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Developing a Model of Human Resource Excellence in the Digital Era

ABSTRACT

The primary objective of this study is to develop a model of human resource excellence in the digital era. The research employed a mixed-methods approach (qualitative and quantitative). In the qualitative phase, data were collected through thematic analysis and the Delphi technique. The qualitative statistical population consisted of professors and experts in the field of human resources. Using purposive sampling, 12 experts were selected for the extraction of initial data (interviews), and 7 experts were selected to provide feedback in the Delphi process. Thematic analysis was conducted using the Attride-Stirling method with the aid of NVivo software. The results yielded 129 open codes, 50 basic codes, 15 organizing codes, and 3 global themes. In the quantitative phase, the statistical population comprised 1,200 experts and managers in the fields of human resources and technology across the country. Based on Cochran's formula, a sample size of 291 participants was determined. Quantitative data were analyzed using SPSS and SmartPLS software. The findings of this study indicate that the model of human resource excellence in the digital era consists of three main dimensions: (1) Implementation Space (path coefficient = 0.384), with components including nature, formulation, environment, evaluation, and technology; (2) Human Resource Space (path coefficient = 0.353), with components including performance, goal setting, executive tools, control, and meritocracy; and (3) Digital Era Space (path coefficient = 0.301), with components including technological conditions, economic conditions, political conditions, communication barriers, and the structure of intelligent organizations. Among these, the Implementation Space, Human Resource Space, and Digital Era Space exert the greatest influence, respectively, on the formation of the model of human resource excellence in the digital era. Furthermore, within the Implementation dimension, the component of nature (path coefficient = 0.801) was identified as the most significant factor; within the Human Resource dimension, the performance component (path coefficient = 0.844) was found to be the most influential; and within the Digital Era dimension, technological conditions (path coefficient = 0.900) emerged as the most critical component.

Keywords: Human Resource Excellence, Digital Era, Artificial Intelligence.

Introduction

The advent of the digital era has transformed every facet of organizational management, with human resource management (HRM) standing at the forefront of this transformation. As organizations increasingly rely on advanced technologies, artificial intelligence (AI), and data-driven decision-making, the nature, structure, and strategic relevance of HRM have evolved substantially [1]. In recent years, HR functions have expanded beyond administrative and operational roles, becoming strategic partners in value creation through technology integration and innovation [2]. The incorporation of digital tools into HRM processes—commonly referred to as digital HR or e-HRM—has led to unprecedented opportunities for organizational agility, workforce optimization, and sustainable competitiveness [3].

The Fourth Industrial Revolution has created a profound technological shift that mandates HR professionals to align human capital strategies with digital transformation initiatives. This paradigm shift involves leveraging automation, AI-driven analytics, and cloud-based systems to streamline talent acquisition, performance management, and employee engagement [4]. However, such transformation is not limited to technology adoption; it requires rethinking leadership approaches, employee empowerment, and organizational culture [5]. As a result, HR excellence in the digital age is no longer defined solely by efficiency or cost reduction but by adaptability, innovation, and resilience in the face of technological disruptions [6].

Digital HR models have evolved to support data-informed decisions that enhance organizational performance, encourage innovation, and promote a culture of continuous learning [7]. Research indicates that integrating technology enablers such as machine learning, predictive analytics, and intelligent automation into HR practices significantly enhances workforce productivity and retention [8]. These digital interventions enable HR professionals to interpret complex data patterns, predict employee behavior, and create proactive workforce strategies [9]. Nevertheless, organizations face challenges in managing data privacy, algorithmic bias, and the ethical implications of automation [10]. Thus, the digitalization of HR is not merely a technical endeavor but a multidimensional transformation that encompasses social, ethical, and strategic considerations.

The emergence of HR 4.0—a term inspired by Industry 4.0—represents this evolution toward a data-driven, intelligent HR ecosystem [4]. HR 4.0 integrates artificial intelligence, robotics, and digital analytics into core HR functions to optimize decision-making and enhance employee experience [11]. It transforms recruitment through AI-driven screening, supports personalized learning pathways via adaptive technologies, and promotes fairness through data-informed performance evaluation systems [12]. Moreover, digital HR solutions facilitate real-time workforce insights, remote collaboration, and digital communication, all of which are crucial in post-pandemic organizational ecosystems [13]. These tools allow HR departments to move from transactional support to strategic forecasting—building digital fluency as a critical competence for both leaders and employees [14].

Technological evolution in HRM also emphasizes the role of analytics in human resource decision-making. HR analytics or people analytics enables HR leaders to move beyond intuition-based judgments to evidence-based strategies [8]. By using big data and predictive models, HR analytics helps identify trends in employee engagement, turnover, and performance that inform proactive policy-making [9]. Furthermore, the application of advanced analytics aligns HR objectives with organizational key performance indicators (KPIs), thus ensuring a measurable contribution to corporate strategy [15]. However, achieving HR excellence through analytics requires a robust digital infrastructure, skilled data interpreters, and a culture that embraces transparency and innovation [16].

While technology is an enabler, human adaptability remains at the center of digital transformation [5]. Organizations that prioritize upskilling and reskilling initiatives enable employees to adapt to emerging digital tools and evolving job requirements [17]. This capability becomes even more critical in dynamic environments such as IT and service industries, where continuous learning and digital literacy directly affect organizational success [18]. Agile HR strategies thus aim to balance human intuition with technological precision—developing a digitally competent workforce while preserving the human essence of management [19].

The pursuit of HR excellence requires the integration of internal and external stakeholder perspectives [16]. Internally, HR must focus on empowering employees, ensuring inclusion, and fostering trust within data-centric environments [20].

Externally, it must align with technological, economic, and political forces shaping global labor markets [21]. The growing interdependence between technological systems and human capabilities necessitates adaptive leadership capable of bridging digital gaps and promoting innovation [3]. Furthermore, the sustainability of HR excellence depends on ethical governance—ensuring data confidentiality, transparency, and fairness in algorithmic decision-making [1].

In today's context, the E-HRM framework has become an essential element of strategic human capital management [3]. Through the digitization of recruitment, performance appraisal, and employee engagement systems, E-HRM enhances operational efficiency and responsiveness. Studies show that the adoption of E-HRM systems contributes to organizational agility by reducing administrative costs and increasing decision-making speed [22]. Moreover, the integration of AI-powered systems into HR practices fosters better employee experiences through personalized interfaces and self-service tools [12]. These technological shifts redefine the role of HR professionals from administrative executors to strategic data interpreters and change agents [13].

However, the successful implementation of digital HR systems requires a comprehensive framework that combines technological readiness, strategic alignment, and human-centered design [2]. Many organizations face structural and cultural barriers such as resistance to change, lack of leadership commitment, and insufficient training programs [6]. Furthermore, the transition to digital HR practices demands the recalibration of performance metrics, employee engagement models, and organizational learning systems [7]. The success of these initiatives depends not only on technological infrastructure but also on fostering an innovative culture that supports experimentation and continuous improvement [11].

