



Research article

Linking digital leadership and employee digital performance in SMEs in China: The chain-mediating role of high-involvement human resource management practice and employee dynamic capability

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ABSTRACT

Background: In the digital era, the role of digital leadership is becoming increasingly prominent. However, the exploration of the alignment between digital leadership and high-involvement human resource management practices (HI-HRMPs) in influencing employee-based resources remains an overlooked research area among current scholars.

Objective: This study aims to analyze the influence of these elements on the digital performance of employees. Based on the Resource-Based View (RBV) and Dynamic Capability Theory (DCT), this research focuses on Chinese Small and Medium Enterprises (SMEs) and employs purposive sampling to select four representative regions in China (Shanghai, Guangzhou, Guizhou, and Anhui). The survey targeted employees within SMEs and was conducted using questionnaire surveys. Structural equation modeling (AMOS) is utilized for analysis.

Results: The findings indicate that: (1) digital leadership cannot directly influence employee digital performance and employee dynamic capability but can directly influence HI-HRMP; (2) HI-HRMP mediate the influence of digital leadership on employee digital performance, but employee dynamic capability cannot mediate the influence of digital leadership on employee digital performance; (3) HI-HRMP and employee dynamic capability play a chain mediating role between digital leadership and employee digital performance.

Conclusion: In the digital market, digital leadership improves employee digital performance by boosting HI-HRMP and enhancing employee dynamic capabilities. The findings support studies on practical applications and link between digital leadership and employee digital performance. The uniqueness of this study lies in applying HI-HRMP and employee dynamic capabilities as chain mediating variables in the digital market. This approach extends the application of HRMPs and dynamic capability theory, providing theoretical guidance and decision support for the digital operations of SMEs.

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1. Introduction

In recent years, the COVID-19 pandemic has shaken China's and the world's economies and transformed business paradigms, which revolution includes production changes, shopping habits, and marketing strategy changes [1]. Within this context, a new epoch of digital technologies has surfaced, permeating the business environment and fundamentally altering the landscape of organizational management and innovation [2]. According to a survey by the International Data Corporation (IDC), by 2023, corporate investments in digital technologies are expected to reach \$7.4 trillion, growing at a rate of more than 50 % [3]. According to statistics, SMEs account for 90 % of the total number of global enterprises. Due to their inherent flexibility, they have become the primary engine driving economic growth and have made significant contributions to global economic development [1]. In 2021, the number of SMEs in China exceeded 40 million, providing 80 % of the nation's employment opportunities, 70 % of innovative products, and contributing 50 % of corporate income tax [4]. The "Classification Regulations for SMEs" and "Methods for Classifying Large, Medium, Small, and Micro Enterprises" (2017) in China classify entrepreneurs by staff count, operating income, and assets. The criteria for medium-sized businesses are: There are 300–1,000 people and 200,000–400 million yuan in operating income. The criteria for small businesses are: 20 to 300 people and 3 to 20 million yuan in operating profits are required [5]. Research conducted in the post-pandemic era indicates that when SMEs embrace digitalization, the economy becomes notably more efficient [1]. Moreover, digital transformation has emerged as a development strategy for many SMEs in various countries [3]. For instance, OECD members consider SMEs as integral to national strategies. The European Union has set a target to achieve 90 % digitalization among SMEs by 2030. Similarly, China, in its "14th Five-Year Plan," emphasizes the construction of a digital China. Statistics show that China has 4,800 SMEs in 2022, 3.4 times more than in 2012. Digitally transformed SMEs have improved company outcomes, staff productivity, and output [6]. Research indicated that digitization often depends on employees' skills, mindset, and capabilities [7]. Moreover, employees' digital skills serve as indicators of the maturity of digital technology applications [8]. However, in China, a considerable impediment to digital transformation lies in the fact that up to 44 % of executives still exhibit a deficiency in digital talent [9,10]. Additionally, the integration of digital technologies may lead to challenges concerning employee well-being, including stress and work-life conflicts, thereby hindering the financial returns on technology investments and digital transformation [11]. Meanwhile, the millennial generation (those born between 1980 and 1994) and Generation Z (those born between 1995 and 2009) together constitute nearly 40 % of China's population. For them, integrating digital technologies into work has become an indispensable part of their daily lives [12].

Therefore, in the process of digital transformation, companies need to balance the interests of employees and implement scientific management methods to increase employee happiness and motivation to improve the productivity of the organization, which is a key issue that organizations urgently need to address [13,14]. In particular, employees' effective application of digital technologies to achieve job performance - digital performance - is a key aspect of successful digital transformation [15,16]. Moreover, digitally literate employees are in high demand by employers because they can handle data, creatively convey information, solve issues, and create new products and workflows [17]. SMEs need to mobilize the younger generation of employees to effectively utilize digital technologies to achieve performance goals [18]. Therefore, employees have transformed into a "digital workforce" [14]. However, past research on digital transformation has predominantly emphasized organizational-level performance indicators, such as big data analytics capabilities [19,20] and digital innovation [21–23], and has failed to adequately address the achievement of digital performance at the individual level. A systematic review of databases reveals that, to date, there are only four articles studying employee digital performance [9,10,14,24]. Past research also indicated that data-driven culture mediates the relationship between senior management and employee digital performance, while digital self-efficacy mediates the relationship between transformational supervisory leadership and employee digital performance [14].

