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Building High Involvement Work Systems in the Digital Era: Employee Experience-Oriented Digital HRM and Employee Involvement

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ABSTRACT

Despite the increasing application of digital technology in management practices, its implications for employee involvement and high involvement work systems (HIWSs) remain largely unexplored. Based on an in-depth qualitative case study of Tencent—one of China's largest information technology companies—this article explores whether and in what ways employee experience (EX)-oriented digital HRM contributes to the development of HIWSs. Drawing on socio-technical systems theory, we examine the goals, tasks, structures, actors, and technical elements of the digital HRM system in the case company, as well as the interactions among these elements. Our findings suggest that the EX-oriented digital HRM system enhances two key dimensions of HIWSs: technological empowerment and organizational involvement. First, EX-oriented digital HRM provides employees with digital tools that enable them to exercise some autonomy in various facets of their work life. This includes self-management, team collaboration, and personalized learning and development opportunities. Second, EX-oriented digital HRM arguably promotes employee involvement in both product development and some aspects of organizational management by leveraging user experience design. This study contributes to the theory of socio-technical systems and the literature on HIWSs in the digital era.

1 | Introduction

High involvement work systems (HIWSs) are said to represent an overall management orientation that focuses on providing employees with greater involvement to improve organizational performance and competitiveness, as well as employees' experience at work (Wood 2020). In recent years, the concept of HIWS has received significant attention in the literature, with most studies focusing on its impact on employee and organizational outcomes (e.g., Elorza et al. 2022; Martínez-del-Río et al. 2012; O'Neill et al. 2011; Riordan et al. 2005; Song et al. 2020). These studies suggest that increasing employee involvement (EI) offers better opportunities for employees to fully utilize their skill set and exercise their judgment more effectively. In addition, it is argued that enhanced EI is associated with a higher level of employee motivation, leading to improvements in both employee and organizational performance (see Boxall et al. 2015; Boxall et al. 2019).

Although existing research largely examines the impact of HIWSs, the approaches to building such systems are relatively diverse, as the high-involvement model of work is expressed in various ways across different environments (Boxall and Huo 2022). The practices said to be associated with HIWSs usually include team-based designs (e.g., problem-solving teams, self-directed teams, and idea-capturing schemes), information sharing (e.g., briefings and employee suggestion programs), aggregate compensation strategies (e.g., appraisal and gain-sharing), flexible job design (e.g., job rotation), and employee training (Boxall et al. 2019; Wood 2020). These practices can

vary widely in terms of the level of EI and the extent to which they effectively represent workers' interests. However, very limited research has examined HIWS approaches in the digital era. One exception is the study by Malik, Kumar, et al. (2023), which shows that relational coordination through digital technologies increases the quality of employee interactions in HIWSs. Therefore, as Boxall et al. (2019) suggest, more attention should be paid to studying the implications of advanced digital technologies for EI and HIWSs.

Digital technologies are increasingly applied not only to business operations but also to management practices, such as human resource management (HRM). Digital HR applications influence not only how managers recruit, evaluate, and try to motivate employees, but also how employees experience the HRM system (Edwards et al. 2024; Prikshat, Islam, et al. 2023). More recently, digital HR applications have increasingly focused on enhancing the employee experience (EX). In digital HRM, EX refers to the way in which employees perceive and respond to digital HR products and services (Malik, Budhwar, et al. 2023). Arguably, not only do digital HR tools provide personalized and individualized experiences for employees in their daily work, but they also encourage employees, as users of digital HR tools, to provide feedback and contribute their knowledge to the development and use of these tools (Malik, Budhwar et al. 2022; Malik, Budhwar, et al. 2023). However, there is limited research exploring how and in what ways EX can be enhanced within digital HRM. The concept of HIWS focuses on employees' ongoing perceptions and experiences of the level of influence they have over the decisions that affect the work process (Boxall and Winterton 2018). Despite this, the link between EX-focused digital HRM and EI remains underexplored.

To address these gaps, this study aims to explore approaches to building HIWSs in the digital era and examine whether and how digital HRM systems focused on EX can contribute to HIWSs. Specifically, this study seeks to answer three research questions. First, how does digital HRM shape EI practices? Second, how can EX be enhanced in digital HRM? Third, in what ways can EX-oriented digital HRM practices contribute to developing HIWSs in organizations?

This article draws on evidence from the information technology (IT) sector to address these questions. Empirical studies suggest that EI is more prevalent in capital-intensive industries, such as high-skilled service sectors, compared to labour-intensive industries (Boxall and Huo 2022; Boxall and Winterton 2018). According to a Eurofound report (2013), industries with advanced computer technology and a skilled workforce, such as the IT sector, exhibit higher levels of EI. This is likely because IT companies rely on continuous employee skill development and innovation, and skilled workers often seek autonomy and value professional engagement (Kim et al. 2021). Moreover, compared to other industries, IT companies place greater emphasis on leveraging digital HRM practices to promote EX and try to motivate employees (Malik, Budhwar, et al. 2023).

We conducted an in-depth single case study of Tencent, one of China's largest IT companies, as a “critical” case (Yin 2018, 49). It is worth noting that quantitative and survey-based methodologies for evaluating HIWSs tend to predominate, while qualitative case studies are much less common (Boxall et al. 2019). Thus, this exploratory qualitative case study addresses Boxall et al.'s (2019) call to utilize qualitative studies to better understand the development of HIWSs.

The theory of socio-technical systems (STS) is applied in this study. STS recognizes that organizations are composed of technical and social subsystems, which can influence one another and collectively shape how organizations function (Trist and Bamforth 1951). With the increasing application of digital technologies in organizations, STS provides a valuable theoretical lens for examining emerging digital systems, particularly the interactions between technical and social subsystems and their outcomes (Knox 2024; Pan and Froese 2023).

This study contributes to the existing literature in several ways. First, it advances the HIWS literature by providing insights into the development and implementation of HIWSs in the digital era and by revealing the relationship between digital HRM and HIWSs. We argue that the EX-oriented digital HRM system strengthens two key dimensions of HIWSs: technological empowerment and organizational involvement. The EX-oriented digital HRM arguably offers a form of technological empowerment for employees in their jobs, for example, by efficiently executing HR activities, encouraging self-management and team collaboration, and allowing better access to personalized learning and development opportunities. Moreover, through user experience (UX) design, EX-oriented digital HRM encourages EI in product design and development, as well as in some aspects of organizational management (such as HR policies and practices).

Second, this study extends the STS framework (Bostrom and Heinen 1977) into the field of digital HRM and explores its socio-technical dimensions, including goals, tasks, structures, actors, and the technical aspects of digital HRM systems. We argue that goals are the strategic core of the STS framework and essential for balancing and integrating the technical and social subsystems. Rather than merely focusing on digital technology, we place greater emphasis on UX design in product development as a key technical element of the digital HRM system. We emphasize the role of employees as key actors in digital HRM, a perspective often overlooked in previous research, which has predominantly focused on HR staff, IT staff, and managers (Yalenios and d'Armagnac 2023; Zhou et al. 2022). Moreover, we illustrate how these dimensions—goals, tasks, structures, actors, and technical aspects—interact dynamically within the digital HRM system to promote EX and EI.

Third, this study has significant implications for the literature on digital HRM and EX by illustrating how EX can be managed in digital HRM. We integrate design thinking perspectives into digital HRM rather than focusing solely on the application of digital technology. We argue that by incorporating UX design thinking and methods into management practices, organizations can improve EX in digital HRM. In our case study, UX design served as a pivotal link between the technical and social subsystems within the organization, promoting socio-technical development in management practices.

Fourth, this study enriches the methodological landscape of HIWS research, which has largely been confined to conceptual

and quantitative approaches. Using qualitative methods, this study provides deeper insights into the "how" of the relationship among digital HRM, EX, and HIWSs.

2 | Literature Review

2.1 | HIWS, STS, and Digital Technologies

HIWSs involve a set of HRM practices aimed at enhancing EI and providing employees with opportunities to influence job-related decision-making (Boxall and Huo 2022; Boxall and Winterton 2018; Lawler 1992; Wood 2020). According to Wood (2020), high involvement practices entail two key dimensions. The first is *role involvement*, or "empowerment," which is said to maximize employee autonomy and responsibility in job design. The second is *organizational involvement*, which encourages employee involvement in some areas of decision-making and collaboration beyond the traditional narrow confines of their roles, through practices such as team working, idea-capturing schemes, information sharing, and selection and training for involvement (Wood 2020; Wood and Ogbonnaya 2018). As Lawler (1992) suggests, HIWSs can arguably create a climate in which workers feel involved in decisions that affect their work, receive relevant information, have opportunities to voice concerns, earn rewards that reflect their contributions, and access the training and development they want.

