

Digital Human Resources: Literature Review and Research Prospects

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*Digital human
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ABSTRACT

Comprehensive digitalization is profoundly changing people's production, life, work and learning styles. The rapid development of the digital economy also prompts enterprises to carry out profound digital transformation. Human resources work is an important part that affects the organizational structure and business activities of enterprises. Digital human resources has become an important factor for the success of enterprise transformation. Scholars at home and abroad have conducted in-depth research on the definition and characteristics, mode mechanisms, risk countermeasures, etc. of digital human resources. Therefore, this article will sort out and look forward to the concept characteristics and the current status of research and development at home and abroad.

INTRODUCTION

The term "digital human resources" first appeared in the "Deloitte 2016 Global Human Capital Trends" report, which argued that digital human resources represented a revolution rather than a slow evolution. In 2021, General Secretary Xi Jinping emphasized during a collective study session that "the digital economy is becoming a crucial force in reorganizing global factor resources, reshaping the global economic structure, and altering the global competitive landscape. Developing the digital economy is a strategic choice for seizing the new opportunities presented by the new round of scientific and technological revolution and industrial transformation"[1]. In 2024, the state introduced the "Action Plan for Accelerating the Cultivation of Digital Talent to Support the Development of the Digital Economy (2024-2026)". This plan emphasized that digital talent can boost the development of the digital economy and accelerate the development of new forms of productive forces. With the rapid development of China's digital economy and the continuous upgrading of network infrastructure and intelligent terminal industries[2], the support of technology drives organizational change. Digital human resources management, through new-generation digital technologies

such as mobile Internet, cloud computing, big data, and artificial intelligence, creates a unified digital workplace, realizes the process and automation of human resources management, enhances the employee experience, helps organizations make scientific human resources management decisions, and the digital development of human resources has become an inevitable development trend.

The development trend of digital human resources shows that digital intelligence will become the core strategy for organizations to improve efficiency and also a powerful weapon for seizing the talent dividend. As the new generation enters the workplace and becomes the main force in organizations, having grown up with mobile Internet technology, they will accelerate the digital intelligence of all employees in the organization and serve as a guarantee for enhancing digital capabilities. At the same time, with the continuous growth of human resources data, digital human resources management will become a shining star among the value creators of organizations. In summary, the development of digital human resources is not only a manifestation of the technological revolution but also a new journey of human progress. Against the backdrop of

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digitalization, change, opportunities, talent, and integration, the transformation of the foundation of digital human resources management is of great significance for improving organizational effectiveness, optimizing the talent structure, and promoting innovative development.

Facing the profound changes that digitalization is bringing to the ways people produce, live, work, and learn, the rapid development of the digital economy is also driving enterprises to undergo deep digital transformation. Human resources (HR) functions are a critical component influencing organizational structure and business activities, and digital HR has become a key factor in the success of enterprise transformation. Scholars have conducted extensive research on the definition and characteristics, models, mechanisms, risks, and countermeasures related to digital HR. Therefore, this paper aims to review and summarize its conceptual features and the current state of research development, while also providing an outlook for future directions.

1. Concept Definition and Characteristics

The conceptual landscape of modern management theory is often punctuated by seminal figures and foundational texts, yet the emergence of Digital Human Resources (Digital HR) as a significant paradigm defies such a neat origin story. Unlike other classic organizational theories with clear progenitors — such as Taylor's Scientific Management or Mayo's Human Relations approach — Digital HR cannot be attributed to a single founder or a definitive inaugural proposition. It is, instead, a contemporary and evolving mode of human resource management that has been gradually conceived and shaped organically within the crucible of the Information Age. Its genesis is inextricably linked to the rapid, wave-like advancement of information and communication technologies, a force that has fundamentally reshaped the socioeconomic fabric. This management paradigm is thus less an invention and more an adaptive response, emerging as the logical confluence and deep integration of technological capability with the enduring functions of human capital management. It represents a quintessential product of its time, evolving in lockstep with digital transformation trends that permeate all aspects of organizational life. Moreover, these activities are carried out simultaneously and intertwined with each other[3]. This viewpoint expounds the connotation of digital