However, in digital era, Chinese SMEs require digital leaders who can delineate clear objectives and directions for digital transformation while motivating and empowering employees to acquire digital skills, thereby promoting the sustainable development [25]. Moreover, the deeper understanding and comprehension of digital transformation among senior management is one of the key pathways for Chinese SMEs to overcome the challenges of digital transformation [26]. Currently, organizations are experiencing VUCA (Volatility, Uncertainty, Complexity, and Ambiguity) conditions [27]. For SMEs to innovate effectively and keep pace with the digital era, SMEs must shift from traditional leadership to digital leadership, thereby fostering sustainable development [28]. In 2022, Khaw et al. [29] conducted a systematic review of digital leadership, defining it as the ability of leaders to possess innovative ideas at the digital level, inspire employees within digital environments, and establish sustainable communication with employees in digital settings while formulating digital strategies. In 2023, Tigre et al. [30] defined digital leadership as having the qualities of a leader that are essential to succeeding in a digital environment: communication, empowerment, openness, trust, agility, collaboration, innovation, and adaptability. Based on a comprehensive review of past literature on the definition of digital leadership, this study considers digital leadership to have characteristics such as strategic orientation, dynamic management, and empowerment [29]. In 2022, Borah et al. [25] developed a maturity scale that incorporates the aforementioned characteristics of digital leaders. Moreover, this concept addresses the challenges currently faced by Chinese SMEs in the process of digital transformation [18,25]. Indeed, empirical research has demonstrated that digital leadership is a key factor in achieving employee performance during digital transformation [31]. Unfortunately, many companies fail to recognize digital leaders, resulting in poor performance and irreparable damage [31].

However, strong empirical evidence suggests that the key focus on aligning leadership strategies and HRM policies is on high-level investments in employee-based resources, which are significantly and positively correlated with higher levels of employee performance [32]. In the HRM system, this study primarily focuses on the HI-HRMP strategy because it can promote employees' adaptability to technology through the implementation of effective HRMPs, thereby facilitating the achievement of employee innovation performance [22]. Furthermore, HI-HRMP has a positive effect on innovation performance, with employee attitudes and behaviors acting as mediating factors [33]. The HI-HRM system plays a crucial role in enabling adaptable employees to carry out a wide range of duties in

uncertain situations [34]. Moreover, the implementation of various high-investment human resource strategies is expected to lead to the development of unique employee-based assets [35]. This study utilizes the classification principle suggested by Rubel et al. [22] to conceptualize HI-HRMP into five domains: capability development, empowerment, information sharing, recognition, and employee involvement. This paper provides a complete overview of the functionalities of HI-HRMP [36].

According to literature on dynamic management capabilities, leaders' managerial cognition can explain how HRM strategies can increase internal employee resources and improve performance by effectively managing and allocating them [37]. Moreover, a large body of research shows that employee behaviors and attitudes mediate the effect of HI-HRMP on performance [36,38,39,40]. Recent empirical research reveals that employee dynamic capabilities as a mediator variable affect employee performance more than employee attitudinal and behavioral variables [9,10]. Therefore, this study will update the mediating variables from past research (employee attitudes and behaviors variables) to employee dynamic capability variables [41]. Despite the huge influence of employee dynamic capacity on job performance in dynamic marketplaces, a few scholars have researched it empirically [9,10,41]. Moreover, in the digital era, there is limited scholarly research on how the consistency between digital leadership and HI-HRMP drives the enhancement of employee digital performance through employee-based resources (such as EDC) [42].

This study investigates how HI-HRMP and employee dynamic capabilities mediate the relationship between digital leadership and the digital performance of employees. Additionally, it investigates how HI-HRMP and employee dynamic capabilities form a sequential mediation chain, transmitting digital leadership's impact on digital performance of employees. This research enhances the understanding of the relational mechanisms between digital leadership and employee digital performance. The second part of this study comprises a theoretical basis and research hypothesis. The third part involves research design, while the fourth part consists of test results. The fifth part discusses. Lastly, this part includes conclusions and suggests avenues for future research.

2. Theoretical basis and research hypothesis

2.1. Theoretical basis

The DCT arises as an alternative technique to solve the inherent shortcomings of the RBV [38]. Dynamic capabilities are an extension of the resource, which effectively links resources and performance [39]. RBV indicates that rare, valuable, non-imitable, and non-substitutable internal resources afford a business a robust competitive advantage [43]. Businesses can develop, integrate, and reconfigure their capabilities and resources using the framework that DCT offers in order to quickly respond to changing environments [39]. SMEs naturally rely more on intangible resources to retain sustainable competitive advantages because of their severe resource restrictions and the restricted availability of tangible assets relative to intangible assets [40]. Therefore, SMEs can benefit the organization by leveraging intangible resources (such as human capital). The ownership of most intangible assets is uncertain, making them difficult to acquire and transfer [43]. However, SMEs can quickly adjust their internal intangible resources in response to uncertain conditions as a result of their strategic operability, adaptability, and flexibility [44]. Additionally, top-level management skills and HRMP are intangible assets for SMEs, according to study. Their rarity, imperfect imitability, and substitutability can indicate their ability to sustain competitive advantage and innovation [45].