Worker involvement practices are extensively discussed in STS theory (Boxall and Winterton 2018; Guest et al. 2022). STS was originally developed at the Tavistock Institute of Human Relations in London in the 1950s; it encouraged greater involvement through autonomous or semi-autonomous work groups (Trist and Bamforth 1951). The ideas of the STS school were consolidated in the "Quality of Working Life" initiative in the 1970s (Redman and Wilkinson 2001). By the 1980s, the agenda for workers' involvement had become driven by business interests under the term EI. The core feature of EI is management-initiated and stresses direct communication with employees with the hope of improving employees' motivation, satisfaction, and commitment (Redman and Wilkinson 2001). Employee involvement as a key element of work design has since spread, to varying degrees, to most industrialized countries (Guest et al. 2022).

According to STS theory, organizations consist of two independent yet linked subsystems: the technical subsystem and the social subsystem. The technical subsystem covers technologies, equipment, and processes that support work practices, while the social subsystem mainly focuses on people, their involvement, and their relationships within the organization. The primary focus of STS theory is the joint optimization of an organization's social and technical elements (Guest 2022). It emphasizes worker autonomy, choice, and involvement, recognizing employees as more than mere extensions of machinery (Guest et al. 2022). In other words, prioritizing technological elements and neglecting social elements when new work systems are implemented can lead to reduced productivity and lower job satisfaction (Knight and Parker 2021; Knox 2024). Employees are therefore seen as valuable contributors, and organizations are encouraged to empower them by allowing them to have greater influence over their work and production processes (Lawler 1992). However, the concept of joint optimization has been criticized as overly broad and oversimplified, and the way that social and technical subsystems interact remains unclear (Guest 2022).

With the emergence of digital technologies, an increasing number of studies have applied STS theory to analyze their implications for work design, processes, and systems (e.g., Guest et al. 2022; Parent-Rocheleau and Parker 2022; Parker and Grote 2022; Winby and Mohrman 2018). For example, Winby and Mohrman (2018) propose the term "digital socio-technical systems design," which suggests two key elements: first, the integration of digital technology design with the social system; and second, multi-stakeholder participation. Similarly, Parent-Rocheleau and Parker (2022) suggest that there should be three core aspects of human influence when applying algorithms to job design: first, providing employees with a voice in the system; second, giving employees the option to opt out of the system; and finally, enabling employees to provide input or contribute to the system. These interpretations tend to emphasize the importance of seeking input and involvement from employees and other stakeholders. However, as Guest et al. (2022) point out, existing studies primarily focus on applying STS to analyze the impact of digital technologies on production or work processes, and there has been little attention to the digitalization of management practices, such as digital HRM. Moreover, although recent studies have examined the impact of HIWSs on organizations' digitalization processes (Nguyen, Malik, et al. 2024; Nguyen, Pontes, et al. 2024), the question of whether and how digital applications in HRM practices affect HIWSs remains underexplored. Therefore, in this article, we apply STS theory to examine the relationship between digital HRM and HIWSs.

2.2 | Digital HRM Systems as Socio-Technical Systems

The application of digital technologies in HRM practices has increased considerably in recent years (Budhwar et al. 2022), including the use of artificial intelligence (AI) in employee recruitment (Pan et al. 2021), HR analytics for managerial decision-making (McCartney and Fu 2024), and robotics and virtualization technologies in training and development (Vrontis et al. 2021). A digital HRM system can arguably be seen as a socio-technical system, as it reflects the socio-technical outcomes of using digital technologies for HRM purposes (Meijerink et al. 2021; Strohmeier 2020).

Beyond the concept of joint optimization, we draw on the STS model proposed by Bostrom and Heinen (1977) to better capture the interaction between technical and social elements within a digital HRM system. It is suggested that an organizational work system comprises four interacting and coordinating dimensions: tasks, structures, technology, and actors (Leavitt 1965). A social subsystem comprises structures and actors, while a technical subsystem consists of technology and tasks (Bostrom and Heinen 1977). These four dimensions are interdependent and provide a framework for analyzing how the social and technical aspects of a system interact (see Figure 1). *Task* refers to the specific activities or work processes required to achieve the system's goals and objectives (Lyytinen and Newman 2008). It

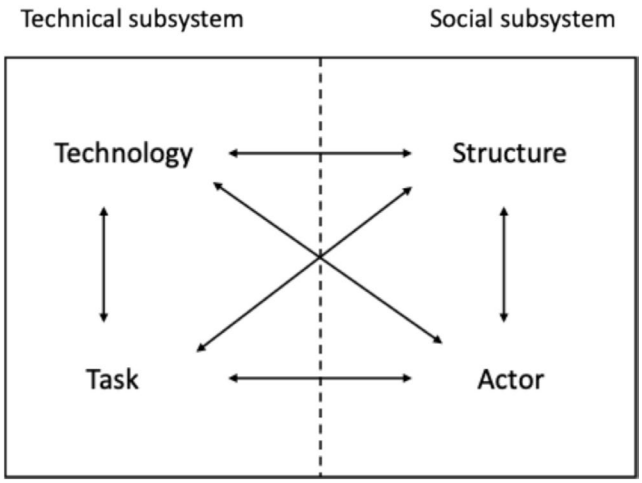

FIGURE 1 | STS model. *Source:* Bostrom and Heinen (1977, 25).

describes what work is done and how it is carried out within a digital HRM system. Although Bostrom and Heinen (1977) suggested that tasks typically align with the goals and objectives of the work system, the strategic role of goals is not explicitly reflected in their model.

Structure involves the formal and informal arrangements of the system, including roles, hierarchies, rules, and communication patterns. It describes how people are organized and how authority, decision-making, and accountability are distributed within the system. In a digital HRM system, this dimension helps clarify the distribution of roles and responsibilities. *Technical* aspects encompass all elements that build an organization's technical core, including hardware, software, equipment, and technical processes that support organizational goals and facilitate work within the system. In a digital HRM system, these aspects include digital technologies, digital products, or tools, and relevant technical or design approaches. Existing literature on digital HRM mainly focuses on the application of digital technologies and their impact (e.g., Pan et al. 2021; Vrontis et al. 2021), but few studies examine the technical processes and approaches used, such as product design and development. *Actors* are individuals or groups who carry out or influence work within the system, including employees, managers, and other stakeholders. This dimension emphasizes the skills, needs, motivations, and social interactions of people working within the system. HR and IT staff are typically recognized as key actors in a digital HRM system (Yalenios and d'Armagnac 2023; Zhou et al. 2022); however, the role played by employees has so far received little attention. Furthermore, the current literature remains unclear about how these dimensions interact within a digital HRM system and to what extent and in what ways they promote EI.

2.3 | Digital HRM, EX, and EI

Existing research suggests that digital HRM is primarily implemented in organizations to enhance efficiency, reduce costs, and standardize management practices (Bondarouk et al. 2017; Parry and Tyson 2011). Meanwhile, recent research indicates an increased emphasis on EX in digital HRM practices. For example, some IT companies are said to place great emphasis on improving EX in their digital HR applications to support and attempt to motivate employees (Malik et al. 2021; Malik, Budhwar et al. 2022; Malik, Budhwar, et al. 2023).

The term EX was coined by Abhari et al. (2008) and was originally built on the concept of customer experience management. In recent years, it has been applied to HRM. In this perspective, employees are viewed as internal customers, and organizations are said to motivate them by providing services and value. Morgan (2017, 8) defined EX as "the intersection of employee expectations, needs, and wants and the organizational design of those expectations, needs and wants." Plaskoff (2017, 137) defined EX as "the employee's holistic perceptions of the relationship with his/her employing organization derived from all the encounters at touchpoints along the employee's journey." EX has been applied in the HRM literature to examine specific HR practices, such as performance appraisal (Farndale and Kelliher 2013) and flexible work arrangements (Chen and Fulmer 2018).

In the context of digital HRM, EX is defined as "continuous, non-deliberate, spontaneous, and real-time employee reactions and responses to diverse stimuli from the AI-assisted HRM applications" (Malik, Budhwar, et al. 2023, 99). Malik, Nguyen, and Budhwar (2022) argue that AI applications in HRM practices deliver high levels of personalized, hyper-personalized, and individualized EX, as well as improving HR effectiveness for organizations. Dutta et al. (2023) argue that the communicative and interactional nature of AI chatbots offers personalized EX. Similarly, Malik et al. (2021) suggest that AI-enabled talent management applications not only enable talent-focused knowledge sharing but also improve individual experiences within multinational enterprises. Moreover, it is argued that as recipients of personalized experiences, employees can experience a form of "empowerment" (Prikshat, Malik, and Budhwar 2023) and develop greater commitment and engagement with the organization (Dutta et al. 2023; Malik, Budhwar, et al. 2023). These studies mainly examine the impact of digital HR applications on EX and argue that EX is the "missing link" between digital HRM and these employee outcomes. However, the relationship between EX and EI, as well as how EX is managed within digital HRM, remains relatively underexplored.

