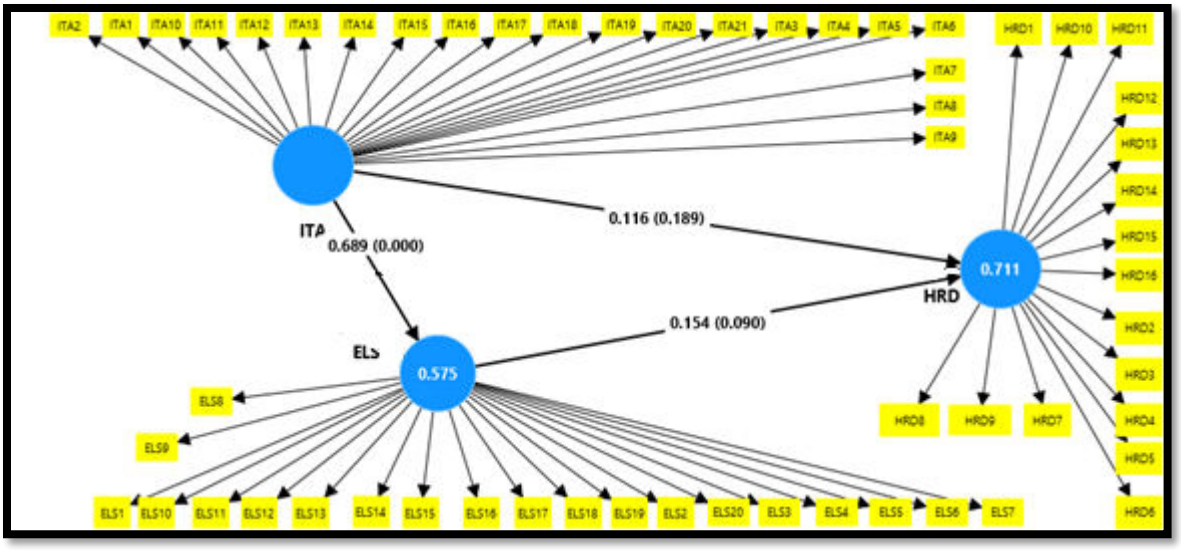

Figure 3: Path Model Significance Results

In support of the model, Table 10 reports the direct effects of ITA and ELS on HRD. The path from ITA to HRD was statistically significant (β = 0.222, t = 3.643, p < 0.001), indicating a positive and direct effect of IT alignment on HR development. Furthermore, the relationship between ITA and ELS was also highly significant (β = 0.689, t = 8.951, p < 0.001), suggesting that effective IT alignment contributes to the acceleration of employee learning processes. However, the direct path from ELS to HRD was not statistically significant (β = 0.154, t = 1.696, p = 0.090), leading to the rejection of this direct effect.

Table 10: Direct Hypotheses

Hypothesis	β	Sample Mean	SD	t-statistic	p-value	Decision
ELS → HRD	0.154	0.155	0.091	1.696	0.090	Rejected
ITA → ELS	0.689	0.692	0.077	8.951	0.000	Accepted
ITA → HRD	0.222	0.225	0.061	3.643	0.000	Accepted

To assess the mediating role of ELS, the indirect effect of ITA on HRD via ELS was evaluated. As shown in Table 11, this indirect path was statistically significant (β = 0.46, t = 7.369, p < 0.001), indicating full mediation. Although the direct effect of ELS on HRD was not significant, the pathway through which ITA influences HRD via ELS was both statistically robust and meaningful. These findings highlight the critical mediating role of employee learning speed in translating IT alignment into HRD gains.