Recent research has also emphasized the role of sustainability and corporate ethics in digital HR transformation. Sustainable HR practices ensure that technological adoption does not compromise employee well-being or equity [18]. Such practices include designing inclusive algorithms, promoting environmental sustainability in HR processes, and supporting long-term employability through continuous learning [10]. Digital tools can amplify or diminish equity, depending on how they are managed; thus, the integration of ethical principles into HR digitalization becomes crucial [14]. Moreover, the digital transformation of HR aligns with global sustainability goals, emphasizing human development, diversity, and transparency in workforce management [15].

Beyond technological infrastructure, the agility of the HR function has emerged as a defining factor for organizational excellence [5]. Agile HR fosters innovation, flexibility, and responsiveness in a rapidly changing environment [4]. It promotes cross-functional collaboration, iterative problem-solving, and decentralized decision-making [19]. By applying agile methodologies, organizations can create adaptive work systems capable of withstanding digital disruptions [20]. Furthermore, agile HR systems integrate performance analytics with behavioral insights to enable personalized development and learning pathways [8].

Digital transformation has also redefined HR education and professional development, underscoring the need for digital literacy among HR practitioners [10]. The modern HR professional must combine technical proficiency with strategic foresight—capable of using AI tools for forecasting talent trends, designing digital engagement strategies, and managing hybrid workforce models [13]. Educational institutions and corporate academies now focus on developing competencies such as digital ethics, data governance, and HR analytics [21]. As HR transitions toward an AI-augmented function, the emphasis on creativity, empathy, and human judgment remains critical [12].

Moreover, the growing interconnectivity of global business environments necessitates that HR excellence models incorporate cross-cultural adaptability and remote workforce management [4]. Virtual collaboration technologies have enabled organizations to transcend geographical boundaries, but they also introduce challenges in managing communication, performance, and inclusion [1]. Thus, HR systems must foster digital empathy, emotional intelligence, and cross-border engagement strategies [17]. These competencies become indispensable for maintaining organizational cohesion in digitally distributed work environments [23].

In addition, scholars have emphasized the integration of HRM with financial and technological systems, enabling data interoperability and strategic forecasting [14]. This synergy between HR, accounting, and AI ensures data accuracy, predictive budgeting, and holistic talent management [3]. Such integration not only enhances organizational transparency but also improves long-term sustainability and decision-making agility [11]. Through the fusion of digital systems and human-centric approaches, organizations can achieve excellence characterized by innovation, inclusivity, and resilience [7].

Collectively, the literature underscores that achieving human resource excellence in the digital era depends on a balanced interplay among technological sophistication, human adaptability, ethical governance, and strategic agility [15, 16, 18]. By aligning digital HR strategies with organizational vision and values, firms can not only enhance operational performance but also cultivate a future-ready workforce [5]. The digital age demands an HR model that integrates AI-driven decision-making, continuous learning, and employee empowerment within a framework of ethical and sustainable practices [8, 13].

Therefore, the present study aims to design and validate a comprehensive model of human resource excellence in the digital era, integrating technological, human, and strategic dimensions to enhance organizational performance and sustainability.

Methodology

In this study, a qualitative research design with a thematic analysis approach was employed, characterized by an exploratory nature, to identify the components of human resource excellence in the digital era. The participants of this study included academic experts, specialists in the field of human resources, and professionals active in the domain of artificial intelligence. They were selected purposefully, in accordance with the research problem and objectives. Participant selection was based on criteria such as expertise, experience, and familiarity with the research domain. The sampling was non-probabilistic and purposive, aiming not for statistical generalization but for achieving informational richness and a deep understanding of the studied phenomenon.

As qualitative research does not follow a fixed rule for determining sample size, interviews were conducted until theoretical saturation was achieved. After 12 interviews and repeated observation of recurring themes, the researcher concluded that no new information could be extracted from additional participants. Subsequently, to ensure the completeness and final confirmation of the findings, the researcher reestablished communication—both in person and remotely—with all experts and updated the collected data.

The data collection instrument in this research consisted of semi-structured and in-depth interviews with experts. To ensure the effective use of this tool, the researcher first conducted extensive preliminary studies using reputable scientific sources to gain sufficient familiarity and readiness for conducting the interviews. During the interview process, particular attention was paid to the principles of qualitative interviewing, including active listening, asking open-ended questions,

avoiding interviewer bias, refraining from leading questions, and adhering to time management. The interview questions were designed based on the theoretical background and the literature review (Chapter Two) and were divided into two main categories: introductory questions and main questions.

The interview protocol included topics such as the model of human resource excellence in the digital era, core and shared themes, conceptual topics and semantic patterns, outcomes of model implementation, and measures for infrastructure development. During the interviews, the researcher employed probing questions such as “Could you elaborate further?” to deepen the discussion, and when deviations from the main topic occurred, guiding questions were used to bring the conversation back on track. The interview protocol consisted of demographic information and eight main questions directly designed to identify the components of human resource excellence in the digital era.

The data analysis process was conducted using thematic analysis. Initially, the collected interview data were analyzed manually and with NVivo qualitative data analysis software. Coding was performed in three stages—open, axial, and selective coding—in accordance with the grounded theory approach. To enhance research validity, triangulation, member checking, and credibility-based evaluation techniques were applied. During the coding process, the researcher engaged in constant comparative analysis, continuously comparing new concepts with existing data, which was also maintained during higher-level thematic analysis.

To ensure qualitative validity, various strategies were employed, including the use of multiple sources to ensure theme consistency, participant feedback, rich and detailed description of data, clarification of researcher presuppositions, identification of negative cases, sufficient time spent in the research field, peer data collection, and external auditing of the entire study. The reliability of the analysis was assessed by calculating the inter-coder agreement coefficient, which yielded a value of 0.832, indicating a high degree of dependability and trustworthiness in the findings.

In the quantitative phase, the statistical population consisted of 1,200 experts and managers in the fields of human resources and technology nationwide. Using Cochran’s formula, a sample size of 291 was determined. The data collection instrument was a researcher-developed questionnaire. To assess the reliability of the instrument, Cronbach’s alpha coefficient was calculated for each factor. The results indicated that all alpha values were above 0.7, demonstrating acceptable reliability. Quantitative data were analyzed using SPSS and SmartPLS software.

Findings and Results

The findings of this study in the qualitative section were derived from thematic analysis and comprised two key subsections: coding and theme analysis, and the thematic network. These two components collectively describe the qualitative process of the study—from data extraction to the development of the final conceptual framework—in detail.

In the coding phase, all interviews were thoroughly examined, and irrelevant segments were excluded. The main coding process was then initiated. Considering the overall concept of human resource excellence in the digital era, the researcher identified text segments that explicitly or implicitly referred to this concept. Each meaningful segment was assigned a code, which was recorded alongside the relevant text. Concurrently, a separate file was maintained to store the list of codes, allowing for continuous review and monitoring of repetitions or conceptual differences among the codes. When new information emerged that was not reflected in existing codes, a new code was created and added to the list. After completing manual coding, the data were imported into NVivo software. In this stage, folders corresponding to conceptual categories

were created for each interview, and relevant codes were organized accordingly. The interviews were re-examined multiple times to ensure coding accuracy and comprehensiveness. Unrelated codes were removed, and new relevant segments identified during reanalysis were re-coded.