human resources from a relatively broad perspective and emphasizes the simultaneity of its activity scope and technological application. In China, after extensive research and practice, the currently widely accepted definition is: Digital human resources is a new type of management mode that actively applies digital technology and information means in human resources management practices to effectively manage the human resources of enterprises. This definition not only clarifies that the management scope of digital human resources is corporate human resources but also emphasizes that its core lies in using digital technology and information means to ensure the effectiveness of management. Further analysis shows that digital human resources have some distinct characteristics, including digital-driven, agility, intelligent decision-making, self-service, and cost-effectiveness, etc.[4]. Digital-driven means that the management process takes data as the core and relies on the collection, analysis, and application of data to drive decision-making and management activities; agility reflects that this management mode can quickly adapt to the changes in the internal and external environments of the enterprise and flexibly adjust human resources strategies; intelligent decision-making relies on advanced algorithms and data analysis tools to provide a scientific basis for the enterprise's human resources decisions; self-service enables employees and managers to independently complete relevant human resources management operations to a certain extent, improving efficiency; cost-effectiveness highlights that through digital means, it is possible to effectively reduce the cost of human resources management while ensuring the quality of management.

The scholarly inquiry into Digital HR reveals a fascinating tapestry of perspectives, distinctly colored by the academic environments, cultural contexts, and practical realities in which researchers are situated. Scholars across the globe, while examining the same broad phenomenon, have cultivated different research trajectories and underlying value systems, leading to a rich, if sometimes fragmented, body of literature. Internationally, a notable contribution comes from scholar Alan, whose viewpoint frames Digital HR as a complex and comprehensive organizational process. This process, in Alan's conceptualization, is characterized by the holistic application of digital technologies across the entire spectrum of human resource management activities. It encompasses a continuum from initial recruitment and selection, through onboarding, performance management,

learning and development, and extends to compensation, benefits, and payroll administration. Crucially, Alan emphasizes that these activities are not sequential or isolated but are conducted simultaneously and are deeply interdependent, woven together by shared digital platforms and data streams. This perspective offers a broad, process-oriented understanding of Digital HR, highlighting its integrative nature and the synchronicity of its technological application and managerial scope.

In contrast, within the Chinese academic and professional context, extensive research and practical experimentation have converged upon a definition that, while aligned in spirit, carries distinct nuances. The widely accepted definition positions Digital HR as a new management model that actively employs digital technologies and information methodologies within HR practices to achieve effective governance and optimization of an enterprise's human resources. This definition performs two critical functions. First, it explicitly demarcates the domain of Digital HR: the human resources of the enterprise itself. Second, and more importantly, it centers the core mechanism of this model: the strategic use of digital and informational tools as the primary enablers of management efficacy. The emphasis is squarely on leveraging technology to attain effectiveness, implying a focus on outcomes such as improved decision quality, operational efficiency, and strategic alignment.

Delving deeper, this model is operationalized through a constellation of interrelated and defining characteristics that distinguish it from traditional HRM. A closer analytical examination reveals these core attributes:

Data-Driven Core: At the heart of Digital HR lies a fundamental shift from intuition-based to evidence-based management. The process is intrinsically data-centric, relying on the systematic collection, sophisticated analysis, and strategic application of people analytics. Data becomes the primary fuel for decision-making and the steering mechanism for management interventions, spanning from predicting talent attrition to optimizing workforce planning.

Agility: Reflecting the volatile, uncertain, complex, and ambiguous (VUCA) nature of the modern business environment, Digital HR is characterized by organizational agility. This refers to the capacity of the HR system and its associated strategies to respond rapidly and flexibly to shifts in both the internal organizational climate and the external market, regulatory, and competitive landscapes. It enables proactive rather than reactive adjustments to talent

management approaches.

Intelligent Decision-Making: Moving beyond basic data reporting, this characteristic entails the use of advanced algorithms, machine learning models, and predictive analytics tools. These technologies transform raw data into actionable insights and foresight, providing a scientific, empirical basis for strategic HR decisions. This could manifest in AI-powered candidate matching, personalized learning path recommendations, or models identifying high-potential employees.