Arguably, since employees are the end-users of digital products (Malik, Budhwar, and Kazmi 2023), UX can be considered an important part of EX in digital HRM. UX design encompasses the interaction between users and products or services and plays a critical role across multiple stages of product development, from initial design to everyday use (Jang and Han 2022). Managing UX is argued to help reduce the gap between designers' intentions and users' perspectives and experiences, thereby enhancing users' acceptance and motivation to use the products (Jang and Han 2022). Furthermore, Gruber et al. (2015) suggest that applying UX-based design principles to management practices can yield potential benefits, including improvements in internal processes and the enhancement of EX.

In addition, UX-based design thinking entails the involvement of users in the product development process (Bissola 2020;

Brown 2008). Employees can not only respond to digital applications but also become involved in promoting digital HRM, for example, by contributing to product development by leveraging their knowledge and skills (Malik, Budhwar, and Kazmi 2023; Malik, Budhwar, et al. 2023). In particular, IT sector employees can actively contribute as co-designers and co-creators by participating in product design and development through consultation and collaboration (Gruber et al. 2015). As Schweisfurth and Herstatt (2016) suggest, when employees, as "embedded users," take part in product design and development, they not only bring their own perspectives but also contribute to shaping problem solutions and product innovation. Moreover, employees are more likely to co-create the value of HRM when they are involved in the co-design and collaborative use of digital HR tools (Hewett and Shantz 2021). It can be argued, therefore, that managing and improving UX can not only improve EX but also serve as a channel for EI.

3 | Research Methods

3.1 | Research Design

Given the limited extant knowledge regarding the development and implementation of HIWSs in the digital era, this study attempts to address this gap through qualitative, case-based research. A qualitative case study offers an exploratory approach not only to gain deep insights into a new phenomenon but also to capture and understand the social and organizational contexts of the ongoing phenomenon (Yin 2018). Moreover, a case study is particularly valuable for addressing "how" questions about a contemporary phenomenon in a real-life context. We applied a single-case design due to its capacity for in-depth investigation. A single case study enables us to immerse ourselves deeply in the research context, collect rich data from multiple sources, and gain in-depth insights into one particular research setting. A single case study is also well suited to examining complex organizational processes and phenomena at a fine-grained level (Ozcan et al. 2017).

3.2 | Case Selection and Case Profile

The case selection in this study was based on theoretical and purposive logics (Emmel 2013). Empirical studies have suggested that higher levels of EI are more likely to be found in industries with relatively advanced computer technologies (Boxall et al. 2019; Eurofound 2013). Moreover, some major technological giants, considered as "born digitals" (Monaghan et al. 2020), have taken the lead in the digitalization of HRM by developing their own digital products for HRM practices (Cheng and Hackett 2021). Tencent, one of China's largest IT companies, was selected as the case company. According to Forbes' (2022) annual ranking, Tencent, founded in China in 1998, was one of the world's top five tech companies in 2022. Over the past two decades, Tencent has cultivated an extensive portfolio of products and diversified services tailored to both individual consumers and businesses. Tencent offers a feasible and suitable setting for our research aims, as it provides access that enables us to gain insights into the studied phenomena that other organizations would not (Siggelkow 2007).

More importantly, Tencent represents a "critical" case (Yin 2018, 49), as the main themes and the phenomena of interest in this study are strongly evident. This case can also "... represent a significant contribution to knowledge and theory building" (Yin 2018, 49). First, as a leading Chinese IT company with more than 100,000 employees, Tencent is a pioneer in using digital technologies and products in its HRM practices. According to Tencent's internal report, by 2022 the company had developed more than 150 digital HR products covering all major HRM functional areas, including recruitment and selection, performance management, training and development, employee benefits, and employee well-being. Second, Tencent exhibits distinctive characteristics in digital HRM, as it claims to emphasize EX and place significant importance on EI.

3.3 | Data Collection

Data from multiple sources were collected in this case study. Primary data were obtained from 30 qualitative interviews with employees at the case company (for interviewees' profiles, see Table 1). In 2022, we conducted semi-structured interviews with eight managers and eight staff members in the HR department. The interview participants were selected following theoretical and purposive logics (Emmel 2013). The participants acted as key informants for our research as they were involved not only in daily HR operational activities but also in the digitalization of HRM. They participated in the development of various HR products, including HR administrative products, external recruitment products, internal recruitment products, objective and performance management products, training and development products, employee benefits products, well-being products, and HR analytics products. We asked about the digitalization process of HRM, the features of digital HR products, the development methods used, and employee feedback on their experiences with these products. Some illustrative questions included: "What is the design concept behind this product? What are its main features?" "Please elaborate on how your team improved the employee experience throughout the design, development, and promotion of this HR product." "How do employees become involved in promoting digital HRM?" The interviews were between 40 and 90 min in length.

To gain a more comprehensive perspective, we also interviewed staff members from seven business groups within the case company. Due to challenges in recruiting participants, we used snowball sampling. According to Hennink et al. (2017), code saturation can be achieved with as few as nine interviews, while Guest et al. (2006) suggest that most data saturation occurs within the first 12 interviews. These findings align with Namey et al. (2016), who argue that saturation typically occurs between 8 and 16 interviews. In this study, we conducted 14 interviews with staff from business groups to "... develop a comprehensive understanding of explicit and concrete issues in the data" (Hennink et al. 2017, 605). We inquired about their experiences with digital HR products, their

TABLE 1 | Interviewee profile.

Interviewee code	Gender	Job position	Interview length (min)
Interviewees from the case company			
HR manager 1	Male	Senior manager	62 (1st interview) 89 (2nd interview)
HR manager 2	Male	Team manager, Product management team	89 (joint interview with HR manager 1 and 3)
HR manager 3	Male	Team manager, Solution architecture team	89 (joint interview with HR managers 1 and 2)
HR manager 4	Male	Team manager, R&D team	63
HR manager 5	Male	Team manager, HR ecosystem team	94 (joint interview)
HR manager 6	Female	Team manager, Product solution team	
HR manager 7	Female	Product manager	70
HR staff 1	Female	HR data team	40
HR staff 2	Female	R&D team	46
HR staff 3	Male	Performance management team	46 (joint interview)
HR staff 4	Female	R&D team	
HR manager 8	Female	Team manager, employee well-being team	48 (joint interview)
HR staff 5	Male	Employee well-being team	
HR staff 6	Male	Training and development team	65
HR staff 7	Female	Internal mobility team	40 (joint interview)
HR staff 8	Female	Internal mobility team	
Staff 1	Male	Business group 1	27
Staff 2	Male	Team manager, Business group 1	28
Staff 3	Male	Business group 2	26
Staff 4	Female	Business group 2	20
Staff 5	Male	Team manager, Business group 3	40
Staff 6	Male	Business group 4	24
Staff 7	Female	Business group 5	60
Staff 8	Male	Business group 3	27
Staff 9	Male	Business group 6	25
Staff 10	Female	Team manager, Business group 6	25
Staff 11	Male	Team manager, Business group 7	43
Staff 12	Male	Business group 7	29
Staff 13	Male	Business group 7	24
Staff 14	Male	Team manager, Business group 7	32
Interviewees from other companies			
HR specialist 1	Female	IT company A	32
HR specialist 2	Female	IT company B	29
HR specialist 3	Male	Financial company A	25

(Continues)

TABLE 1 | (Continued)

Interviewee code	Gender	Job position	Interview length (min)
HR specialist 4	Male	Financial company B	20
HR specialist 5	Female	Financial company C	45
HR specialist 6	Female	Financial company D	40

involvement in developing these products, and the impact of digital HRM on their work. The average duration of these interviews was approximately 30 min.

The interview data from the case company were triangulated with additional data sources to increase internal validity (Yin 2018). First, observations were made during fieldwork. We visited the case company and experienced its digital HR products. Second, the interview data were supplemented with survey data collected from 1970 employees across all business groups within the company. Employees were asked about their experiences with HRM policies and practices, and they were given the opportunity to respond to an open-ended question about corporate management. Third, we interviewed six HR specialists from two other IT companies and four financial companies in China. We inquired about their perspectives and approaches to promoting digital HRM, as well as its impact. This helped corroborate and validate the findings by cross-verifying information obtained from different parties across different companies and sectors. Fourth, secondary data were gathered from both internal and external sources. Internal documents from the case company included business publications and presentations, HRM policies, and research reports. Externally published documents included a wide range of news articles, social media posts, and blogs about the topic and the case company.

All the interviews in this study were conducted in Mandarin and digitally recorded. The first author transcribed and translated the recordings into English, and the second author reviewed the transcripts. Both authors are proficient in Mandarin and English.

3.4 | Data Analysis

All interview transcripts and secondary data were entered into NVivo for data analysis. Data were analyzed using an inductive approach, following the bottom-up method (Braun and Clarke 2021). We used thematic analysis as the main method for identifying, analyzing, and interpreting patterns of meaning ("themes") within qualitative data (Braun and Clarke 2021). Following Braun and Clarke's (2021) analytical procedure, we generated first-order codes and second-order themes and further developed third-order theoretical dimensions. The first phase of data analysis involved familiarizing ourselves with the data. The interview transcripts were reviewed to confirm transcription accuracy and to gain an overview of the data. The second stage involved coding the interview data from HR staff first, and then coding the interview data from staff in business groups. Then, iterations of data analysis were conducted between the raw data and prior literature. After several iterations, the first-order codes were reviewed, compared, and combined into second-order themes. At this stage, we cross-checked data from both HR staff and business group staff and identified 13 second-order themes. After generating the second-order themes, we mapped them onto third-order theoretical dimensions and developed a conceptual framework to identify the links and patterns among the second-order themes. In addition, we discussed emerging results with key participants throughout the research process to validate the findings and ensure theoretical saturation. Finally, we created a data structure that presents the first-order codes, second-order themes, and third-order theoretical dimensions (see Appendix A).