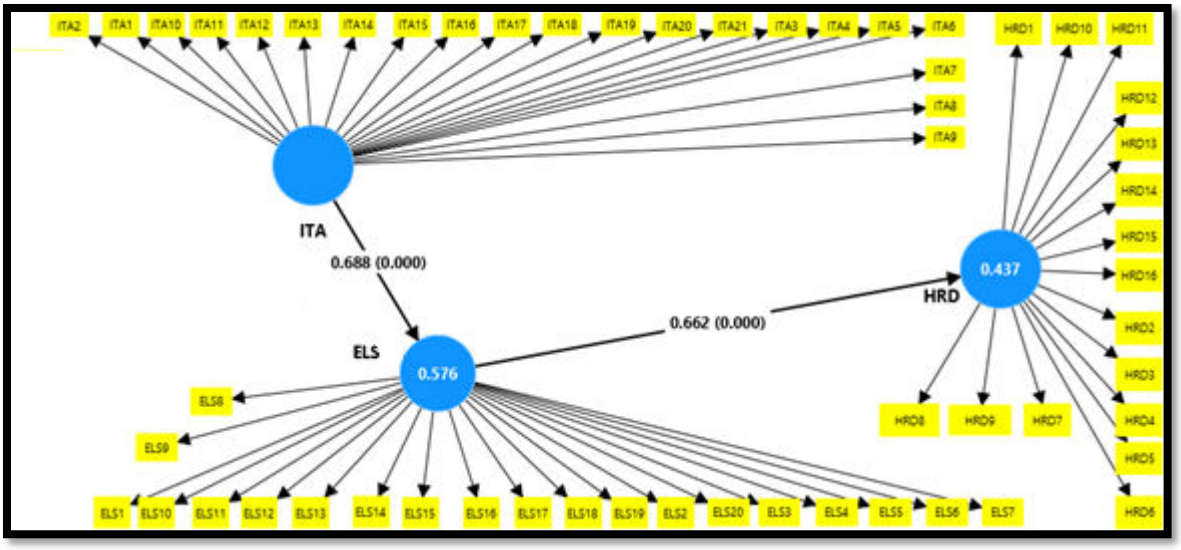

Figure 4: Path Model Results of Mediation

Table 11: Indirect Hypothesis

Hypothesis	β	Sample Mean	SD	t-statistic	p-value	Decision
ITA → ELS → HRD	0.460	0.459	0.060	7.369	0.000	Accepted

The explanatory power of the model was further confirmed by the coefficient of determination (R^2) values, reported in Table 8. The model explained 57.7% of the variance in ELS and 71.3% of the variance in HRD, suggesting strong predictive capability.

Table 8: Coefficient of Determination (R^2)

Dependent Variable	R^2	Adjusted R^2
ELS	0.577	0.575
HRD	0.713	0.711

Effect size (f^2) analysis presented in Table 9 shows that ITA has a large effect on ELS (f^2 = 0.353), a small effect on HRD (f^2 = 0.011), and that ELS has a minimal effect on HRD (f^2 = 0.035). These values are interpreted based on thresholds suggested by Cohen (1988), where 0.02 = small, 0.15 = medium, and 0.35 = large.

Table 9: Effect Size (F^2) Analysis

Path	f^2	Effect Size
ELS → HRD	0.035	Small
ITA → ELS	0.353	Large
ITA → HRD	0.011	Small

5. Discussion

The first significant finding from this study is the positive and statistically significant relationship between Information Technology Alignment (ITA) and Human Resource Development (HRD). This result aligns with prior literature that emphasizes the strategic importance of IT integration in modern HR functions. When technological infrastructure and digital systems are well-aligned with the strategic goals of an organization, they create an enabling environment for talent development, performance tracking, and continuous learning (Nicolás-Agustín et al., 2022; Meijerink et al., 2021). In the context of Saudi universities, where digital transformation is being rapidly pursued in line with Vision 2030, the alignment of IT with HR processes ensures that administrative, academic, and support staff can better access training systems, performance evaluation tools, and knowledge-sharing platforms. This finding echoes the conclusions of Alhamami (2023), who noted that Saudi universities with clearer digital integration strategies also showed better outcomes in employee development and institutional performance.

Another critical result is the strong and significant relationship between ITA and Employee Learning Speed (ELS). This indicates that when employees are provided with digitally aligned and accessible systems, they are able to learn new skills, tools, and protocols more rapidly. This is consistent with the organizational learning literature, which posits that technological compatibility enhances cognitive absorption and reduces learning friction (Ghosh et al., 2021). For example, employees using integrated learning management systems (LMS), performance dashboards, or mobile training applications are likely to develop new competencies at a faster pace compared to those relying on outdated or disconnected systems. In the Saudi education sector, such agility is crucial given the pace of global educational technology adoption and changing skill demands. The findings support the assertions of Abdelhamid and Sposato (2019), who demonstrated that learning agility is a central outcome of digital learning environments, especially in institutions seeking workforce modernization.