Self-Service Empowerment: Digital HR architectures often feature integrated platforms (e.g., Enterprise Resource Planning or dedicated HR Information Systems) that enable delegation of routine administrative tasks. Employees can manage personal data, request leave, access payslips, and enroll in training, while managers can handle approvals, conduct performance check-ins, and generate team reports. This decentralization of transactions improves operational efficiency, enhances user experience, and frees HR professionals for more strategic roles.

Cost-Effectiveness: A compelling pragmatic attribute is the emphasis on optimizing the economic equation of HR service delivery. Through automation of repetitive tasks, streamlining of processes, reduction of administrative overhead, and improved allocation of HR investments based on data, digital means offer the potential to significantly lower the operational costs of human resource management. Crucially, this is achieved not by diminishing service quality but often by enhancing it through greater speed, accuracy, and accessibility.

In synthesis, Digital HR emerges as a historically contingent concept born from technological progress, interpreted through diverse scholarly lenses that reflect regional and pragmatic emphases. Its operational essence, however, is captured in a cohesive model defined by a data-driven nucleus, augmented by agility, intelligence, user empowerment, and a strong imperative for value-driven efficiency. This conceptual framework provides the foundation for both understanding its current implementation and guiding its future evolution as a cornerstone of modern organizational management.

2.Literature Review of Digital Human Resources at Home and Abroad

Through sorting out relevant literatures, it is found that the

main research directions of domestic scholars on digital human resources mainly focus on five aspects: studying the importance and specific paths of digital human resources from the perspective of managers or enterprises, discussing the impacts brought by digitization at the employee level, researching the impacts of digital technology on human resources starting from digitization itself, putting forward suggestions on the combination of people and digital technology, and finally expounding the changes and challenges brought about in the digital era. Analyzing and discussing from the perspective of managers or enterprises, scholars Guo Jinhua and Zhu Chengliang, from the enterprise level, by citing the "value chain theory", put forward the necessity of digital human resources transformation of manufacturing enterprises and the improvement of enterprise added value. They also promoted the high added value at both ends of the "smile curve" of manufacturing enterprises from two aspects: upstream research and development innovation and downstream service operation, and proposed practical path choices[5]. Scholars such as Ma Qian took start-up enterprises and incubation platforms as the breakthrough points. By introducing digital technology, which brought opportunities and development to the above-mentioned enterprises, they proposed the digital enabling service path mechanism of "digital technology support service + organizational management optimization service co-creation ecosystem embedding mechanism", clarified the characteristics and differences of different stages of digitalization of innovative enterprises, and provided specific ideas for the selection of digital human resources of Xi'an Zhongke Chuangxing Technology Incubator Co., Ltd. through specific case analysis[6]. Discussing from the perspective of employees, scholars such as Li Shaolong proposed that in the digital era, human resources should adopt digital gamification management, that is, HRM. This group of scholars believes that in the situation where traditional incentive methods are gradually declining, more efforts should be made to stimulate employees to establish internal incentive motives, and gamified human resources under the digital environment is a novel and effective attempt[7]. Scholars Wang Shaojie and Li Jing, in management practice, recognized the change of employees from the "robots" established in the industrial era to the "digital people" with the advent of big data, and proposed that digital people will become the masters of organizational human resources[8]. In terms of digital

development, scholars such as Li Yanping adopted the digital-HRM research method and proposed that human resources should rapidly develop digitally to improve organizational management efficiency and enhance employees' technical capabilities. They also emphasized the urgency and inevitability of enterprises' digital transformation[9]. Scholars such as Zhang Zhipeng discussed that digital transformation has completely subverted human resources services, and analyzed the impacts of digital technology on organizational human resources from three dimensions: the digitalization of business resources, the scenario-based application of data resources, and the intelligence of data resources[10]. In terms of the integration of people and technology, scholars such as Xie Xiaoyun explored new practices of digital technology and human resources, sorted out and summarized dimensions such as training and development, assessment and supervision, reward and punishment mechanisms, the relationship between organizations and employees, human intelligence and machine intelligence, etc., and proposed the five major tensions in digital human resources. Scholars such as Li Ping proposed at the organizational structure level that artificial intelligence (objective intelligence) and human intelligence (subjective intelligence) have become a unity of opposites like yin and yang[11]. Regarding the changes and challenges brought to small and medium-sized enterprises (SMEs) in the context of the digital era, scholar Lei Jiewei discussed the changes and challenges faced by digital human resources from two aspects. On the one hand, technologies such as big data are used to achieve enterprise benchmark recruitment and improve the accuracy of human resources analysis. On the other hand, it is difficult for enterprises to carry out the top-level design of digital human resources, and there is a lack of relevant high-end digital professionals[12]. Scholars such as Lü Fen affirmed that SMEs are important contributors to China's economic development and used fsQCA to analyze how to promote the digital technology innovation capabilities of SMEs to adapt to the development of the times[13].