4 | Findings

Drawing on the STS model by Bostrom and Heinen (1977), we examine the goal, task, structure, actors, and technical aspects of the digital HRM system in the case company and investigate how these elements interact and contribute to the development of HIWSs.

4.1 | Goal: EX-Orientation in Digital HRM

Our findings suggest that digital HRM in the case company is oriented towards enhancing EX. A senior HR manager claimed that employees are seen as users of HR services and are the most valuable resource at Tencent. Staff in the HR department stated that the aims of HRM digitalization are to provide employees with a better experience, enhanced support, and improved services. In 2012, Tencent introduced a set of external e-HRM tools, but they were not well received by staff because they failed to meet employees' needs or support their daily work. Therefore, the HR department decided to design and develop its own digital HR products. While Tencent has cutting-edge technology and extensive expertise in product development, according to Tencent's HR managers, its digitalization of HRM is not solely driven by technological advancements. Instead, they stated that its primary focus is on supporting employees and improving their overall experience.

> The rapid development of digital technology and our technological capabilities are not the main reasons that we promote the digitalization of HRM. We want to serve and support staff, which motivates us to provide suitable technologies and develop products for our employees. (HR manager 1)

> When other companies are undergoing digital transformation, they often involve significant changes and management interventions to alter work habits

> and processes. We don't require major changes to employees' work habits. We try to support them and improve the employee experience. (HR manager 3)

This is not necessarily the case in other IT companies, which develop products that are not always designed to address internal needs or enhance EX. An HR specialist from another leading IT company in China stated that their HR products were primarily aimed at external users for business profit, rather than catering to internal needs.

> In our company, they want to pursue commercialization (through digital HR products), which consumes a lot of resources. External needs are prioritized, and internal needs cannot be fulfilled due to a lack of resources. (HR specialist 1, IT company A)

By contrast, Tencent chose not to prioritize external commercialization, and its digital HR products are more internally oriented and designed for internal users. An HR manager stated:

> At present, Tencent has not chosen to pursue significant commercial development in digital HRM. Our primary responsibility is not to meet external needs; our focus is on internal functions and needs. I think this is a strategic choice of Tencent. (HR manager 7)

More importantly, HR managers claimed that in relation to Tencent's HR products, they aim to enhance EX and address their employees' needs, rather than solely focusing on management needs.

> Our digital HRM system prioritizes EX over management needs. We emphasize employee autonomy and involvement, and we focus on their needs and perspectives when providing digital tools. Unlike other companies that prioritize managerial goals and control, our approach focuses on what employees need in various scenarios. (HR staff 2)

> At Tencent, all the products for the external market are based on user needs and user experience, whilst all the products for internal use are employee-centered, focusing on employee needs and employee experience. (HR manager 6)

This perspective is also supported by staff in business groups.

> Although the HR department is traditionally viewed as an internal managerial unit, at Tencent, its focus is not just on serving leaders and managers, but also on employees. When they provide internal services or interact with employees, their goal is to deliver a superior experience. (Staff 2, Business group 1)

By contrast, interview data from financial companies suggest that their digital tools primarily aim to meet managerial requirements, such as enhancing managerial efficiency and promoting standardized management.

> With rapid business growth, the original HR methods can no longer meet development needs, necessitating a digital upgrade to improve HR efficiency. Additionally, our CHO (Chief Human Resources Officer) stated that the digital application of HR will better control subsidiaries through standardized management. (HR specialist 3, Financial company A)

4.2 | Task: Fulfilling HR Functions Through Digital Products

Tencent HR managers stated that, in the digital era, products can serve as a bridge between traditional HR functions and enhanced HR services. With the goal of improving EX, the main task in Tencent's digital HRM system is to develop and utilize digital products that fulfill HR functions and optimize HR operations.

> We want to develop a suite of mature products that go beyond being mere auxiliary tools. Instead, these products will take the lead in delivering HR services and an outstanding EX while effectively addressing operational needs, with human input supporting the process. (HR manager 1)

By 2022, the HR department had designed and developed more than 150 digital HR products. These products cover all HR functions and modules (see Table 2) and provide touchpoints throughout the end-to-end employee journey, from recruitment, promotion, and development to exit or retirement.

These digital HR products help implement HR policies and support managerial processes such as recruitment and performance management.

> No HR team can operate independently without products now. We rely on a set of products to support the implementation of policies, systems, and processes. (HR manager 7)

However, rather than rigidly following managerial procedures, these products are designed to address individual needs and adapt to diverse scenarios in order to improve EX. To achieve this, they need to be both flexible and comprehensive, as different challenges or needs can arise for different types of users in a variety of contexts. Recruitment products are a good example.

> The basic task of recruitment products may seem like simply implementing the recruitment process, but in fact, what we focus more on is understanding what

TABLE 2 | Digital HR products in the case company.

HR tools/products	Characteristics
HR administrative tools (HR assistant)	• One-stop self-service for HR administrative activities • Real-time access to personal and organizational information
External recruitment platforms	• Self-service for the recruitment procedure • Automated talent selection and identification
Internal recruitment tool (Flowing water platform)	• Aligned with internal mobility policy • Protect staff privacy
Objective and performance management (Objectives and Key Results tools)	• Goal setting and alignment • Progress tracking • Co-involvement in objective management
HR analytics tools (Talent PivotTable)	• People analytics • Comprehensive staff profile
Training and learning platforms (Qlearning)	• Various resources (internal and external) • Interactive platform with user-generated content • Personalized and customized training and learning resources
Employee benefits and well-being platforms	• Various well-being programs, covering physical, psychological, and financial aspects • Tailored services for specific employee groups (e.g., mothers, interns)

> users need and the scenarios they are in. Because the recruitment targets, applicants, and channels are highly diverse, we need to break down the relevant scenarios and analyze user needs.

In addition to adapting to various scenarios, these digital HR products are designed for dynamic work relationships. The HR department claimed that HR products not only follow management processes but also aim to improve EX in daily interactions with colleagues, managers, and HR staff. It is said to prioritize integrating digital technologies into evolving work relationships rather than restricting them to traditional procedures.

> The logic of HR products is complicated, as it is based on dynamic work relationships, not on linear managerial procedures. (HR manager 1)

4.3 | Structure: Three Pillars of HR and Openness

In most companies, IT teams are responsible for developing HR products and are typically separate from the HR department. In such cases, IT teams often struggle to fully understand the needs of HR and employees, while HR teams may lack the technical expertise to effectively communicate their needs, leading to a disconnect between the two. However, at Tencent, the HRM department is structured according to Ulrich three-pillar model (1997), comprising three key teams: the Centre of Expertise (COE), the Shared Delivery Centre (SDC), and Human Resources Business Partners (HRBP). Each team plays a distinct role within the digital HRM system. The COE team is responsible for formulating HR strategies, policies, and procedures. The team also oversees core HR functions and projects, including recruitment, training and development, and compensation and benefits. Additionally, they draft HR product plans to support the development and implementation of HR policies and procedures. Building on these product plans, the SDC team develops digital products and platforms to deliver tailored digital solutions. Meanwhile, HRBP teams act as strategic partners within different business groups and build relationships with them. Through ongoing communication, they gather feedback, identify business needs, and serve as HR advisors, guiding business groups in effectively utilizing HR products. Together, these three teams collaborate closely to drive the development of digital HR products.

> As designers of digital product systems, we maintain a close relationship with both the COE and HRBP teams. First, we have channels to identify their needs, and then we work together to transform those needs into actionable plans and implement them. (HR manager 7)

Furthermore, openness is a key feature of the case company's digital HRM system. Although the HR department itself is responsible for developing its own HR products, it actively seeks interdepartmental communication, as the company encourages breaking down departmental silos and promotes cross-boundary collaboration. As one HR manager commented,

> Every member, whether a product manager or project leader, can decide who to consult and seek out conversations, often across different domains. These cross-functional conversations didn't offer similar perspectives or repetitive feedback; they truly sparked new ideas and inspiration. For example, I found it valuable to have conversations

> with staff from the gaming department. (HR manager 1)

Additionally, the HR department encourages input from staff across departments. At the organizational level, Tencent has established Oteams (short for Open-Source Collaborative Teams) to foster knowledge sharing and learning across teams. Oteams promote the open sharing of reusable capabilities between departments. The HRM department actively participates in Oteams to enhance its technological and product development capabilities.