In total, 346 initial codes were extracted, but after final refinement and validation, 129 codes were retained as final. Among these, 217 codes were identified as shared codes across participants. The Holsti reliability formula was applied to assess coding consistency, yielding a PAO value of 0.834, indicating substantial reliability and high trustworthiness in qualitative coding.

Following the completion of the coding process, theme analysis commenced. Conceptually similar codes were grouped to form basic themes. Researchers observed that certain codes represented higher-level concepts that could be divided into smaller, more specific units. Consequently, the analysis returned to higher-level codes, and through further decomposition, more refined basic themes were extracted. Each basic theme was then assigned a label that reflected its meaning. Subsequently, basic themes with close semantic relationships were grouped into organizing themes, representing the intermediate level of analysis and linking basic themes to overarching themes. Finally, the organizing themes were integrated to form global themes, constituting the final layer of thematic analysis and representing the conceptual framework of the model of human resource excellence in the digital era.

Table 1

Themes Related to the “Implementation Space” Component of Human Resource Excellence Identified in NVivo Software

Codes	Basic Theme	Organizing Themes	Main Themes
Weak AI infrastructures	Focus on results	Nature	Implementation Space
Organizational and managerial behavior toward issues			
Lack of training aligned with the digital era			
Systemic innovation in the organization	Simplicity of processes		
Decisions of scientific commissions without effective representation from science and technology parks			
Internet quality and lack of global connectivity	Intersectoral cooperation		
Incompatibility of certain laws with global trade principles			
Lack of legal obligations to support science and technology parks	Executive sustainability		
Divergent interpretations of smart transformation			
Lack of AI infrastructure	Human barriers		
No budget allocated for advanced infrastructures			
Lack of responsibility			
Low employee motivation			
Absence of a future-oriented vision	Managerial barriers		
Instability of management in the public sector			
Profit-oriented thinking rather than foresight			
Lack of participatory systems and use of others' opinions	Negotiation barriers		
Ineffective managerial negotiations with executive domains			
Lack of international cooperation in AI regulations			
International sanctions	Environment		
External communication conditions			
Lack of smart infrastructure contracts			
Increasing internet restrictions			
Misalignment of certain laws in the digital era	Environmental deterrents		
Lack of legal obligations to support technology producers			
Lack of accountability regarding environmental failures	Regulatory misalignment		
Inattention to business ecosystem conditions			
Misinterpretation of recruitment regulations	Outdated knowledge and networks	Technology	
Weak and outdated legal frameworks for new technologies			
Non-use of digital currencies in smart transactions	Obsolete methods		
Slow procedural workflows and lack of digitalization			
Absence of smart HR planning	Recruitment processes	Formulation	

Gap between design and implementation		
Lack of an appropriate HR operational structure	Smart legislative frameworks	
Disorganized strategy formulation structures		
Entrusting revenue-generating management roles to affiliates	Stakeholder bias	
Low executive risk-taking		
Ineffective training in planning programs		
Indifference toward digital era developments	Lack of oversight institutions	Evaluation & Control
Reduced scientific supervision		
Governmental non-commitment to performance outcomes	System inefficiency	
Inability to address elite center issues		
Administrative corruption among executives	Political collusion	
Membership in AI councils		
Weakness of supervisory institutions		
Membership in digital-era networks		
Lack of transparency	Systemic corruption	
High costs		
Complexity		
Uncertainty		

As shown in the table above, the themes related to the deterrent component of implementing human resource excellence in the country include five dimensions: the *nature of human resource excellence*, the *environment of human resource excellence*, *technology*, *formulation of human resource excellence*, and *evaluation and control of human resource excellence*. Among these, the nature of human resource excellence, accounting for 36.7% of the related thematic codes, is considered the most significant dimension. The remaining themes are ranked as follows: evaluation and control (24.5%), environment (16.3%), formulation (14.3%), and technology (8%).

Table 2

Themes Related to the Deterrent Component of Human Resources Identified in NVivo Software

Codes	Basic Theme	Organizing Themes	Main Themes
Lack of connection with leading countries	Process delays	Functional	Human Resource Space
Outdated structures in internet operations and filtering			
Temporary operational programs for problem-solving	Continuous development		
Issues in the planning process of the HR department			
Currency instability for purchasing infrastructures			
Lack of motivation in database network programs	Dynamic evaluation		
Lack of trust in artificial intelligence within HR			
Existence of algorithmic networks and HR structures	Performance transparency		
Traditional information systems in HR performance			
Inflexible HR regulations in exceptional circumstances	Smart objectives	Goal Setting	
Long cycles in implementing smart services	Strategic synergy		
Lack of synergy in managing the smart system's performance	Interaction follow-up		
Scattered actions for achieving goals			
Direct digital payment collection tools	Digital collaboration	Executive Tools	
Outdated structures in HR departments and state-owned companies			
Temporary technological programs			
Misalignment of implementation tools			
Challenges in the supply, production, and distribution of smart equipment	Intelligent automation		
Divergent interpretations in applying exemptions			
Disorganization in financial policy execution within HR	Data-driven analysis		
Poor profitability of traditional systems			
Lack of willingness to engage in modern educational collaborations			
Public mistrust toward artificial intelligence	Continuous supervision	Control	
Indifference toward business deviations and environmental disruptions			
Governmental non-commitment in the final years of performance			
Conflict of interest among HR managers in implementation programs			
Lack of authority among executives	Digital collaboration		
Existence of recruitment broker networks instead of HR management			
Misconduct of managers causing mistrust in social capital	Integrated work experience		

Overemphasis on formal credential assessments instead of real evaluations		
Customization of certain assessments		
Bureaucratic disorder in monitoring processes	Merit-based selection	Meritocracy
Managerial instability and unqualified appointments		
Political influence in appointments		
Lack of an efficient managerial information database		
Governmental monopoly limited to a few infrastructural companies	Justice-oriented culture	
Indifference toward the positive or negative outcomes of work		
Inflexible HR regulations in the digital era		
Long-term plans becoming non-operational due to changing conditions	Competency development	
Unclear strategies and conflicting priorities		
Lack of use of profitable digital programs		
Scattered actions toward achieving objectives		
Lack of incentive programs for elites		
Absence of competition in presenting intelligent business models	Transparent decision-making	
Lack of incentive mechanisms in technology parks		
Non-utilization of intelligent compensation and reward systems		

As shown in the table above, the themes related to the deterrent component of human resources encompass five dimensions: *functional*, *goal setting*, *executive tools*, *control*, and *meritocracy*. Among these, meritocracy, with 29.8% of the thematic codes related to the human resource component, is regarded as the most significant dimension. The remaining dimensions are ranked as follows: executive tools (21.3%), functional (19.2%), control (19.2%), and goal setting (10.6%).