Foreign scholars have studied digital human resources in two parts according to the time series, taking the COVID-19 pandemic as a dividing line. Before the pandemic, most foreign scholars focused their research directions on the impact of the configuration of the digital employee model against the backdrop of the digital society and economy. For example, Fuchs proposed new digital labor forms such as

digital labor and digital work[14]. After experiencing the pandemic, foreign scholars have taken digital human resources as the key research focus and analyzed the impacts brought by digitization from different dimensions. Regarding the changes in the digital workplace, as the management gradually accepts new technologies, the workplace also needs to be adjusted accordingly. This new leadership style has introduced concepts such as flexibility. In this context, flexibility specifically means that the workspace is no longer limited to a specific physical location. Scholars such as Maral believe that during the pandemic, remote work and hybrid work have been widely adopted. They studied the impact of the shift in work patterns on office workers and analyzed the development potential of the future sustainable work environment. They analyzed the opportunities and challenges brought by the digital workplace from the perspectives of individuals, teams, and leadership, and concluded that in order to achieve the expected work patterns and value benefits, employers need to provide support and redesign the physical digital workplace to meet the diverse needs of employees[15].

In terms of the digital transformation of human resources, Villajos believes that over time, in order to enable organizations to adapt to more intense market competition, the focus of human resources needs to shift from traditional strategic management methods to sustainable management methods, and digitization is a necessary measure for human resources reform[16]. Standing at the level of human resources leadership, scholar Zervas discussed how to effectively promote the development of digital skills, enhance organizational resilience, and drive economic development, and concluded the necessity of digital practices carried out by human resources leaders[17]. Scholars such as Divya, through bibliometric methods, revealed the research trends in the fields of digital transformation and human resources management, providing references for subsequent research[18].

3.A renowned theoretical study

In addition, there exists a renowned theoretical model that provides a clear and systematic explanation of the dynamic relationship between organizations and talent mobility. Based on the "Attraction-Selection-Attrition" (ASA) theoretical model proposed by Schneider (1987), the illustrated diagram vividly reflects the dynamic process of how organizations

and individuals achieve mutual adaptation through attraction, selection, and attrition — thereby shaping organizational homogeneity.

The ASA model highlights a crucial phenomenon: organizations tend to recruit and retain individuals who are similar to existing members, thereby reinforcing organizational homogeneity. Over time, this may lead to a lack of diversity in perspectives and thinking, potentially hindering innovation and adaptability. Therefore, modern organizations should strive to strike a balance between maintaining cultural consistency and introducing appropriate diversity while applying the ASA framework. For instance, during the attraction stage, organizations can showcase not only their cultural strengths but also their openness and inclusiveness. During the selection phase, assessment tools can be designed to evaluate not only job skills but also whether candidates can bring new perspectives and experiences. In the attrition stage, organizations should establish mechanisms for feedback and adjustment, allowing individuals who do not fully fit in but possess unique value to have opportunities for adaptation and growth. Furthermore, with the rise of digital human resource management, the application of the ASA model has gained new possibilities. For example, organizations can use data analytics to more accurately assess the degree of match between individuals and the organization; intelligent recruitment systems can simulate organizational culture and work scenarios, allowing candidates to experience them in advance; and employee retention analysis models can help identify attrition risks early and intervene. These digital tools not only enhance the efficiency of attraction, selection, and attrition but also make these processes more scientific and precise.