4.4 | Technical Aspects: UX Design and Open-Source Technological Support

The digital HRM system at Tencent highlights two key technical elements: UX design in product development and open-source technological support. Tencent HR has established a comprehensive product development process encompassing design, development, testing, implementation, and iteration. Notably, UX design, a user-centered design approach, plays a pivotal role in the process. Tencent places significant emphasis on enhancing UX in products targeted at external markets, and this approach extends to deeply influencing the design of its internal digital HR products.

> At Tencent, all the products are based on UX design thinking. We [HR staff] apply it to HR products as well, to improve EX. Such design is integrated into every detail of our HR products. (HR manager 7)

UX design aims to ensure that the product aligns with user needs, preferences, and expectations, with the hope of achieving higher satisfaction and adoption rates. To achieve this, user involvement is central to this design approach and has been seen as a "must-do" at Tencent. *User involvement* means integrating users into the digital HRM system through various methods at different stages of HR product development, such as one-on-one interviews, focus groups, surveys, and usability tests. All HR staff at Tencent are required to attend training sessions to learn the principles and methods of user involvement.

> Every Tencent employee attends a course called 'User involvement' as their first lesson upon joining, including HR in the COE teams. Before we introduce any policy or system, we conduct user involvement methods and user opinion surveys. At every critical stage—from ideation to development, initial demos, and final launch—we actively seek user feedback on their perceptions and suggestions for optimization. This is extremely important. Moreover, user satisfaction ratings and word-of-mouth scores are key factors in determining whether a product is successful. (HR staff 2)

UX design is embedded throughout the entire product development process. By adopting a UX-driven approach, HR teams gain deeper insights into users' needs and identify pain points, allowing them to integrate these needs into product design and continuously refine the product through iteration to address problems. As a result, the product development process evolves with active user involvement.

> We analyze the issues raised by users. If the issue requires immediate system changes, we will continuously refine the system. If the issue involves modifying rules, we will improve the rules based on different scenarios and strategic priorities. Throughout this process, it is an ongoing iteration, so when issues arise, everyone just needs to solve them. (HR manager 7)

Moreover, HR staff employed different UX design methods depending on the target users and product scenarios. For products aimed at a broad spectrum of employees, HR staff conducted surveys to gather feedback. For products designed for team managers within business groups, HR staff usually conducted one-on-one interviews with both managers and team members to gain an in-depth understanding of their needs as well as the norms and procedures of their departments or teams. The HR team even conducted informal interviews with potential candidates to gather feedback on their experiences with the online recruitment tools. In addition, HR teams actively incorporated their own experiences as participants into the product design process. For example, based on their experiences at the graduate job fair, HR staff designed a queuing calling system to match recruiters and applicants more efficiently. As a result, the evolving process, driven by UX design, not only creates user-friendly products but also allows them to adapt to diverse scenarios and dynamic work environments.

> We respond quickly to user feedback, and the SDC team enhances technology and improves the product according to the complexity of business scenarios. Like a Transformer, the product adapts to different business contexts, rapidly shaping functions that meet specific user needs. (HR staff 6)

In addition to UX design, the digital HRM system leverages Tencent's internal open-source technological infrastructure to promote the adoption of advanced technologies and enhance product capabilities. Tencent has been a pioneer in applying these technologies within its HRM system. For example, AI is applied in recruitment to improve talent identification, virtual reality is used in training programs to provide employees with an immersive learning experience, and blockchain technology is used to create digital qualifications throughout the recruitment and training process. Most HR products are built on existing platforms such as WeChat[1] and WeCom.[2] Additionally, Oteams provide technological solutions that drive continuous product improvements. For example, features from Tencent Meeting[3] and Tencent Docs[4] have been integrated into recruitment tools in an attempt to improve the online recruitment experience for applicants. As HR staff commented,

> Working on HR products at Tencent relies on a highly open, supportive, and collaborative environment. We can take advantage of Tencent's technological platform, including real-time APIs, AI, and cloud services. This is one of the key differences that sets our digital HRM apart. (HR staff 2)

> When we are building our technology roadmaps and seeking technological solutions, we rely on our internal open-source technological cooperation. Oteams are just like an open-source platform with various interfaces, and we can assemble or connect the technological components to develop our products. (HR manager 4)

4.5 | Actors: "Employees are our users"

In Tencent's digital HRM system, key actors include not only HR personnel from the three teams (COE, SDC, and HRBP) collaborating to develop HR products, but also employees from various business groups. This differs from other companies, where HR and IT teams are usually the primary actors, while employees from business groups often have little involvement. As an HR staff member from a financial company noted,

> These digital HR tools are mainly designed for our HR team itself. Employees are just passive recipients. We rarely communicate with them about how to use them, nor do we need to. (HR specialist 4, Financial company B)

In contrast, at Tencent, employees are seen as important "users" of digital HR products.

> Employees are our users, and we really care about our employees and their experience. For example, whether they use products well or not and whether they use products happily or not are very important for us. (HR manager 3)

In this sense, Tencent employees are important actors and play an active role in digital HRM, rather than being passive recipients or outsiders. The UX design approach and the openness of the digital HRM system enable Tencent employees to become involved in the development and optimization of digital HR products, as we discuss in section 4.6.2.

At Tencent, the actor dimension emphasizes the awareness and skills of HR staff, as well as the knowledge that employees can bring to the digital HRM system. HR staff recognize the importance of enhancing EX through digitalization and receive proper training in UX design. Meanwhile, employees from business groups possess sufficient knowledge to embrace digitalization and are more willing to contribute their expertise to its development.

> Tencent excels at developing products; its HR products are generally of a high standard. They are continuously iterating and optimizing the products. We can see that products are constantly evolving, bringing added value and an enhanced user experience. (Staff 2, Business group 1)

> We are IT engineers ourselves; if the products are not working well, we will immediately reach out to give feedback and quickly point out a better way to do it. (Staff 10, Business group 6)

4.6 | Contributing to HIWSs

Our interview data suggest that Tencent's digital HR products offer a positive EX. First, these HR products are noted for their user-friendly design, practical utility, and continuing optimisation:

> It's like 'use and go'; most of the tools are quite user-friendly! They save a lot of my time. When using them, I primarily operate on my phone, and everything feels smooth and efficient. It allows me to focus more on my business, and (HR) tasks like these can be quickly sorted out. (Staff 11, Business group 7)

> As users, we can feel that HR products are continuously being updated and optimized, providing new features and value points. This iteration and optimization enhance the user experience. (Staff 2, Business group 1)

Second, from the HRM perspective, these products help improve EX in executing HR activities, fulfilling HR tasks, and supporting their work. The following quotations provide some examples:

> HR products are not only related to HR policy support, but also our benefits. They meet work-related needs, personal growth needs, and lifestyle needs. (Staff 7, Business group 5)

> These products are not like some cold-hearted tools for us, or something that companies impose on us. I feel that these products are truly supporting us, not only in our work but also in our lives. (Staff 10, Business group 6)

Furthermore, our findings suggest that Tencent's EX-oriented digital HRM system contributes to two dimensions of HIWSs, namely technological empowerment and organizational involvement.

4.6.1 | Technological Empowerment for Employees

By integrating advanced digital technologies with UX-driven product design, Tencent's digital HR products arguably empower employees to exercise autonomy across various aspects of their

work life, including the efficient execution of HR activities, self-management, autonomous collaboration, and personalized, individualized learning and development opportunities.

First, digital HR products provide self-service portals that allow employees to handle HR activities more efficiently. Using digital products on computers or mobile phones, employees can access real-time information about company policies and news. These products also enable employees to manage their own HR-related tasks, such as updating personal information, managing absences, and conducting interviews with candidates, all without requiring manual assistance from HR staff. This not only reduces the HR department's administrative burden but also gives employees more autonomy over their HR-related tasks. The following quotations illustrate employees' experience using the HR assistant and recruitment tools:

> I previously worked in the media industry, where we lacked a dedicated HR product to streamline the recruitment process. Whenever we faced queries about recruitment procedures, we had to reach out to the HR team, which led to time delays and understaffing challenges for the HR department. By contrast, at Tencent, the system provides straightforward tips, and we just follow it, making it user-friendly, convenient, and efficient. (Staff 10, Business group 6)

> This reduces the workload of the HR team, allowing us to independently complete some tasks through self-service. For example, in recruitment, I don't necessarily rely only on the resumés provided by HR. I also regularly check online resumé databases based on my own habits and needs. It is very useful for us. (Staff 2, Business group 1)

With the advent of big data and AI, the execution of HR activities becomes more intelligent and arguably more convenient for employees. For example, recruitment tools can automatically select and identify relevant resumés for team managers in business departments, aligning with their specific skill requirements. In doing so, this saves employees time, allowing them to focus more on their core work and non-routine tasks.