However, past studies have failed to explain why employee-based resources change when top management uses distinct HRMPs [32]. It has also been neglected that RBV's thinking argues that employee-based resources only provide competitive advantages when linked with organizational management strategies (such as digital leadership) and HRMPs [37]. On one hand, in SMEs, digital leaders are the most relevant capability influencing digital growth strategies [46] and can lead to sustainable competitive advantage in SMEs [20]. On the other hand, HI-HRMP assist in establishing a devoted staff with deep tacit knowledge that is hard to replicate or transfer, promoting human capital [47]. Furthermore, the dynamic capability is also an essential source of long-term competitive advantages [46,48]. Scholars began distinguishing employee dynamic capabilities from organizational dynamic capabilities in 2020 due to the increased focus on employees in the digital age. This differentiation focused on employee dynamic capabilities as employee-based resources for job performance in a dynamic market [41,49,50].

RBV-DCT has been studied for years, however academics have not distinguished dynamic capability from employee dynamic capability [41]. Therefore, this study distinguishes between dynamic capability and employee dynamic capability. This expands the variables based on employee-based resources. Furthermore, in the field of HRM, Xi et al. [51] demonstrated the chain mediation effect of CEO leadership behavior on firm performance through the employee relationship atmosphere and employee attitudes. Therefore, this study draws on past empirical research models to construct the framework for this study.

2.2. The relationship between digital leadership and employee digital performance

Due to technological advancements resulting in transformations in human capital, leadership is of paramount importance for companies utilizing digital technologies [2]. To achieve the organization's goals, leaders must convey the organization's vision and unite its members. Digital leaders possess a range of skills, such as sharing information, coaching, empowering, and fostering trust, which is closely linked to innovation [20]. Moreover, research indicates that regardless of company size or industry, adopting digital leadership is essential to adapt to the current digital era [29]. In SMEs, digital leadership is essential for change management, employee performance, and business success. Moreover, digital leaders involve guiding and managing employees with technology, fostering innovation, collaboration, and information accessibility, and improving workplace efficiency and productivity through technology adoption [52]. Furthermore, a mixed-methods study by Benitez et al. [23] highlighted the significance of platform digital capabilities as a necessary factor in the relationship between digital leadership and innovation performance. Similarly, Muniroh et al.

[53] found that digital leadership affects employee performance regarding employee innovation as mediating in the Indonesian telecommunications and information industry. Furthermore, the impact of digital leadership on job satisfaction and performance is significant. Digital leadership can influence employee performance through job satisfaction [54]. Moreover, Borah et al. [20] did a study of 549 employees in SMEs and found that digital leadership moderates the relationship between social media usage and the long-term performance of these organizations. In the digital age, SMEs require digital leadership to adapt and modify their business strategy. Strong digital leaders create digital business strategies and boost corporate performance [55]. However, prior research on the relationship between digital leadership and employee performance has yielded varying conclusions across different industries [56,57]. Despite these critical findings, few research has directly proven the association between digital leadership and employee digital performance. In summary, digital leaders' influence on various facets of organizations, from internal processes to employee performance and innovation, is evident. Although current research offers useful insights on the topic, additional investigation is necessary to establish a clear connection between digital leadership and employee digital performance, particularly in the context of SMEs.

H1. Digital leadership has a positive impact on employee digital performance (EDP) in Chinese SMEs.

2.3. *The mediating role of HI-HRMP*

The characteristics of digital leadership include strategic guidance, maintaining communication with managers and employees, collaboration, agility, empowerment, and dynamic management capabilities [29]. Leaders have a crucial role in providing guidance and exerting influence over their subordinates in SMEs [47]. Rubel et al. [58] define HI-HRM from seven dimensions: competence development, empowerment, organizational trust, information sharing, recognition, fair incentives, and technology adoption. These approaches also improve employee skills, motivation, and engagement and have been shown to improve performance by shaping employee behaviors [59]. HI-HRMP involves various aspects, such as enhancing skills, empowering individuals, providing equitable incentives, sharing knowledge, and acknowledging achievements. These practices provide support for social exchange, as employees perceive organizational recognition for their involvement and contributions, leading to positive behaviors [60]. Moreover, research indicated that different leadership styles have a significant impact on HRMP, highlighting the importance of leaders in HRMP [61].

Furthermore, the influence of HI-HRMP on employee innovation performance is significant [22]. Furthermore, research suggests that different types of leaders can influence employee performance by affecting various practices within HI-HRMPs, such as HR Planning, training, remuneration, and health and safety at work [47]. Research also indicates that digital leaders need to communicate with HR managers and employ appropriate methods such as empowerment to ensure high employee performance. They should engage in dialogue-based open HR managers to ensure employee acceptance [37]. Moreover, past empirical studies have shown that in SMEs, digital leadership positively influences performance with empowerment as a mediating variable, and empowering employees is indeed a component of HI-HRMP [62]. The dynamic management ability of top managers will be beneficial to the realization of corporate goals if it is supported and coordinated by middle-level management [37]. In addition, in SMEs, top leaders can facilitate green innovation performance by influencing HRMPs [21]. HI-HRMP can influence the digitization process and potentially encourage employees to embrace technology [22]. In SMEs, HI-HRMPs have emerged as a prominent HRM strategy aimed at cultivating HR competencies and encouraging employees' engagement in innovative work behavior and employee functional flexibility [34]. Moreover, the fundamental idea behind HI-HRMP is to enhance employee engagement by directly addressing organizational issues and developing knowledge, skills, and abilities [58]. HI-HRMP helps employees engage in creating appealing practices within the company [33]. In particular, leaders need to leverage the management practices of middle managers to implement their strategic goals [63]. Therefore, in SMEs, it is reasonable to assume that HI-HRMP may mediate the association between digital leadership and employee digital performance, implying that digital leadership indirectly influences employee digital leadership by impacting HI-HRMP.