Table 3

Themes Related to the Deterrent Component of the Digital Era Identified in NVivo Software

Codes	Basic Theme	Organizing Themes	Main Themes
Lack of shared understanding of AI concepts in HR departments	Reluctance to invest in technology	Economic Conditions	Digital Era Space
Ambiguous and slogan-driven objectives in smart units			
Weak analytical capacity of commercial departments regarding technology			
Lack of transparency in digital platform regulations	Economic violations		
Absence of integrated management for online businesses			
Lack of incentives for digital investment			
Failure to provide prerequisites for the digital era	Lack of economic transparency		
Inefficiency of the digital era command headquarters			
Unclear and unrealistic goal setting in the digital era			
HR managers' inability to implement AI policies	Regulatory adaptation	Political Conditions	
Low problem-solving capacity in implementing modern technology policies			
Disagreements among IT and HR managers	Digital lobbying		
Lack of international relations hindering technology and investment inflow			
Divergent perceptions of corruption in digital governance	Political sustainability		
Distrust in negotiation processes			
Network-based interactions replacing direct and effective communication	Technological innovation	Technological Conditions	
Improper utilization of capacities to mitigate digital shocks	System integration		
Lack of exchange rate stabilization			
Unpredictable regional tensions	Digital skill development		
Inadequate use of elite HR capacities in IT equipment manufacturing			
Inhibiting and non-entrepreneurial business environment	Organizational agility	Structure of Intelligent Organizations	
Lack of defined intelligent responses to internal and external disruptions	Data-driven intelligence		
Nominal goal setting without operationalization			
Ambiguous and non-targeted AI strategies for specific timeframes			
Reactive and short-term approaches to HR problems	Cultural gap reduction	Communication Barriers	
Rigid laws for AI investors			
Lack of continuous communication between elites and government bodies	Digital accessibility		
Absence of regional cooperation agreements	Continuous feedback		
Lack of obligation to enforce coordination committee decisions			
Willingness of major foreign companies to enter the market			

As shown in the table above, the themes related to the deterrent component of the digital era encompass five dimensions: *economic conditions*, *political conditions*, *technological conditions*, *structure of implementing organizations*, and *communication barriers*. Among these, economic conditions, accounting for 19.2% of thematic codes related to the digital era space, represent the most significant dimension. The remaining dimensions follow in order: political conditions (17%), technological conditions (12.8%), communication barriers (12.8%), and structure of intelligent organizations (8.5%).

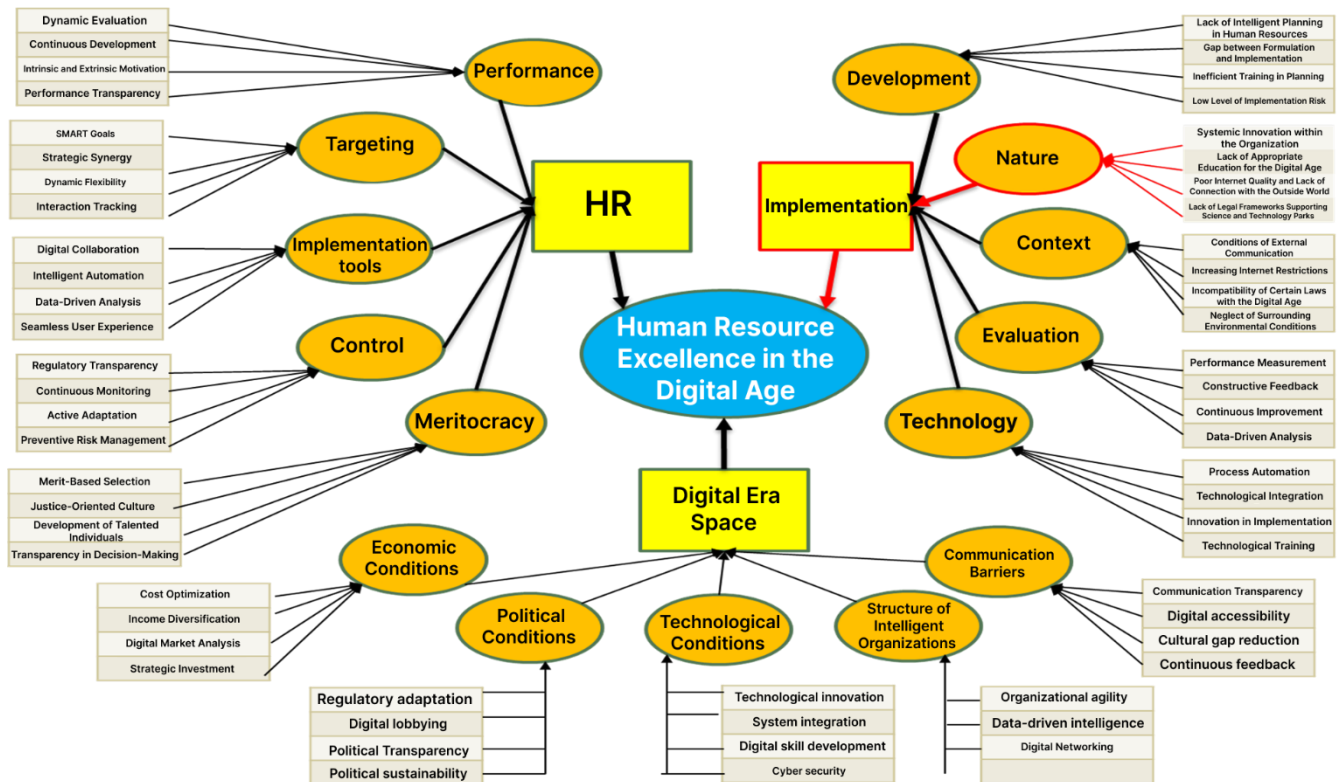
As presented, the total number of codes derived from the 12 interviews amounted to 346 codes, of which 129 codes were selected as final and common. Based on the coding results, 38% of the codes correspond to the implementation space of human resource excellence, 36.4% to the human resource space, and 25.6% to the digital era space. This indicates that most sources emphasize the implementation space of human resource excellence, followed by a slightly lower emphasis on the human resource space, and a significantly lower focus on the digital era space.

What is the prioritization of the dimensions and components of the human resource excellence model in the digital era?

Based on the dimensions identified in response to the first research question, the thematic network derived from the qualitative phase can be represented as follows:

Figure 1

Thematic Network of the Components of the Human Resource Excellence Model in the Digital Era (NVivo Output)



In this section, after establishing the human resource excellence model in the digital era as addressed in the qualitative phase, we seek to answer the question: “How is the validation of human resource excellence in the digital era carried out?” Accordingly, based on the model derived from the qualitative phase, a questionnaire was designed and administered to the target population. Finally, after collecting the data, model validation was assessed via structural equation modeling using the partial least squares (PLS) method.

To evaluate model quality, we used the Goodness of Fit (GOF) index, the redundancy (Stone–Geisser) index (Q^2), and the coefficient of determination (R^2). The principal criterion for the quality of endogenous latent variables in a path model is the coefficient of determination, which indicates the percentage of variance in the dependent variable explained by the independent variable.