> I can quickly filter out suitable candidates for the first-round interview using certain tags on the platform. Then the recruitment tools seamlessly notify candidates and automatically arrange interview appointments. So it allows us to focus our efforts on the professional aspects of the selection process. (Staff 8, Business group 3)

Second, digital HR products empower employees to engage in self-management. For example, objective and performance management products such as OKRs (Objectives and Key Results) allow employees to set, track, and review their goals, receive feedback, and assess their own performance, which arguably encourages self-reflection and continuous self-improvement. Moreover, OKR tools encourage employees to articulate and align their goals with relevant colleagues, even across different departments involved in a project. This promotes effective communication, coordination, and teamwork, empowering employees to share ideas and collaborate on various projects.

> After establishing and setting goals, individuals need to take initiative in various aspects, including self-directed learning, self-organization, and independently identifying and addressing issues. This also involves identifying causes, seeking feedback from colleagues, and initiating self-improvement. Otherwise, relying solely on manual reminders can easily lead to deviations, especially when managing a large team. (Staff 5, Business group 3)

> Within the OKR tools, you can list your own objectives and share them with those you deem appropriate, such as your superiors, peers, collaborators, or subordinates. Throughout this process, everyone's input and collaborative efforts can be displayed. (Staff 2, Business group 1)

Similarly, the learning and training platform—Qlearning, built on big data and AI, provides employees with a wide range of training materials, courses, and resources from both internal and external sources. Employees can voluntarily apply to become "tutors," creating and uploading videos, as well as organizing speeches, seminars, and workshops on the platform to share their own experiences and expertise. Moreover, instead of being a one-way delivery system, Qlearning functions as an interactive knowledge-sharing platform, where employees can freely connect, communicate, and share with others. This not only facilitates the acquisition of diverse skills and knowledge crucial for their jobs but also lays the groundwork for collaborative opportunities and cross-departmental activities within the organization. Using this platform, employees can coordinate their work and learn from and collaborate with others, without hierarchical direction.

> Tencent, with approximately 100,000 employees, has diverse business departments. While I work in the cloud department and you in the gaming department, the chances of our paths crossing in daily work routines are minimal. However, if I come across a course on Qlearning that's relevant to my project, I can directly reach out to the tutor on the platform to discuss potential collaboration possibilities. (Staff 8, Business group 3)

> I personally benefited from my experience with Qlearning as it allowed me to connect with colleagues from various business departments. Through these connections, trust was established, enabling faster collaboration when opportunities arose. This experience has expanded my network and facilitated the swift development of collaborative relationships. (Staff 5, Business group 3)

Third, digital HR products arguably empower employees to the extent that they provide personalized and individualized learning and well-being initiatives. Employees can take charge of their own professional training and development by selecting relevant courses and acquiring new skills through the Qlearning platform, which automatically and dynamically adjusts and recommends relevant resources based on their individual needs and preferences. Moreover, thanks to the flowing water program—an internal recruitment tool—employees can apply for internal positions, allowing them to pursue varied career development opportunities.

> Upon joining Tencent, my role initially focused on marketing. However, my interest in the gaming industry led me to dedicate time to studying it. I discovered an opportunity on the flowing water platform and subsequently joined a gaming department. Now, I can combine my marketing expertise with my passion for the current job, which enhances my skills over the long term. (Staff 3, Business group 2)

Importantly, the flowing water platform (created in 2012) encourages free, autonomous, and voluntary internal mobility for employees. This feature has been especially valuable during organizational restructuring; instead of being passively transferred, employees can apply for other positions within the organization. Following some restructuring, one employee successfully applied twice for internal posts through the flowing water program. She commented:

> I took proactive action instead of being transferred passively. I searched all the posts I was interested in and then just clicked 'apply'. In the process, I had a better understanding of the business and the teams. (Staff 4, Business group 2)

In addition to personalized learning and development, employees can access a range of individualized well-being programs that cover physical, psychological, and financial aspects. By understanding employees' needs, these products incorporate various scenarios that encompass different facets of work and life from employees' perspectives. For example, one of the most popular well-being products is "penguin community," where employees can easily select the well-being programs they need on their mobile phone, such as family insurance, medical examinations, holiday packages, and housing finance plans. Furthermore, specific product sets are crafted for targeted groups. For example, "mum helper" is designed for pregnant staff, and not only provides access to relevant information and policies concerning pregnancy and maternity leave, but also establishes a platform for communication and information sharing among mothers. "Intern helper" supports interns in navigating various challenges they may face during their internship, including work, accommodation, and benefits. This approach arguably helps employees feel acknowledged and recognized, regardless of their life stage. One HR staff member stated:

> Through these products, we provide comprehensive information and foster community interaction around the different phases of an employee's journey, so that they feel genuinely cared for. (HR staff 5)

4.6.2 | Organizational Involvement in Digital HRM

By incorporating UX design, employees, recognized as key users, become actively involved within the digital HRM system. First, some aspects of employee voice can be heard in the digital HRM system. Based on UX design principles, the HR department established an internal user involvement program called "voice program," which collects employee feedback throughout the entire product development process. During the ideation and design stage, HR staff interview employees to understand their needs and expectations for the products. Before a product's launch, a group of employees is invited to test, helping identify potential issues. After the launch, HR teams regularly gather feedback and conduct surveys to assess employee preferences. During product upgrades, certain employees, particularly frequent users, are chosen to test new versions and provide feedback. The HR staff in the employee benefits and well-being team strongly emphasized their commitment to valuing and integrating employee voice, as their products are specifically designed for employees.

> We asked for employees' opinions, feedback, and suggestions on our products. We even used their feedback or scores to decide whether a product was successful or not. Employee voice is very, very important. (HR manager 8)

Employees also appreciate opportunities to share their input.

> I find them (HR teams) quite proactive in seeking out and addressing HR product-related issues, such as compensation, benefits, and recruitment. Since joining Tencent, I've noticed that most of the interviews I have had were with HR teams. (Staff 9, Business group 6)

Second, employees can actively and directly participate in both product design and technology application, taking on the role of co-designers and co-creators of the digital HRM system. To encourage co-creation, the HR department set up a project called "Experience Officers." Through this initiative, employees voluntarily join HR product teams and contribute to product development—a move partly inspired by the example set by Oteams. In this program, employees are given tasks or presented with HR product scenarios, where they share their expectations and insights on HR products. They can also propose ideas based on their own preferences. In most cases, Experience Officers are product managers or IT engineers from business groups, and they often incorporate their extensive knowledge, expertise, and even technical skills into the ideation and development of HR products, contributing valuable and innovative ideas.

> The approach (for co-creation) can be quite straightforward, ranging from hand-drawing to verbal descriptions, and some (employees) may even create demos. Essentially, this process becomes a wellspring of inspiration and creativity for our (HR) product team. (HR manager 8)

> During the co-creation phase, we encouraged them to actively participate in the design of the HR product. Moreover, we assessed the proposals they contributed and selected the most creative ones and the most popular ones. (HR manager 6)

Third, employees can become involved in policy improvement by contributing to HR product iteration. The HR team continuously iterated and upgraded HR products by incorporating employee feedback and experiences, ultimately optimizing HR policies. A good example is the flowing water program. To begin with, it did not work very well, and there were very few successful applications for internal mobility. In the early version of the product, when applicants clicked "I want to apply," a prompt box appeared with two buttons, asking applicants to choose whether to inform their current line manager. A majority of applicants chose not to inform their current line manager. Their application would then be sent to the interviewer, who would interview the candidates. If the candidates passed the interview, a notification bar would show on the interviewer's system, reminding them that the candidates had not yet informed their current line manager. Only when candidates informed their line manager could the next step in the process proceed. Following employee feedback, the HR team realized that the two-button option and the notification bar were placing too much pressure on applicants. This was because line managers might be less inclined to support employees' requests for internal mobility if they were informed beforehand. In addition, employees often preferred not to disclose their intentions to their current line managers until they received a job offer. Based on this feedback, the two-button option and the notification bar were removed from the online system. Furthermore, the HR department established a new rule that employees would not need to notify their line manager until they had received an offer from another department. To further address employee concerns, the HR team developed a mobile application to eliminate the inconvenience of accessing the internal recruitment website in the office. This solution not only addressed accessibility issues but also enhanced applicants' privacy throughout the recruitment process.

> We are continuously refining the system and modifying rules at the same time. We hear employees' voices through interviews and surveys. It's an ongoing, agile, iterative process where we keep identifying and resolving issues with the system and the policies. (HR staff 7)

As a result, not only has the internal mobility policy been refined, but the flowing water platform has also been optimized, which encouraged more staff to apply for internal positions. From 2012 to 2020, over 60,000 employees applied for internal positions via the platform, with more than 12,000 successfully transferring to internal roles (Tencent 2022). The product also received positive feedback from staff, as one employee stated,

> My own experience (of the flowing water program) was very smooth. The system is well-designed, respects our preferences, and effectively safeguards our privacy. We have the flexibility to transfer after the transition period, ensuring our freedom of mobility within the company. No worries or risks for us. (Staff 4, Business group 2)

5 | Discussion and Conclusion

Based on an in-depth qualitative case study of one of China's largest IT companies, this article explores whether and in what ways the EX-oriented digital HRM system can contribute to the development of HIWSs. Drawing on STS theory, we examine the goal, task, structure, actors, and technical elements of the digital HRM system, as well as the interactions among them (see Figure 2). Tencent claims that the main *goal* of the digital HRM system is to enhance EX. To achieve this, the Tencent HR department has developed a suite of digital products that cover core HR activities to fulfill HR functions and optimize HR operations. These products not only execute managerial processes but also adapt to diverse scenarios and dynamic work relationships. To support these efforts, the HR department is structured into three teams: COE, SDC, and HRBP, each with distinct responsibilities yet working closely to drive digitalization. The openness of the digital HRM system enables the HR department to actively collaborate with teams and employees in business groups to develop and refine HR products.