H2. Digital leadership has a positive impact on HI-HRMP in Chinese SMEs.

H3. HI-HRMP mediates the impact of digital leadership on employee digital performance in Chinese SMEs.

2.4. *The mediating role of employee dynamic capability*

Digital leadership has always helped firms adapt to changing times, connect people to open work ecosystems, balance human and technical involvement, and promote digital resource sharing [56]. The study was conducted on a sample of 88 senior responders from an Indonesian telecoms company, and the results show that digital leadership directly influences dynamic capabilities [64]. Digital leadership indirectly affects dynamic capabilities through innovation management [56]. Market-oriented strategies moderate the association between digital leadership and dynamic competence, according to Indonesian telecoms company senior management research [65]. Top management commitment can enhance the influence of dynamic capability on employee performance when implementing big data analytics [19]. Furthermore, although past research indicates that employee dynamic capabilities stem from dynamic capabilities and share similar functionalities, albeit focusing on different subjects, employee dynamic capabilities primarily reflect the contributions of employees to the organization in a dynamic market [10,41].

According to the RBV and DCT, organizations possessing resources with core competitive advantages contribute to developing dynamic capacities, thereby enhancing job performance [39]. This suggests that core strategy resources can indirectly improve job performance by enhancing dynamic capabilities [43]. Moreover, in the future outlook section, previous studies have suggested that effective incentives implemented by top-level leaders can contribute to developing employee dynamic capacities, and thereby enhance performance goals in dynamic markets [57]. Different leadership styles can directly or indirectly affect dynamic capability

(perception, seizing, and reconfiguring) as evidenced by a study conducted on Spanish manufacturing firms [61]. Furthermore, research has demonstrated that employee dynamic capability surpasses employee attitudes and behaviors in terms of employee performance [12,13]. Based on dynamic capability theory, employee dynamic capability was introduced in 2020. Employee dynamic capability is the integration, development, and reconfiguration of employee capacities to respond to quickly changing surroundings, directly affecting job performance in dynamic markets, emphasizing the vital role of employees [41]. In conclusion, it is reasonable to believe that the employee dynamic capability plays a mediating role between digital leadership and employee digital performance in Chinese SMEs. To tackle this issue, the study puts up the following postulated connections:

H4. digital leadership has a positive impact on employee dynamic capability in Chinese SMEs.

H5. Employee dynamic capability mediates the impact of digital leadership on employee digital performance in Chinese SMEs

2.5. The chain mediating role of HI-HRMP and EDC

Past literature suggests that CEO managerial cognition aids in explaining when implementing HRMP may lead to greater company-level employee resources and when companies can effectively manage and coordinate these resources for productive purposes [37]. Deploying these employee-based resources to gain competitive advantages is essential [37]. How organizations use HI-HRMP to boost employees' technical innovation performance and the mechanisms behind it are important [22,58]. Because HI-HRMP promotes employee involvement, middle-level managers must inspire proactiveness through a variety of initiatives [66]. Moreover, in SMEs, HR managers must employ appropriate methods to ensure high employee performance, they need to engage in dialogical and open HI-HRMP to ensure employee buy-in Ref. [47]. Research indicates that relying solely on management is insufficient, companies should also, akin to high-reliability organizations, leverage their strengths to make employees their most vital assets [67]. Past research indicated that HI-HRMP significantly influences innovation performance through employee attitudes and behavioral variables as mediators [33]. Digital HRMPs significantly influence employee performance through employee motivation as a mediator [68].

Additionally, Digital leadership and HRMPs are crucial for SMEs in digital technology development since they transform human capital [2]. Researchers suggest that HRMPs affects employees' attitudes, behaviors, and organizational outcomes through mediating mechanisms [59]. Moreover, HR managers need leaders to provide support through empowerment and cooperation [69]. When top leaders urge middle management to implement effective HRMPs, such as recognizing employees' abilities, implementing fair rewards, and empowering them, which will have a positive impact on employee motivation and creativity [47]. Moreover, HI-HRMPs represent a relationship-based strategies that prioritizes employee development [47]. HI-HRMP framework delineates HRPs available for improving employee motivation in SMEs in the current business environment [70].