Interestingly, the direct effect of Employee Learning Speed on Human Resource Development was not statistically significant, despite a positive trend. While previous research, such as De Meuse (2019), highlights the role of learning agility in enhancing HRD, the insignificant result in this study may reflect contextual or methodological nuances. It is possible that while learning speed contributes to capability building, its effect on formal HRD metrics (e.g., training completion, promotions, leadership readiness) is not immediately observable or is mediated

through other organizational processes. Another explanation could be the institutional culture in some Saudi universities, where structural or bureaucratic constraints may inhibit the full translation of fast learning into measurable development outcomes. This calls for further research into moderating variables such as leadership support, organizational culture, or training effectiveness.

One of the most pivotal findings of this research is the significant indirect effect of ITA on HRD through ELS, confirming the mediating role of employee learning speed. This validates the central theoretical model of the study and affirms that technology alignment enhances HRD not only directly but also indirectly by empowering employees to learn more effectively. This result reinforces Swanson's (2022) HRD framework, which positions learning as a key mechanism through which organizational inputs (like technology) influence outcomes. Moreover, it aligns with Senge's (2006) perspective on the "learning organization," in which institutions become effective only when their members are continuously acquiring and applying knowledge. The mediation finding emphasizes the need to focus on both infrastructure and learning culture, since providing digital tools alone is insufficient if employees are not enabled to use them effectively and translate that use into performance gains.

The final interpretation relates to the magnitude of these effects. The R^2 values for ELS and HRD (0.577 and 0.713, respectively) indicate that the model has strong explanatory power. These values suggest that over 70% of the variance in HRD outcomes can be explained by ITA and ELS combined, a substantial finding in organizational research. Furthermore, the effect size (f^2) analysis revealed that ITA has a medium-to-large impact on ELS but only a small direct effect on HRD, while ELS's impact on HRD is also relatively small. These findings confirm that employee learning speed is a crucial conduit through which digital strategies translate into human capital development. As Pashutan et al. (2022) argued, digital transformation without strategic alignment and employee capability building will not deliver the desired performance results.

Collectively, the results contribute to an emerging body of literature that links digital strategy, organizational learning, and human resource outcomes. The results are particularly significant in the context of Saudi Arabia's education system, which is navigating complex transitions involving digitalization, globalization, and policy reform. This study provides empirical support for the proposition that universities must go beyond hardware or software upgrades and instead create integrated strategies that foster both technological alignment and

individual learning agility. Institutions that do so will be better positioned to develop competitive, adaptable, and future-ready workforces capable of thriving in dynamic educational landscapes (Alhosani & Ahmad, 2024; Alharbi, 2021).

6. Conclusion

This study investigated the impact of information technology alignment on human resource development within the Saudi education sector, with a specific focus on the mediating role of employee learning speed. The findings demonstrate that aligning IT infrastructure and systems with organizational goals plays a critical role in enhancing workforce development outcomes in higher education institutions. When digital tools and HR strategies are effectively integrated, they foster a supportive environment where employees are better positioned to acquire new skills, adapt to change, and contribute meaningfully to institutional performance.

The results confirmed that information technology alignment not only directly influences human resource development but also significantly boosts employee learning speed. Employees who have access to well-integrated and user-friendly digital systems are more capable of rapidly learning and applying new knowledge, which in turn supports broader development initiatives. The positive mediation effect of learning speed underscores the importance of cultivating a digitally agile workforce that can respond efficiently to evolving demands.

However, the study also found that learning speed on its own does not exert a strong direct effect on development outcomes, suggesting that its value may be maximized only when supported by enabling systems and organizational structures. This highlights the importance of adopting a comprehensive strategy that includes not just investment in technology but also a focus on learning culture, change management, and leadership support.

Overall, the findings contribute to a growing body of knowledge emphasizing the intersection between digital transformation and human capital development. For educational institutions in Saudi Arabia, these insights underscore the necessity of viewing IT alignment not merely as a technical concern but as a strategic imperative for long-term workforce competitiveness and institutional excellence.

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