A distinctive technical feature of Tencent's digital HRM system is its strong focus on UX design, with user involvement at every stage of product development. From design and development to testing, usage, and iteration, the system evolves dynamically with continuous user involvement. Additionally, the digital HRM system leverages the company's internal open-source technological infrastructure to accelerate the adoption of advanced technologies and enhance product capabilities. Key actors in the system include HR staff from the three teams who collaborate on HR product development, as well as employees from business departments. The UX design approach and the openness of the digital HRM system enable employee involvement and allow employees to play a crucial role in shaping and refining the system.

Furthermore, the EX-oriented digital HRM system strengthens two key dimensions of HIWSs: technological empowerment and organizational involvement. First, it arguably provides employees with technological empowerment in their daily work. By integrating digital technologies and emphasizing UX, HR products serve as essential tools for information processing, communication, coordination, and knowledge sharing. More importantly, they enhance employees' experience and autonomy in certain aspects of their work, including the efficient execution of HR activities, self-management,

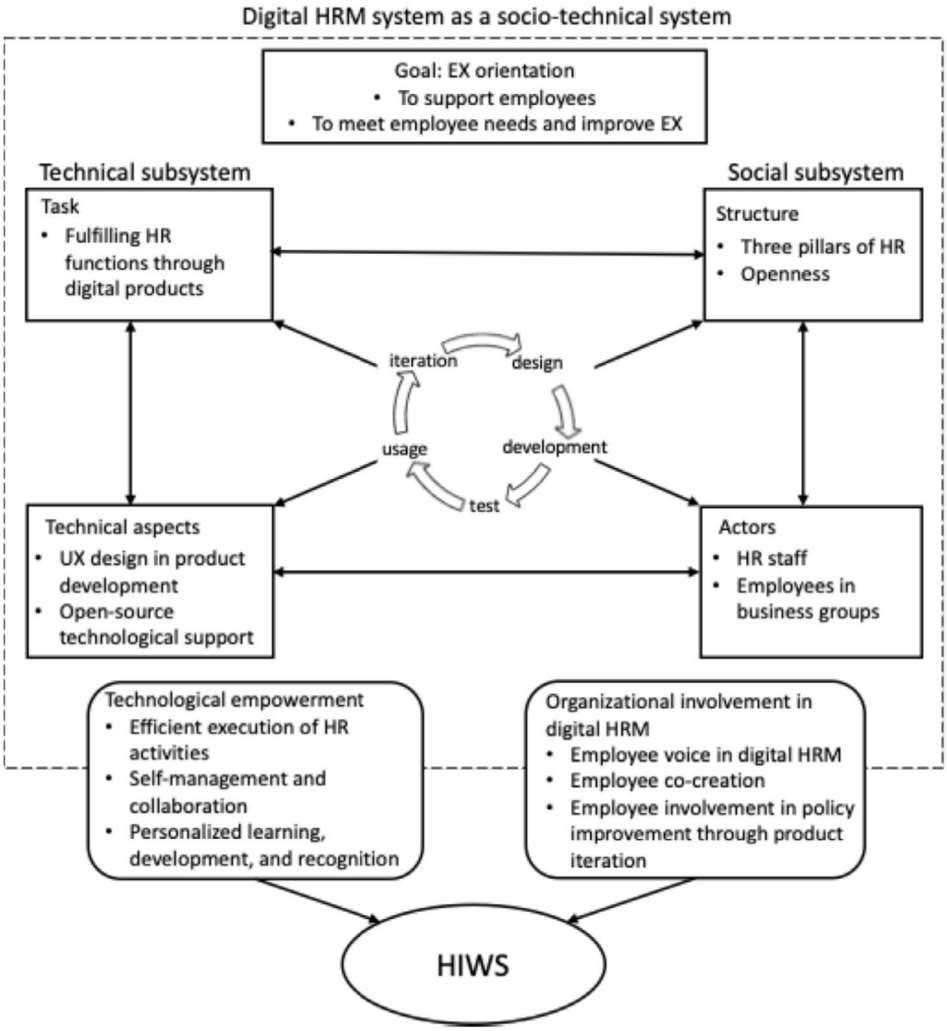

FIGURE 2 | STS model in digital HRM. *Source:* Authors' elaboration.

team collaboration, and personalized, individualized learning and development opportunities. Second, EX-oriented digital HRM promotes employee involvement in both HR product development and some aspects of organizational management by leveraging UX design. Viewing employees as users, the HR department effectively integrates user involvement and EI into the design, development, and iterative processes of HR products. Employees' feedback and voices are taken into account, not only in HR product development, but also in some aspects of HR policy operations. In addition, co-creation in the HR product development process encourages employees to participate directly in the digital HRM system. In this way, staff from business groups not only contribute their expertise to product development and iteration but also share their perspectives on some HRM policies and practices.

5.1 | Theoretical Implications

Our research makes several theoretical contributions to the existing literature. First, this study contributes to the HIWS literature. Previous research predominantly examines the impact of HIWSs using quantitative methods. However, a qualitative case study approach enables a deeper investigation into how HIWSs can be developed in the context of applying digital technologies to management practices (Boxall et al. 2019). This is particularly relevant, as very limited research has explored whether and how the application of digital technologies to management practices affects EI. In doing so, this study sheds light on the relationship between digital HRM and HIWSs and advances our understanding of approaches to HIWSs in the digital era. We demonstrate that digital HRM, with a focus on EX, can strengthen two key dimensions of HIWSs (Wood and Ogbonnaya 2018): technological empowerment and organizational involvement.

Similar to previous studies (Malik, Budhwar, et al. 2023; Malik, Kumar, et al. 2023), our findings indicate that digitalization of HRM can influence how employees perform their tasks and how they receive, deliver, and exchange information at work. For example, digital HR tools facilitate self-management, knowledge sharing, and personalized learning and development opportunities. Such technological empowerment can, to some extent, reduce the need for direct management intervention. More importantly, beyond the empowerment enabled by digital technologies, our findings highlight the role of organizational involvement in the digital HRM system. In this study, employees actively contribute to HR product development and refinement by providing feedback, suggestions, and

innovative ideas. Furthermore, employees' involvement extends to influencing aspects of HRM policies and practices, offering insights that go beyond product usage to inform internal management practices. A good example is the enhancement of HR policies within the company through EI in the flowing water platform. Unlike traditional EI practices, such as briefings, idea-capturing schemes, and teamwork (Wood 2020), EI opportunities in digital HRM, including the "voice program" and employee co-creation, are enabled by applying UX principles to management practices. These practices are strongly influenced by the company's product development values and approaches, effectively integrating user involvement and EI within the digital HRM context.

Although the digital HRM system, with its focus on EX, arguably contributes to developing an HIWS in the case company, it does not equate to a comprehensive HIWS within the organization, and we recognize that it cannot address the greater range of employee interests at work. It arguably provides a level of technological empowerment through self-service and self-management features and opportunities for involvement in some aspects of internal management.

However, these features are limited in scope. The case company primarily addresses employee needs related to HR digital tools, HR product usage, and HR task fulfillment. The digital HR system at Tencent emphasizes individual employee voice through its internal user involvement "voice program," a well-established form of "employee involvement." However, EI should not be conflated with those forms of employee participation that represent the wider range of employees' interests, which are likely to be achieved only through legislatively underpinned systems of collective employee participation rights and/or collective voice through an independent trade union. Such forms of employee participation attempt more directly to address the balance of power between employer and employee and address employees' core interests, such as working conditions, working hours, and remuneration (Blyton and Turnbull 2004). In other words, while Tencent's digital HRM system allows for considerable levels of EI in digital HR functions among relatively well-educated and highly skilled groups of employees, it is nevertheless a system initiated and controlled by management primarily for managerial interests. Only in some limited areas does it address employees' interests, and it does not extend to the organization's production system more generally (Boxall and Winterton 2018).

Second, this study contributes to the theory of STS. Guest (2022) suggests that the emergence of digital technologies provides a new impetus to optimize both the social and technical aspects of organizations in the design of work systems, thereby provoking renewed interest in this theoretical approach. In alignment with this imperative, this study extends the STS framework into the realm of digital HRM. We conceptualize the digital HRM system as a socio-technical system and propose a STS model of digital HRM (see Figure 2). Specifically, we examine key socio-technical dimensions, including goals, tasks, structures, actors, and technical elements within the digital HRM system.