Some authors go even further to suggest that the role of dynamic capability in surviving in a fast-paced market is paramount for sustaining long-term organizational performance [27]. According to the RBV and DCT, organizations possessing resources with core competitive advantages contribute to the development of dynamic capabilities [39]. Past research has tested that HI-HRMP is considered a fundamental resource for the sustainable development of SMEs [47,71]. HI-HRMP enhances employees' skills, thereby bolstering organizational resilience [58]. This underscores the pivotal role of HI-HRMP in nurturing dynamic capability to cope with uncertainty [72]. Personal human capital (individual skill development) and organizational knowledge (information sharing) are considered drivers of dynamic capabilities [48]. However, in 2020, stemming from DCT, employee dynamic capability as employee-based resources emerged as a novel concept in academic research. Especially in dynamically changing markets, the role of employee dynamic capability is particularly significant [41,73]. Employee dynamic capabilities provide rapid integration, development, and adjustment to changing workplace conditions that directly impact job performance [49]. Moreover, past empirical research indicates that transactional and transformational leadership styles, through their influence on the human resource system, directly or indirectly affect dynamic capabilities [61]. Research indicates that work environments characterized by empowerment, fair rewards, support, and trust are conducive to developing dynamic capacities [58]. While past studies have emphasized the contribution of HRMPs to dynamic capabilities, empirical validation between HI-HRMP and employee dynamic capability is still lacking [48]. Furthermore, in the field of HRM, research indicates that CEO leadership behavior's impact on firm performance is mediated by the employee relationship climate and employee attitudes as chain-mediating variables [51]. The concept of "chain mediating variables"

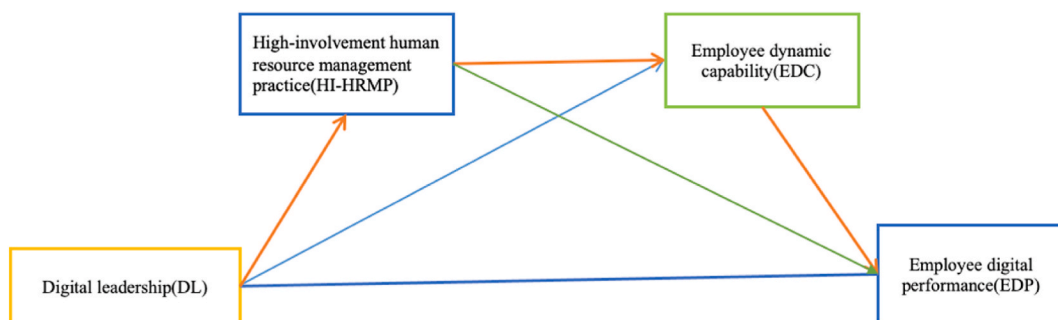


Fig. 1. Research model.

suggests that multiple mediating variables (such as HI-HRMP and EDC) operate sequentially in a chain-like manner to achieve performance goals [10,51].

Although the current literature has investigated the effectiveness of digital leadership in organization, there is still a lack of in-depth research on the mechanisms through which digital leadership influences employee digital performance. Moreover, strong empirical evidence suggests that the key focus on aligning leadership strategies and HRM policies is on high-level investments in employee-based resources, which are significantly and positively correlated with higher levels of employee performance [32]. Therefore, this study establishes the following hypotheses:

H6. HI-HRMP and employee dynamic capability plays a chain mediating role between digital leadership and employee digital performance in Chinese SMEs (Fig. 1).

3. Study design

3.1. Research participants

Chinese SMEs from Guangzhou, Shanghai, Guizhou, and Anhui were selected for this study. The survey began August 1, 2023. The list was compiled from www.sme.com.cn and State Administration for Industry and Commerce of China channels. Website searches revealed that in 2023, Anhui Province had 759 SMEs listed in the sixth batch, Shanghai had 2,532 SMEs listed in the fourth batch, Guizhou Province had 507 SMEs listed in the fifth batch, and Guangzhou had 1,200 SMEs listed in the sixth batch. Official websites provided the database's SMEs' names (Google Drive: <https://drive.google.com/drive/my-drive>). Purposive sampling selected 80 SMEs from each region's online list, totaling 320 potential SMEs. This study selected a wide group of digital SMEs to ensure broad applicability. Additionally, the purposes of the survey were disclosed to the surveyed SMEs while maintaining anonymity and contact emails of SME employees were obtained with their consent. The Questionnaire Star platform was utilized to distribute the survey questionnaires.

As of September 16, 2023, responses were received from 108 companies, resulting in a response rate of approximately 50 %. Of the 1,000 questionnaires distributed, 500 were recovered, with 134 invalid questionnaires excluded, leaving 366 valid questionnaires. The statistical analysis conducted by Hooper and Martin [74] suggests that a sample size of 300 or more is adequate, as per the research parameters. Consequently, the current survey requires 366 legitimate questionnaires. The survey targeting of these four provinces was the result of a combination of factors. Shanghai is a financial and economic powerhouse, Guangzhou is a manufacturing and commerce hub, Hefei is a city that emphasizes traditional industries and emerging economies, and Guizhou is currently in the process of enduring digital transformation. Secondly, the sample is represented by SMEs in these provinces, as they contribute to economic output across industries. The initial section of the survey investigated demographic and socioeconomic variables, including gender, age, work region, education level, and employee count.

3.2. Measurement

This study redesigned the measuring scale based on the current scale and guaranteed consistency between the Chinese questionnaire and the English version using back translation, expert discussion, and other means. These efforts ensured the questionnaire's correctness and comprehensibility so respondents could comprehend and answer it. The scale includes 5 latent variables and 41

Table 1
Demographic characteristics.