Table 4

Indices for Assessing Model Quality

Model Quality	R^2	Redundancy (Q^2)	GOF
Executive Tools	0.598	0.601	0.397
Evaluation	0.229	0.127	
Formulation	0.552	0.244	
Structure of Intelligent Organizations	0.579	0.108	
Meritocracy	0.269	0.097	
Economic Conditions	0.809	0.295	
Technological Conditions	0.271	0.502	
Political Conditions	0.540	0.339	
Functional	0.712	0.445	
Implementation Space	—	0.250	
Digital Era Space	—	0.345	
Human Resource Space	—	0.229	
Technology	0.432	0.234	
Nature	0.637	0.227	
Environment	0.641	0.283	
Communication Barriers	0.706	0.229	
Goal Setting	0.412	0.045	
Control	0.454	0.328	
Human Resource Excellence in the Digital Era	0.993	0.491	

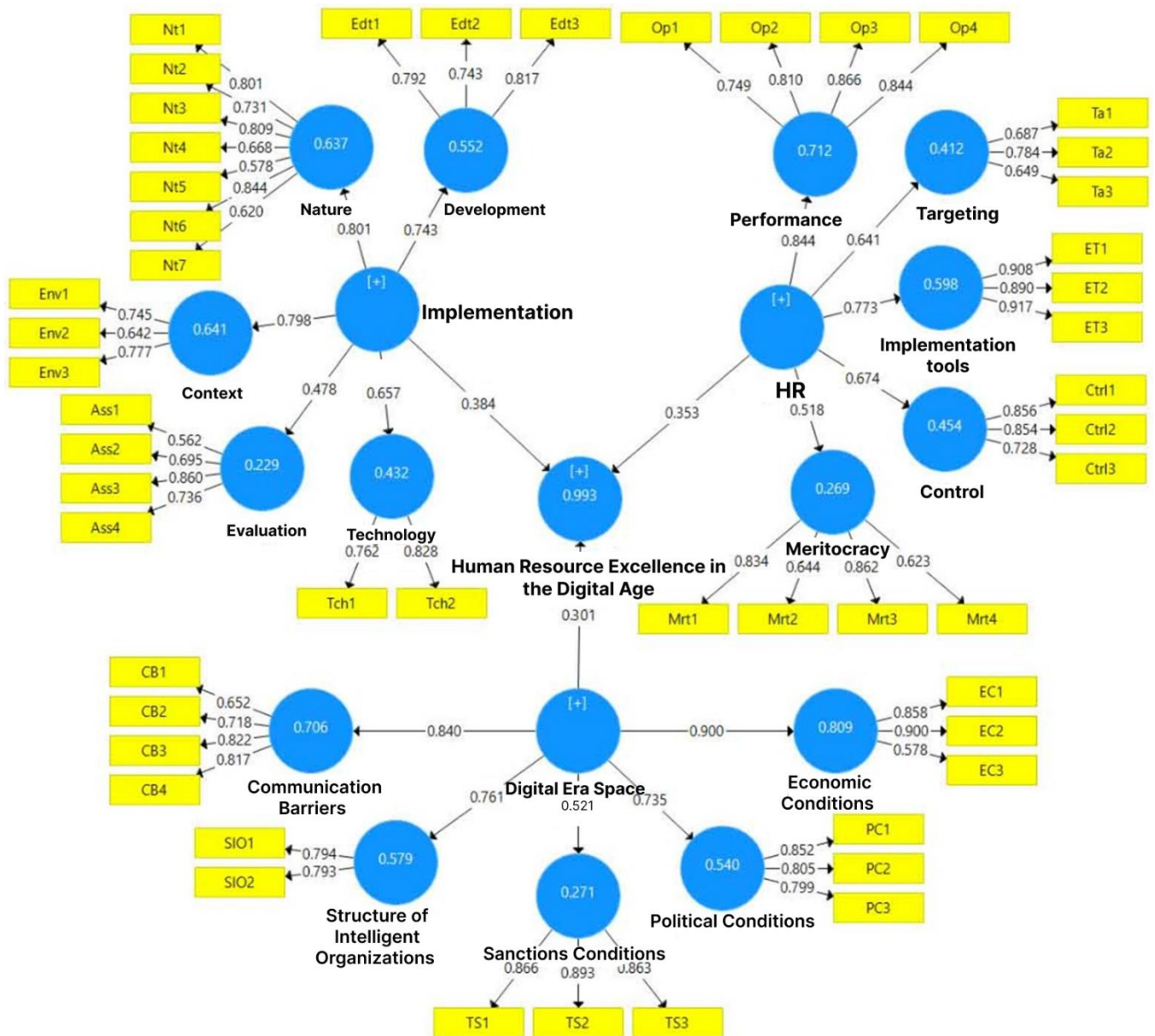
The redundancy index—also known as the Stone–Geisser index—examines the predictive capability of the structural model under omission. When this index exceeds zero, the observed values are well reconstructed and the model has predictive ability. In this study, the redundancy index equals 0.491 for the variable “human resource excellence in the digital era,” 0.250 for “implementation space,” 0.345 for “digital era space,” and 0.229 for “human resource space.”

Furthermore, the most important model-fit index in the partial least squares technique is the Goodness of Fit (GOF). The GOF criterion was introduced by Tenenhaus et al. (2004) and is computed according to the following relationship. Wetzels et al. (2009) proposed 0.01, 0.05, and 0.36 as weak, medium, and strong benchmark values for GOF. This index is calculated using the geometric mean of the average R^2 and the average redundancy indices:

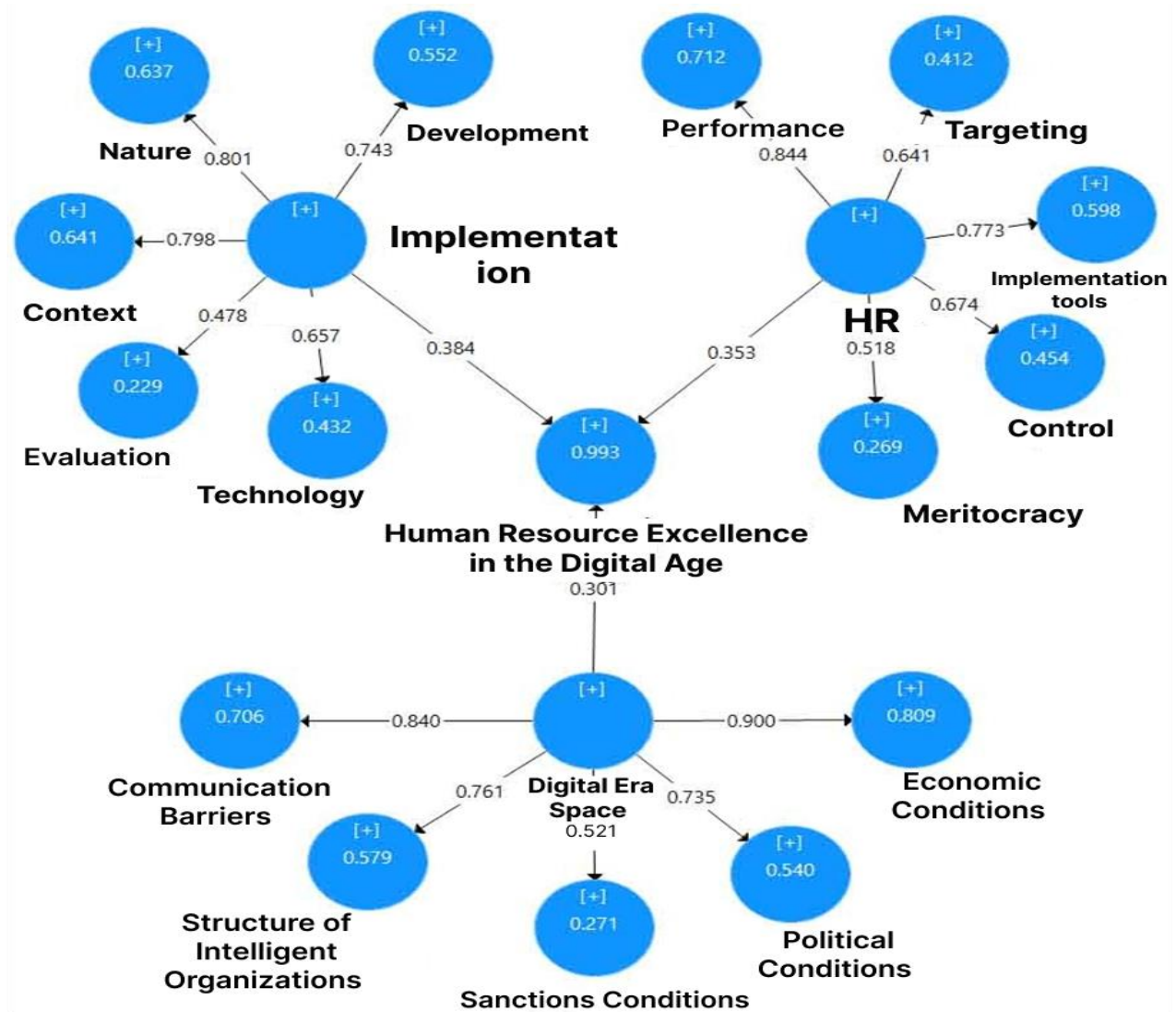
$$\text{GOF} = \sqrt{\text{Average}(\text{Communalities}) \times \text{Average}(R^2)}.$$

According to Tenenhaus et al. (2005), the GOF index in PLS provides a practical solution for assessing overall model fit, analogous to the fit indices used in covariance-based methods, and can be applied to evaluate the overall validity or quality of a PLS model. Like LISREL-style fit indices, it ranges from zero to one, with values closer to one indicating better model quality. It should be noted, however, that unlike certain chi-square–based indices in LISREL-type models, GOF does not assess the degree of fit between the theoretical model and the observed data; rather, it examines the model’s overall predictive capability and whether the tested model successfully predicts endogenous latent variables. Given the value of 0.397 obtained for this model and the benchmarks reported by Wetzels et al. (2009), the model used in this study exhibits an approximately strong goodness of fit.

As noted earlier, PLS-SEM was employed to examine the conceptual model. Path coefficients are standardized and range from -1 to $+1$.

Figure 2*Initial Model of the Study*

The closer a path coefficient is to +1 or -1, the greater the impact along that path. Standardized outer-model coefficients (factor loadings) indicate construct validity. Outer-model loadings range from 0 to 1. As noted earlier, reflective models should demonstrate factor loadings greater than 0.7 for good fit. In the structural model, all outer loadings exceed 0.7; in cases where values lie between 0.5 and 0.7, given that the Average Variance Extracted (AVE) for that construct exceeds 0.5, the measurement remains acceptable (Hair et al., 2013). The coefficient of determination was calculated for endogenous conceptual variables and is shown inside each latent variable ellipse. It should be noted that R^2 is not computed for exogenous variables. Figure 3 presents the structural model of the study in the significance (t-value) state.

Figure 3*Final Model for Examination and Testing (Standardized State)***Table 5***Test Results for the Relationships*

No.	Relationship	Path Coefficient	t-Value	P-Value	Result
1	Implementation Space ← Human Resource Excellence	0.384	30.230	0.000	Significant
2	Human Resource Space ← Human Resource Excellence	0.353	37.278	0.000	Significant
3	Digital Era Space ← Human Resource Excellence	0.301	27.067	0.000	Significant

As shown in Table 5, all relationships among the primary variables in the research model are significant ($P < 0.05$); therefore, the factors associated with each domain have a significant effect on the dependent variable.

Null hypothesis (H_0): There is no significant difference in the prioritization of the components of human resource excellence in the digital era from the perspective of all respondents.

Given the non-normal distribution of the model of human resource excellence in the digital era, the Friedman test was used to examine the first hypothesis.

Table 6*Friedman Test Results for Comparing the Priority of Components of Human Resource Excellence in the Digital Era*

Components of Human Resource Excellence in the Digital Era	Mean Rank	χ^2	df	sig
Implementation Space	2.59	158.447	2	*0.001
Human Resource Space	2.25			
Digital Era Space	1.70			

Significant at $p \leq 0.05$.

According to Table 6, the Friedman test results show a significant difference in the prioritization of the components of human resource excellence in the digital era; thus, the null hypothesis stating that there is no difference in priority among these components from the perspective of all respondents is rejected. The Friedman test results further indicate that the implementation space component has the highest priority with a mean rank of 2.59, while the digital era space (deterrent) has the lowest priority with a mean rank of 1.70 from the perspective of all respondents.

Discussion and Conclusion

The findings of this study provide a comprehensive understanding of the structural and functional dimensions of human resource excellence in the digital era. Based on the results obtained from partial least squares structural equation modeling (PLS-SEM), it was found that three key domains—implementation space, human resource space, and digital era space—significantly contribute to explaining human resource excellence. Among them, the implementation space exerted the strongest influence ($\beta = 0.384$), followed by the human resource space ($\beta = 0.353$) and the digital era space ($\beta = 0.301$). This hierarchy suggests that the quality and adaptability of HR practices in digital transformation depend primarily on effective implementation mechanisms, dynamic human resource systems, and supportive digital infrastructures. These results align with the broader understanding that successful HR excellence in the digital age requires synergy between technological enablement and human-centric design [1, 2, 7].

The significance of the implementation space in shaping HR excellence highlights the pivotal role of executional agility, technological infrastructure, and leadership responsiveness. Organizations that emphasize digital readiness, transparent governance, and agile execution frameworks are more capable of realizing the potential of HR digitalization [3, 5]. The findings show that structural barriers—such as inadequate training, lack of interdepartmental collaboration, and outdated infrastructure—serve as the most critical deterrents to HR advancement. These results corroborate previous studies that argue for the transformation of traditional HR departments into digital ecosystems characterized by automation, system integration, and collaborative innovation [4, 13]. Furthermore, the high explanatory power of the implementation dimension underscores the necessity of digital maturity models in HR, where continuous evaluation and iterative process design enhance performance efficiency [8, 15].