Although goals were not explicitly reflected in Bostrom and Heinen's (1977) model, we argue that goals serve as the strategic core of the STS model, essential for balancing and integrating the technical and social subsystems. In this study, the goal of enhancing EX in digital HRM helps promote the joint optimization of the technical and social subsystems and prevents disequilibrium between them. In line with this goal, digital HRM extends beyond mere technology implementation or product development. Instead, it emphasizes employees' experiences as users, aiming to support employees and address their needs at work. In doing so, it draws attention to employees as important actors—an aspect that has received relatively limited attention in studies of digital HRM, which have mainly focused on HR staff, IT staff, and managers (Yalenios and d'Armagnac 2023; Zhou et al. 2022). Moreover, UX design, a human-centered approach focused on user experience and involvement, plays a crucial role in enhancing EX and serves as a central link between the technical and social subsystems (Winby and Mohrman 2018). By engaging employees as users in HR product development within the technical subsystem, user involvement practices activate EI in the social subsystem. This aligns with academic calls for greater employee input and involvement in "digital socio-technical systems design" (Parent-Rocheleau and Parker 2022; Winby and Mohrman 2018). Additionally, by integrating design thinking perspectives, this study contributes to the "renewal of the socio-technical systems approach" in the digital era (Parker and Grote 2022, 25) and highlights the value of STS for understanding EI (Boxall et al. 2019).

Moreover, moving beyond the general and simplified notion of joint optimization of technical and social subsystems in STS, we demonstrate the dynamic interactions among socio-technical dimensions within the digital HRM system. As Trist (1981, 24) suggests, the elements in social and technical subsystems "are correlative in that one requires the other for the transformation of an input into an output, which comprises the functional task of a work system." The openness of the digital HRM system enables open-source technological support for implementing and developing digital solutions and provides a foundation for cross-departmental collaboration. UX design further emphasizes employees as key users and active actors within the digital HRM system. Together, openness and UX design facilitate EI within the digital HRM system. Such involvement design allows employees "to contribute to the development of technical functionality and the evolution of the social side" (Fischer and Herrmann 2011, 1). The interplay between user involvement and EI drives the dynamic evolution of the HR product development process—encompassing design, development, testing, usage, and iteration—and contributes to improvements in some HR policies. As Pasmore et al. (1982) argue, socio-technical design for joint optimization is inherently iterative and continuously evolving.

Third, this study contributes to the literature on digital HRM and EX by illustrating how to manage and improve EX within digital HRM. Unlike previous research (Bondarouk et al. 2017; Parry and Tyson 2011), which emphasizes cost reduction, efficiency gains, and strategic support as the main goals of digital HRM adoption, this study highlights the goal of enhancing EX and emphasizes the central role of employees. Some empirical studies have examined the impact of EX in digital HRM on employee outcomes such as employee commitment and engagement (Dutta et al. 2023; Malik, Budhwar, et al. 2023). However, our understanding of how to improve EX remains limited.

This study advances the literature by offering insights into approaches that promote EX in digital HRM.

Prior studies (Malik, Budhwar, et al. 2022; Malik, Budhwar, et al. 2023) have shown that digital HRM applications facilitate the personalization of EX across multiple touchpoints throughout the employment journey. However, this advancement has largely been attributed to the capabilities of digital technology itself. Moving beyond a sole focus on technology, we integrate design thinking perspectives into digital HRM. We argue that design thinking represents a critical factor in enhancing EX. While most applications of design thinking have focused on customer/user experience (Gruber et al. 2015), we suggest that it can be applied to facilitate socio-technical development within management practices, especially in the digital era. Since employees are the end users of digital products, applying UX design principles and methods to management practices enables organizations to effectively improve EX. This improvement is evident not only in the use of HR products but also in the execution of HR activities and across various aspects of workplace support. Effective application of UX in management begins with a deep understanding of employee needs in relation to digital HR products and incorporates employee perspectives, which requires collaboration and co-creation with employees throughout the design process. Our findings echo Gruber et al.'s (2015, 3) call to extend design thinking to the management domain for the "new workplace experience."

5.2 | Practical Implications

This study presents several implications for practitioners. First, more attention should be paid to enhancing EX and EI within digital HRM practices. As previous studies (Bondarouk et al. 2017; Parry and Tyson 2011) suggest, digital HRM practices often exhibit a management-centric orientation, primarily geared towards creating efficient tools for management. In such cases, employees' needs and EX are likely to be significantly overlooked. Nevertheless, this case study indicates that, beyond simply enhancing managerial efficiency, digital HR products can also function as empowering tools to enhance EX and promote EI. Therefore, HR products can be tailored to a diverse spectrum of employees as primary users, extending beyond the confines of managerial roles. Taking EX into account, digital HR applications can offer various touchpoints throughout the end-to-end employment journey and deliver benefits for employees, such as personalized HR services.

Furthermore, it is important to underscore the role of employees in the process of HRM digitalization. Employees can be encouraged to participate in the design and development of HR products by using methods such as surveys, interviews, and grayscale tests, as demonstrated by the case company. This enables employees to contribute valuable feedback, ideas, and perspectives. By embracing employee input, HR departments can more effectively design and deliver digital services that address employees' needs. In contrast, some IT companies develop digital HR products only with commercialization in mind and are likely to overlook the needs of internal employees and EX. Our case study shows that digital HR products that prioritize internal needs, particularly those of employees, can be more effective in supporting employees, even if this is limited to specific HR functions rather than broader employee interests.

Second, the awareness, skills, and capabilities of HR staff are pivotal to the successful application of digital technologies in HRM practices (Chowdhury et al. 2023; Tandon et al. 2024). As digital technologies continue to develop rapidly and are widely adopted, organizations face the imperative to confront and overcome the challenges associated with digitalizing their HRM and broader management processes. At Tencent, in addition to possessing HR professional capabilities, HR staff demonstrate a proactive approach by cultivating awareness of EX within digital HRM and by acquiring relevant skills in HR product development. These skills encompass UX design thinking and methodologies. However, as Boxall et al. (2019) argue, while HR staff and managers in large organizations are likely to possess the necessary skills and abilities, the situation may be different in small and medium-sized enterprises (SMEs). Despite potential constraints on investing in training, it is still advisable for HR staff in SMEs to prioritize employee voice and input when implementing digital technologies in management practices. This approach helps to maintain equilibrium between the technical and social subsystems. Failure to strike this balance could potentially lead to adverse effects on employee acceptance of digital applications within organizations.

Third, amid the wave of digitalization, as companies actively pursue digital transformation and implement digital HRM, managers should avoid over-reliance on digital tools, as this can lead to resource waste and place additional burdens on employees. Although digital tools can offer flexibility and efficiency, they can also blur the boundary between work and personal life. Moreover, digital tools are not all-encompassing and do not fully address employees' broader interests; therefore, managers cannot rely solely on these tools to resolve all HR-related issues. To ensure effective adoption, HR departments should provide adequate training and clear communication on both HR products and the associated work processes, enabling employees to better understand and use these tools.

5.3 | Limitations and Future Research

We acknowledge several limitations in this study. First, the scope of the employee interview data is relatively limited. To address this, we recommend adopting a mixed-methods approach that integrates interviews with surveys to more effectively capture employees' perceptions and experiences of digital HRM applications. Additionally, future research could benefit from employing a longitudinal qualitative method or a quantitative design to further explore and validate the propositions presented in this study.

Second, as this is an exploratory single-case study, we suggest expanding the sample size to include multiple IT case companies for empirical testing, which would help enrich and refine our findings. Furthermore, to enhance generalizability, future research could examine how digital technologies influence EI across contexts and sectors, including firms of varying sizes, including SMEs, and across other industries. The case company examined in this study is considered a "born digital" entity (Monaghan et al. 2020), possessing advanced technological

capabilities and unique features with rich experience in product development. Consequently, our findings may be more relevant to IT companies that engage in co-creation with their employees to develop digital products. This approach may not apply to companies that opt to purchase such applications from third-party service providers. Different sectors, such as finance or manufacturing, may adopt different approaches to EX and EI in digital HRM. Therefore, conducting a comparative analysis across sectors would be insightful.

Third, this study focuses on digital HRM systems and EI, without addressing employee interests, such as remuneration, working hours, and working conditions. We recommend that future research explore whether and how the application of digital technologies affects working conditions, employee participation processes, and collective representation in the IT sector, particularly in light of concerns about long working hours, work-life balance, and work pressures in China's IT industry (Li 2023; Liu 2023).

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Research data are not shared.

Endnotes

[1] WeChat is a Chinese instant messaging, social media, and mobile payment app developed by Tencent.

[2] WeCom is a business communication and office collaboration tool developed by Tencent.

[3] Tencent Meeting is a cloud-based video conferencing platform developed by Tencent.

[4] Tencent Docs is an online document collaboration platform developed by Tencent, similar to Google Docs or Microsoft Office Online.

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Appendix A

Data Structure