		Frequency	Percent
Gender	Male	221	60.4
	Female	145	39.6
Age	18~25	129	35.2
	26~30	77	21.0
	31~40	123	33.6
	41~50	23	6.3
	51~60	13	3.6
	60 above	1	0.3
Education Background	Middle School below	6	1.6
	Middle School	7	1.9
	High school	50	13.7
	Bachelor	228	62.3
	Postgraduate students	75	20.5
No of employees	Total	366	100.0
	<10 employees	50	13.7
	10employees <49employees (10~49)	83	22.7
	50 employees <249 employees (50~249)	84	23.0
	250 employees <400employees	56	15.3
	400employees <1000 employees	93	25.3
	More than1000 employees	0	0.0
Total	366	100.0	

measurement items (Appendix). Except for employee dynamic capability, which employed a 7-point Likert scale, all other model items were assessed on a 5-point scale. Responses varied from strongly disagree to strongly agree (Appendix A). Data analysis was conducted using SEM with AMOS. SEM, a second-generation multivariate analytic method, combines factor analysis with path analysis to allow researchers to simultaneously study and estimate the correlations between various exogenous and endogenous variables and indicators [75]. This study aims to demonstrate the relationships between exogenous and endogenous variables and multiple indicators. Therefore, using AMOS for analysis aligns well with the objectives of this research.

3.3. Descriptive statistics

Based on demographic characteristics, most respondents (60.4 %) were male. Among the respondents, 35.2 % were between the ages of 18 and 25, 21.0 % were between 26 and 30, 33.6.9 % were between 31 and 40, and 10.2 % were between 41 and above. In terms of educational background, less than 1.6 % of the respondents had completed high school, 13.7 % had completed high school, 62.3 % held a master's degree, and 20.5 % had graduate-level education. Regarding job experience, 3.4 % of the participants reported having worked for less than a year, 6 % had worked for one to three years, 13.4 % for four to six years, 12 % for seven to nine years, and 43.8 % for ten or more years. Lastly, just 21.2 % of those surveyed said they had been employed for at least 14 years. The percentage of SMEs with between 10 and 49 employees was 22.7 percent, followed by 23.0 percent with between 50 and 249 employees, 15.3 percent with between 250 and 400 employees, and 25.3 percent with between 400 and 1,000 employees. As a result, every firm surveyed met the requirements for being classified as a SME in China (Table 1).

In statistics, normality refers to the underlying probability distribution assumed (hypothesized) when calculating variable variance. Two methods used to assess the normality of data statistically are kurtosis and skewness tests, along with the Kolmogorov and Shapiro methods [76]. Computing normality test results for all measurement model components was the study's premise. The results indicate that all items have appropriate skewness and kurtosis values of ± 2 . Thus, in summary, all the components in the instruments given in

Table 2
Basic parameter analysis.

	Descriptive Statistics	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
Digital leadership	DL1	1	5	3.660	0.963	-0.364	-0.177
	DL2	1	5	3.770	0.951	-0.362	-0.276
	DL3	1	5	3.800	0.943	-0.401	-0.291
	DL4	1	5	3.840	0.917	-0.388	-0.389
	DL5	1	5	3.770	1.020	-0.637	0.047
	DL6	1	5	3.870	0.949	-0.668	0.280
HI-HRMP	HRC1	1	5	3.780	0.942	-0.229	-0.827
	HRC2	1	5	3.670	0.997	-0.266	-0.564
	HRC3	1	5	3.610	1.124	-0.495	-0.425
	HRC4	1	5	3.730	1.000	-0.357	-0.517
	HRE1	1	5	3.790	0.961	-0.399	-0.379
	HRE2	1	5	3.760	0.950	-0.307	-0.494
	HRF1	1	5	3.680	0.956	-0.268	-0.525
	HRF2	1	5	3.720	0.939	-0.309	-0.423
	HRF3	1	5	3.720	0.925	-0.262	-0.400
	HRIS1	1	5	3.790	0.918	-0.228	-0.743
	HRIS2	1	5	3.780	0.896	-0.193	-0.695
	HRR1	1	5	3.880	0.886	-0.498	-0.089
	HRR2	1	5	3.850	0.878	-0.356	-0.361
	HRR3	1	5	3.900	0.882	-0.464	-0.150
	HROT1	1	5	3.750	0.938	-0.322	-0.415
HROT2	1	5	3.770	0.967	-0.325	-0.481	
HROT3	1	5	3.750	0.932	-0.215	-0.679	
HROT4	1	5	3.710	0.952	-0.280	-0.508	
HRTA1	1	5	3.760	0.876	-0.205	-0.583	
HRTA2	1	5	3.750	0.857	-0.101	-0.619	
HRTA3	1	5	3.850	0.851	-0.197	-0.622	
HRTA4	1	5	3.720	0.900	-0.079	-0.762	
HRTA5	1	5	3.640	0.958	-0.215	-0.481	
EDC	EDC1	2	7	5.030	1.321	0.124	-1.017
	EDC2	1	7	4.930	1.340	0.122	-0.788
	EDC3	1	7	4.950	1.336	0.063	-0.731
	EDC4	1	7	4.920	1.390	-0.068	-0.647
	EDC5	1	7	4.880	1.416	0.015	-0.799
	EDC6	1	7	5.090	1.341	-0.063	-0.822
EDP	EDP1	1	5	3.800	0.882	-0.280	-0.332
	EDP2	1	5	3.820	0.905	-0.390	-0.306
	EDP3	1	5	3.840	0.852	-0.253	-0.390
	EDP4	1	5	3.830	0.877	-0.338	-0.247
	EDP5	1	5	3.820	0.886	-0.393	-0.099
	EDP6	1	5	3.860	0.869	-0.422	-0.097

Table 2 have been accurately represented using a normal distribution. The range of skewness values observed was from -2 to $+2$ (-0.668 to -0.041). Similarly, for kurtosis, data are considered normal if the values are within the range of -7 to $+7$ (-1.017 to 0.097) (Table 2).