The human resource space, as the second most influential domain, represents internal HRM dynamics—particularly those related to performance management, goal setting, meritocracy, and continuous improvement. The model results demonstrate that organizations emphasizing transparent performance metrics, fair evaluation systems, and competency-based recruitment achieve higher HR excellence scores [16, 20]. This finding is consistent with the argument that HR excellence arises from the alignment of human capital strategy with business goals and the use of digital analytics to monitor individual and collective performance [9, 23]. Moreover, the identification of meritocracy as a critical determinant reinforces

the view that equitable performance systems, supported by AI-driven analytics, lead to greater engagement and accountability [11, 18].

The digital era space, although the third in priority, remains an essential factor in the model, emphasizing the significance of macro-environmental conditions—economic, political, technological, and communicative—in shaping HR transformation. The study revealed that economic and technological conditions exerted the most pronounced effects, reflecting the importance of stable infrastructures and innovation-oriented policies in supporting HR excellence [1, 8]. These results align with earlier findings indicating that technological enablers such as AI, automation, and big data are the cornerstone of future HRM [2, 7]. Furthermore, the findings demonstrate that communication barriers and political uncertainty significantly constrain HR agility—echoing the assertion that digital HR success is contingent upon an open, networked, and transparent work environment [3, 19].

The statistical validation of the model through R^2 and Q^2 indices confirms its robustness and predictive power. The high coefficient of determination for the endogenous latent variable “human resource excellence” ($R^2 = 0.993$) indicates that the selected dimensions collectively explain a substantial proportion of variance in HR performance outcomes. Moreover, the Stone–Geisser redundancy index ($Q^2 = 0.491$) suggests that the model possesses a strong predictive capability. These values corroborate the argument that multidimensional HR frameworks—integrating strategic, operational, and technological elements—effectively forecast organizational performance [4, 16]. The strong goodness-of-fit ($GOF = 0.397$) further demonstrates that the proposed model aligns with the theoretical underpinnings of HR excellence in digital transformation contexts [5, 13].

The results from the Friedman test, ranking the components by priority, reinforce the conceptual hierarchy of the three spaces. The implementation space received the highest mean rank (2.59), highlighting its practical dominance in achieving HR excellence, while the digital era space ranked lowest (1.70), reflecting the persistent challenges of digital infrastructure and policy alignment. This hierarchy mirrors the findings of previous research suggesting that while organizations recognize the strategic necessity of digital HR, they often lag in establishing the foundational systems and competencies needed for effective digital integration [6, 14]. Moreover, the prioritization of implementation processes underscores the enduring human dimension of technology adoption—emphasizing the importance of leadership, employee empowerment, and adaptive learning [17, 23].

A critical insight emerging from this study is the interdependence between digital transformation and human adaptability. The integration of artificial intelligence, machine learning, and automation in HRM requires both structural readiness and psychological acceptance among employees [11, 12]. The qualitative data revealed that employee resistance, insufficient training, and managerial instability impede digital HR adoption—findings consistent with literature highlighting the socio-technical barriers to transformation [3, 20]. In this regard, the role of HR in fostering digital literacy and trust becomes paramount. The creation of transparent digital systems that emphasize fairness and ethical governance can mitigate fear of replacement and promote engagement [1, 18].

Moreover, the study confirms that technological capability alone does not guarantee HR excellence; instead, its integration with sustainable and ethical practices determines long-term success. As digital HRM increasingly relies on predictive analytics and algorithmic decision-making, organizations must adopt governance frameworks that ensure accountability, fairness, and data privacy [7, 10]. This view supports the emerging scholarship on “ethical digital HR,” which advocates for human-centered

AI systems that enhance, rather than replace, human judgment [2, 11]. The empirical evidence from this research further illustrates that meritocracy, transparency, and continuous evaluation strengthen trust between HR systems and employees—ultimately improving organizational credibility [16, 21].

The structural equation modeling outcomes also highlight the mediating role of human capability in translating technological advancement into performance outcomes. This finding aligns with earlier research demonstrating that technology-enabled HR systems achieve excellence only when accompanied by capacity-building initiatives and leadership development programs [5, 13]. Thus, HR excellence is not merely a product of digital integration but a dynamic interplay between human potential and technological innovation. Organizations that cultivate an agile workforce, nurture a culture of innovation, and support continuous learning are better positioned to thrive in the digital economy [4, 19].

Another key contribution of this study lies in confirming the multidimensional nature of HR excellence. Unlike traditional single-domain HR models focusing on efficiency or employee satisfaction, this framework emphasizes the convergence of technological, strategic, and humanistic dimensions. The inclusion of macro-level contextual variables—such as economic and political conditions—further situates HR excellence within a systems-oriented perspective [1, 15]. This systemic integration acknowledges that external forces, including policy regulations and global technological trends, significantly shape the internal architecture of HRM [3, 7]. As such, the validated model offers a holistic lens for understanding how digitalization influences HR transformation at both organizational and environmental levels.

Furthermore, the findings echo the argument that **HR excellence is increasingly characterized by flexibility, collaboration, and data-driven adaptability**. The rise of remote work, hybrid teams, and global collaboration has expanded the boundaries of HR functions beyond physical offices and national contexts [17, 23]. In such environments, HR professionals must integrate virtual tools, foster cross-cultural inclusion, and manage dispersed talent through intelligent digital systems [1, 13]. The empirical results affirm that the success of these systems depends on continuous feedback mechanisms, transparent communication, and inclusive leadership styles [8, 14]. These insights advance the conceptualization of HR excellence from a static state of performance optimization to a dynamic capability that evolves with technological and social change [5, 16].

In sum, this study confirms that human resource excellence in the digital era is a function of multidimensional synergy among executional agility, digital infrastructure, and human adaptability. The findings contribute to the growing body of literature emphasizing that technology, when strategically aligned with human potential and organizational vision, can transform HRM from an administrative unit into a strategic powerhouse [2, 7, 10]. By validating the interconnections between implementation effectiveness, human resource systems, and digital environmental conditions, this study not only extends theoretical understanding but also provides a practical roadmap for achieving excellence in HR transformation.

Although this study provides robust empirical evidence on human resource excellence in the digital era, several limitations should be noted. The study's quantitative phase relied on data collected from experts and managers within a single national context, which may restrict the generalizability of findings across different cultural and industrial settings. Moreover, the use of PLS-SEM, while appropriate for exploratory modeling, does not fully account for potential nonlinear interactions between variables. The qualitative component, though extensive, was limited to 12 interviews, and thus may not capture the complete diversity of perspectives within the broader HR and technology community. Additionally, self-reported data may have introduced response bias, particularly concerning perceptions of technological readiness and organizational maturity.