In summary, the ASA model provides a profound analytical framework for understanding the interaction between individuals and organizations. In practical applications, organizations should remain vigilant against the potential negative effects of excessive homogeneity, flexibly adjusting human resource management strategies to achieve a dynamic balance between organizational consistency and individual diversity.

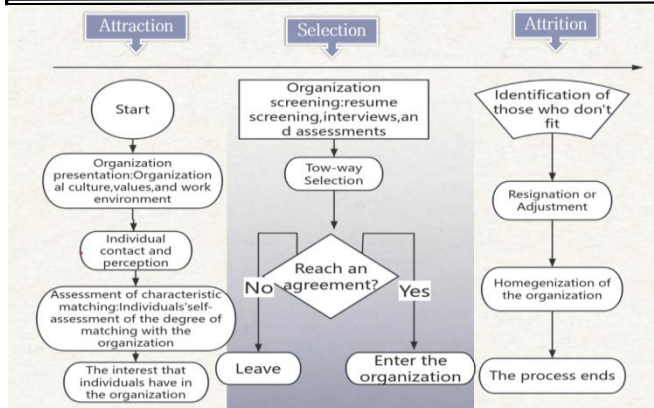


Fig.1.

Building upon the "Attraction-Selection-Attrition" (ASA) model, digital human resources (Digital HR) is revitalizing this classic framework by infusing it with unprecedented dynamism, granularity, and strategic value, allowing it to evolve from a descriptive explanation of organizational homogeneity into a prescriptive engine for managed diversity and adaptive resilience. While the traditional ASA model is often critiqued for potentially fostering static, insular organizations in today's volatile and complex business landscape, Digital HR intervenes precisely at this intersection of legacy theory and modern practice, transforming each phase through data-driven innovation. In the Attraction phase, organizations move beyond broad cultural messaging to targeted, predictive engagement — leveraging analytics from platforms like LinkedIn and Glassdoor for hyper-targeted employer branding, using algorithms to analyze digital footprints of successful employees to build "ideal fit" profiles for proactive candidate identification, and offering immersive pre-experiences through VR tours and AI chatbots to strengthen the quality of initial engagement. The Selection phase is elevated from subjective assessment to an augmented, bias-aware intelligence process, where AI-powered screening tools analyze contextual evidence of skills and problem-solving approaches, structured digital interviews provide data-rich insights into communication styles and cognitive preferences, and carefully designed AI systems help mitigate bias in job descriptions and evaluations — enabling organizations to select for "cultural add" rather than mere "cultural fit." In reimagining Attrition, Digital HR redefines it from a passive exit endpoint into a continuous feedback loop for organizational learning and talent agility, utilizing predictive attrition risk modeling by integrating data from HRIS, engagement surveys, and productivity tools to identify employees at high risk of

leaving, while AI-powered internal talent marketplaces transform potential attrition into dynamic internal redeployment by mapping employees' capabilities and aspirations to new roles or projects, and continuous cultural sensing through sentiment analysis and collaboration pattern monitoring ensures that organizational homogeneity evolves adaptively rather than stagnantly. Ultimately, under Digital HR's influence, the ASA model becomes an interconnected, data-rich cycle that consciously manages the core paradox of building a strong, coherent culture while actively incorporating diverse skills and perspectives, revitalizing it as a framework for "Intelligent Organizational Adaptation" that guides organizations in attracting aligned talent, selecting candidates who thrive and healthily challenge the status quo, and interpreting attrition signals as opportunities for learning and agile restructuring — fostering culturally cohesive yet dynamically diverse organizations equipped to innovate and compete in the 21st century, with the theory's new vitality lying in its enhanced capacity to explain and shape the modern, data-infused interplay between individuals and organizations.