4. Statistics of test results

4.1. Measurement model and structural model

After creating the assessment model, validity and reliability were examined (Table 3). Each scale had a Cronbach’s alpha over 0.7, and the Composite dependability (CR) passed dependability standards. Furthermore, it was crucial to evaluate the measurement model’s validity, particularly its discriminant and convergent validity. Reliability assessment requires AVE and CR estimation for each variable. At least 0.70 and 0.50 for CR and AVE are recommended. Thus, the measurement model deems constructs reliable if loadings are at least 0.50 [77]. Table 3 reveals AVE ratings of 0.710–0.842 and composite dependability values of 0.934–0.970. Both exceed the 0.70 and 0.50 cutoffs. Table 3 exhibits measurement model reliability and mutual validity. Examining whether the items of constructs converge with the latent constructions is known as convergent validity. Convergent validity is assessed using factor loadings, matching t-values, and the AVE [78]. Factor loadings for all constructs were significant ($p < 0.001$) and exceeded the 0.50 criteria, with ranges from 0.777 to 0.937. Furthermore, all factor loadings were statistically significant ($p < 0.001$), with z-values exceeding 1.96 and ranging from 17.570 to 29.055.

The two-step Anderson and Gerbing [78] procedure begins with IBM AMOS 22.0 and maximum likelihood estimate for confirmatory factor analysis (CFA) (Table 3). When necessary, non-dimensional parts were removed to respecify poorly fitting variables. The measurement model was assessed using different fit measurements. Model fit was evaluated using the usual χ^2 approach. Brown

Table 3
Reliability and validity test.

Dimensions		Estimate	S.E.	Z	P	Estimate	Cronbach’s	CR	AVE
HI-HRMP	HRCD4	1				0.931	0.929	0.934	0.780
	HRCD3	0.991	0.044	22.682	***	0.821			
	HRCD2	0.950	0.035	26.962	***	0.887			
	HRCD1	0.902	0.040	22.443	***	0.891			
	HRE2	1				0.912	0.919	0.955	0.811
	HRE1	1.007	0.043	23.244	***	0.904			
	HRF3	1				0.893			
	HRF2	1.019	0.040	25.709	***	0.896			
	HRF1	1.040	0.040	25.783	***	0.898	0.932	0.954	0.804
	HRIS2	1				0.903			
	HRIS1	0.998	0.041	24.129	***	0.881			
	HRR3	1				0.882			
	HRR2	1.032	0.040	26.047	***	0.914	0.936	0.943	0.787
	HRR1	1.029	0.041	25.389	***	0.903			
	HROT4	1				0.885			
	HROT3	0.963	0.040	23.897	***	0.871			
	HROT2	1.045	0.040	26.398	***	0.911	0.943	0.944	0.770
	HROT1	0.981	0.040	24.538	***	0.882			
	HRTA5	1				0.849			
	HRTA4	0.981	0.043	22.770	***	0.886			
HRTA3	0.896	0.042	21.398	***	0.856	0.937	0.936	0.710	
HRTA2	0.952	0.040	23.594	***	0.903				
HRTA1	0.962	0.042	23.092	***	0.893				
DL5	1				0.836				
DL	DL6	0.912	0.042	21.657	***	0.819	0.969	0.970	0.842
	DL4	0.957	0.044	21.875	***	0.890			
	DL3	0.975	0.045	21.548	***	0.882			
	DL2	0.944	0.047	20.108	***	0.847			
	DL1	0.878	0.050	17.570	***	0.777			
	EDC1	1				0.888			
EDC	EDC2	1.067	0.031	34.978	***	0.932	0.953	0.954	0.774
	EDC3	1.058	0.037	28.253	***	0.927			
	EDC4	1.113	0.038	29.055	***	0.937			
	EDC5	1.111	0.044	25.369	***	0.919			
	EDC6	1.033	0.039	26.383	***	0.902			
	EDP1	1				0.841			
EDP	EDP2	1.070	0.049	22.024	***	0.877	0.953	0.954	0.774
	EDP3	1.021	0.045	22.563	***	0.889			
	EDP4	1.051	0.047	22.547	***	0.889			
	EDP5	1.070	0.047	22.859	***	0.895			
	EDP6	1.037	0.046	22.434	***	0.886			

Note. ***p < 0.001 level (one-tailed); CR: composite reliability; AVE: average variance extracted.

recommends using the TLI, CFI, RMSEA, and Standardized Root Mean Square Residual to assess the CFA solution's fit because the chi-square is sensitive to sample size. Good model fit has high first two indices (0.95). An excellent fit is RMSEA and SRMR values below 0.07, whereas an adequate fit is near 0.10 [77]. Fit indicators with strong simulation performance were chosen for this study. Table 4 shows that the structural model fits the data well. Maximum Likelihood Estimation with structural equation modeling yielded the following data and model fit indices: Values: $\chi^2(266) = 1462.63$ ($p < 0.001$), CMIN/DF = 2.232, GFI = 0.948, AGFI = 0.969, IFI = 0.889, RMSEA = 0.058, CFI = 0.948, TLI Key fit indexes were all 0.9 or above. These results imply that the suggested model, which links behaviors and attitudes, is sound both conceptually and experimentally. The fit analysis is presented in Appendix B (Fig. 3). In single-factor confirmatory factor analysis, a significant fit index deviates from the original model, indicating no serious common method bias. The analysis results (Appendix B: Figs. 3 and 4) indicate no issues with common method bias.