Future studies should consider expanding the model's application across multiple industries and cultural contexts to validate its global relevance. Longitudinal research could also examine how HR excellence evolves as organizations progress through various stages of digital transformation. Future scholars may incorporate mediating and moderating variables such as leadership style, organizational learning, and digital ethics to enhance explanatory depth. Integrating advanced analytics methods, such as artificial neural networks or structural multi-group comparisons, could further refine predictive accuracy. Qualitative comparative analyses may also explore how contextual differences—economic, cultural, and political—shape the pathways to HR excellence in the digital age.

Organizations seeking to achieve human resource excellence should prioritize developing a digitally literate and agile workforce, emphasizing both technological and interpersonal competencies. Executives should foster a culture of innovation, ethical digital governance, and cross-functional collaboration to ensure sustainable transformation. Continuous investment in AI-enabled HR analytics, data transparency, and adaptive learning platforms can enhance performance and engagement. Moreover, aligning HR digitalization with strategic objectives and employee well-being will be critical for cultivating a resilient and future-ready organization.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. Written consent was obtained from all participants in the study.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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References

- [1] A. H. Al-Qassem, "The Impact of Technological Advancements on Human Resource Management Practices: Adapting to the Digital Era," *Data & Metadata*, vol. 4, p. 731, 2025, doi: 10.56294/dm2025731.

- [2] R. Indradevi, N. Sathya, and B. Baskar, "Technology-Enabled HR Practices for Successful Implementation of SHRM," *International Research Journal of Multidisciplinary Scope*, vol. 5, no. 2, pp. 427-440, 2024, doi: 10.47857/irjms.2024.v05i02.0529.
- [3] A. Karuppannan, M. Maheswari, R. Hemamalini, M. Ramakrishnan, and K. S. Rangasamy, "E-HRM - Transforming Human Resource Management in the Digital Age: A Conceptual Study," *Tfe*, vol. 2, no. 2, pp. 14-19, 2024, doi: 10.46632/tfe/2/2/2.
- [4] M. A. Pande, R. M. Bangur, and V. Tanwar, "Exploring the Impact of HR 4.0 on Organizational Performance," *International Journal of Information Technology and Management*, vol. 19, no. 1, pp. 32-40, 2024, doi: 10.29070/mqxxkzc33.
- [5] Y. Dahliani, A. Sumady, and R. Rohmial, "Developing Agile Workforce Strategies: The Role of HR in Fostering Innovation and Adaptability in Organizations," *Ijsh*, vol. 2, no. 1, pp. 28-36, 2025, doi: 10.59613/7x8d3p15.
- [6] U. M. Kachalla and H. B. Adamu, "Adoption of Human Resource Technology (HRT): Its Implication on Entrepreneurs and Micro Scale Industries' (MSI) Employee Performance in Yobe State," *Journal of Advanced Research and Multidisciplinary Studies*, vol. 4, no. 3, pp. 127-138, 2024, doi: 10.52589/jarms-lwpt6sh9.
- [7] A. C. Schulz, D. Cürlis, C. Goretzky, D. H. Kruger, B. Pelka, and L. Preissner, "Enabling Technology Hand in Hand With Enabling Practices," *Journal of Enabling Technologies*, vol. 18, no. 2/3, pp. 76-90, 2024, doi: 10.1108/jet-01-2024-0008.
- [8] R. N. Vadithe and B. Kesari, "Role of Technology Enablers for Implementation of HR Analytics in the Indian IT Sector: A Mediation Analysis," *Human Systems Management*, 2025, doi: 10.1177/01672533251314403.
- [9] H. Dadheech, "AI-Driven HR Analytics: Unleashing the Power of HR Data Management," *Shanlax International Journal of Management*, vol. 11, no. S1-Mar, pp. 163-171, 2024, doi: 10.34293/management.v11is1-mar.8098.
- [10] J. Westover, "The Future of HR Education," *HCLReview*, vol. 17, no. 3, 2025, doi: 10.70175/hclreview.2020.17.3.1.2.
- [11] S. Subrahmanyam, "Role of Artificial Intelligence in Re-Inventing Human Resource Management (HRM) 2.0," 2025, pp. 243-264.
- [12] T. Shenbhagavadivu, K. Poduval, and V. Vinitha, "Artificial Intelligence in Human Resource: The Key to Successful Recruiting and Performance Management," *Shodhkosh Journal of Visual and Performing Arts*, vol. 5, no. 6, 2024, doi: 10.29121/shodhkosh.v5.i6.2024.1351.
- [13] T. M. Kanade, "The Evolution of HR," 2025, pp. 49-78.
- [14] D. R. L, "Synergizing Human Resource Management, Accounting, and Artificial Intelligence: A Path to Future Success," *International Journal for Research in Applied Science and Engineering Technology*, vol. 13, no. 2, pp. 1552-1556, 2025, doi: 10.22214/ijraset.2025.66281.
- [15] J. Pak, H. H. Ghaleh, Z. Ma, and M. N. Akhtar, "Antecedents and Outcomes of Enabling HR Practices: The Paradox of Consistency and Flexibility," *Human Resource Management Journal*, vol. 35, no. 2, pp. 371-396, 2024, doi: 10.1111/1748-8583.12571.
- [16] B. Ghlichlee, "HR Excellence Enablers and Results: Developing a Scale for Assessing Key Internal and External HR Stakeholders' Perceptions," *Management Research Review*, vol. 47, no. 6, pp. 964-983, 2024, doi: 10.1108/mrr-11-2022-0807.
- [17] V. S. Rana, "Impact of HR Practices on Job Opportunities and Career Advancement in the Hospitality Industry," *Journal of Social Responsibility Tourism and Hospitality*, no. 41, pp. 29-37, 2023, doi: 10.55529/jsrth.41.29.37.
- [18] S. K. R. Kumar, "Influence of Sustainable Human Resource Practices on ITES Organizational Culture," *Journal of Information Systems Engineering & Management*, vol. 10, no. 13s, pp. 522-530, 2025, doi: 10.52783/jisem.v10i13s.2107.
- [19] A. Tretiakov, T. Jurado, and J. Bensemman, "Employee Empowerment and HR Flexibility in Information Technology SMEs," *Journal of Computer Information Systems*, vol. 63, no. 6, pp. 1394-1407, 2023, doi: 10.1080/08874417.2022.2158962.
- [20] A. Sonar and R. K. Pandey, "Human Resource (HR) Practices - A Comprehensive Review," *Management Journal for Advanced Research*, vol. 3, no. 5, pp. 42-56, 2023, doi: 10.54741/mjar.3.5.5.
- [21] S. Vashisht, U. Mangal, N. Chaudhary, and M. Q. Rezvani, "Enhancing Business Excellence Through the Evaluation and Prioritization of HR Practices," *International Journal of Business Excellence*, vol. 1, no. 1, 2023, doi: 10.1504/ijbex.2023.10062979.
- [22] P. M. Jangam, "HR Audit 2.0: Empowering Employee Performance in Futuristic Management Trends," 2024, pp. 29-34.
- [23] F. A. Tuli, "Transforming Talent Management: The Journey to E-Human Resources Excellence," *Asian Business Review*, vol. 13, no. 2, pp. 29-38, 2023, doi: 10.18034/abr.v13i2.685.