Review and Research Prospects

In the contemporary era, the field of digital human resources (Digital HR) finds itself in a continuous and dynamic process of scholarly exploration and practical application. Its developmental trajectory is not characterized by radical disruption but rather by a more nuanced pattern of gradual, cumulative progress. This trend is substantiated by the observable, year-on-year increase in academic and professional literature dedicated to the subject. The proliferation of such research output signifies a maturing field, with the volume of studies presenting an increasingly rich and multifaceted discourse. The substantive findings and theoretical contributions embedded within this growing corpus of literature are progressively transcending the confines of abstract theory. They are being operationalized and integrated into the practical workflows of enterprises and organizations worldwide, thereby introducing novel paradigms and methodologies to the domain of human resource management.

A comparative analysis of domestic and international research landscapes on Digital HR reveals distinct and significant paradigmatic differences, each with its own strengths and limitations. The perspective dominant in much

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of domestic research tends to coalesce around two primary focal points. Firstly, it strongly emphasizes the urgency and strategic imperative of HR digital transformation, positioning it as a critical, non-negotiable element for the competitiveness and survival of modern enterprises in the digital economy. Secondly, it undertakes a multi-faceted analysis of the impacts of digital technologies across the entire HR value chain, meticulously examining changes in processes from recruitment and talent acquisition, through learning and development, to performance management and compensation. However, a prevalent critique of this body of work is that a substantial portion remains at a relatively descriptive or surface level. It often presents what can be termed a "digitization + HRM" model — layering digital tools onto existing HR processes — without delving sufficiently into the deeper, transformative implications. This surface-level engagement manifests in several specific methodological and theoretical shortcomings: the absence of a widely accepted, robust theoretical framework to ground empirical studies; insufficient integration of macro-level contextual factors (e.g., national digital infrastructure, labor market dynamics, regulatory environments) into the research design; a lack of clarity in research pathways and logical progression; and a notable deficit in rigorous empirical analysis and longitudinal data to validate proposed models and outcomes. This constellation of challenges naturally prompts critical reflection on the future developmental trajectory of Digital HR as a discipline. Key questions emerge: How can Digital HR research transcend its current limitations to construct more sophisticated, predictive, and sustainable theoretical models? In practice, how can enterprises move beyond mere tool adoption to leverage Digital HR strategically, thereby enhancing overall management quality and securing a decisive advantage in hyper-competitive markets? These pressing questions underscore the urgent need for enrichment, methodological refinement, and theoretical deepening in subsequent scholarly inquiry.

In contrast, the international research perspective offers a distinct, though not unproblematic, approach to understanding digital transformation. Foreign scholars have cultivated unique conceptual understandings and research trajectories, often segmenting the transformation journey into discernible phases, such as digitization (converting analog to digital), digitalization (using digital data to streamline processes), and digital transformation

(fundamentally rethinking business models). This phased model provides a valuable heuristic for understanding organizational maturity. However, a noteworthy and critical observation is the tendency among some scholars to conflate or simplistically equate "digitization" with "digital intelligence" or full automation. This conflation can be viewed as a reductionist stance, as it risks marginalizing the enduring and crucial role of human agency, judgment, and strategic oversight within digitally enabled HR systems. It overlooks the socio-technical dimension where technology augments rather than wholly replaces human decision-making and relational aspects of management.

Despite this particular conceptual pitfall, the international research corpus presents numerous aspects worthy of considered (reference). Strengths often include a stronger tradition of interdisciplinary research (merging HR studies with data science, information systems, and organizational theory), a greater emphasis on constructing and testing theoretical frameworks, and more extensive use of empirical, often quantitative, research designs. As the global community of scholars and practitioners ventures further into the complexities of the Digital HR domain, it is imperative to uphold an objective, critical, and scientifically rigorous attitude. The path forward involves a judicious synthesis: reasonably drawing upon and adapting the robust methodologies and theoretical advances from international research while discarding overly simplistic or technologically deterministic assumptions. Simultaneously, domestic research must build on its applied strengths by deepening theoretical rigor and empirical validation. The ultimate goal should be to seek common ground — shared fundamental questions about technology, people, and organization — while respecting and learning from different contextual perspectives. It is on this foundation of critical synthesis and methodological advancement that the future of Digital HR research, both in China and globally, can achieve deeper, more impactful, and sustainable development, ultimately guiding organizations to foster workplaces that are not only technologically advanced but also humane, adaptive, and strategically astute.

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