Discriminant validity measures how much model constructs differ from others. Comparing the square root of AVE for each construct to latent variable correlations determines discriminant validity. As proposed by Fornell and Larcker [79] discriminant validity is demonstrated when diagonal elements surpass off-diagonal elements (Table 5), according to a comparison of all the correlations of AVE square roots in the table. From the above analysis, all the conditions for discriminant validity are fully met. Structural models were tested and assessed for each of the eleven hypotheses, as the measurement model showed a good overall fit and was efficient and dependable.

4.2. Second-order conformational analysis

The original scales used for HI-HRMP encompassed seven sub-dimensions (Table 6) (capability development, empowerment, fair rewards, information systems, recognition, organizational trust, and technology adoption). To make the SEM simpler and the estimation parameters smaller, a second-order model was built. The primary order includes seven components, whereas the second order includes HI-HRMP. Model goodness-of-fit indices: $\chi^2/df = 2.875$, GFI = 0.835, AGFI = 0.795, IFI = 0.937, and RMSEA = 0.084, all within suggested ranges. Furthermore, the chi-square ratio of the first-order seven factors to the second-order factor was 92.65 %, indicating a target coefficient of 0.92. According to Marsh and Hocevar [80], a target coefficient closer to 1 is indicative of a better fit. Therefore, this second-order model is deemed acceptable. The second-order factor analysis is presented in Appendix C (Fig. 5).

4.3. Path hypothesis testing

Table 7 shows that HI-HRMP has a positive impact on employee dynamic capability ($\beta = 1.279$, $p < 0.001$) and on employee digital performance ($\beta = 0.352$, $p < 0.001$). Employee dynamic capability also has a positive impact on employee digital performance ($\beta = 0.353$, $p < 0.001$). However, digital leadership does not affect employee digital performance ($\beta = -0.043$, $p > 0.05$) nor employee dynamic capability ($\beta = 0.074$, $p > 0.005$).

4.4. Mediating effects test

Hayes et al. [81] recommend Bootstrap for mediating effect testing. Researchers fully integrated it into AMOS analysis, allowing repeated random sampling, establishing percentile confidence intervals, and revealing mediation if the confidence interval contains zero. SEM mediation effects of HI-HRMP and EDC were evaluated using 1000 bias-corrected percentile Bootstrap resampling. The results are in Table 8. Direct effect testing showed that the DL-EDP relationship's 95 % confidence interval is zero, indicating that H1 is not supported. This study includes three specific indirect effects paths: "DL→HI-HRMP→EDC→EDP" and "DL-HI-HRMP-EDP", Two of the three mediation hypotheses do not contain 0 at the 95 % confidence interval, which indicates that these two paths' indirect effects are significant, validating hypotheses H6 and H3. Furthermore, it can be observed that the chain mediating effect "DL→HI-HRMP→EDC→EDP" is the most significant, followed by the "DL-HI-HRMP-EDP" mediation effect. However, this path (DL-EDC-EDP) contains zeros in the 95 % confidence interval, so H5 is not supported. In terms of relative effect percentages, the chain mediating effect explains 54.1 % of the total effect, and this path (DL-HI-HRMP-EDP) explains 42.2 % of the total effect, Therefore, it is evident that DL impact on EDP must go through HI-HRMP as a mediating to influence EDC and enhance EDP. The analytical framework is depicted in Fig. 2.

5. Discussion

The hypothesis H1 proposed that there is no direct impact of digital leadership on employee digital performance. These findings align with comparable research [23,60,75]. Past studies have shown that digital leadership's impact on employee performance

Table 4
Fit indices of measurement and structural mode.

Fit indices	χ^2/f	SRMR	RMSEA	GFI	AGFI	IFI	CFI	TLI
Reference values		<0.080	<0.080	>0.900	>0.900	>0.900	>0.900	>0.900
Test values	2.232	0.039	0.058	0.948	0.969	0.889	0.948	0.944

Note: TLI: Tucker-Lewis's index; CFI: Comparative fit index; RMSEA: Root means the square error of approximation; SRMR: standardized root means square residual.

Table 5
Correlations and average variance extracted.

Dimensions	EDP	EDC	HIRHM	DL
EDP	0.829			
EDC	0.793	0.908		
HIRHM	0.723	0.804	0.921	
DL	0.629	0.712	0.860	0.829

Notes: The square root of the average variance extracted for each construct is denoted in bold and italics, while the inter-construct correlations are shown off-diagonally.

Table 6
The chi-squared comparison of second-order constructs.

HI-HRMP	χ^2	Df	χ^2/df	GFI	AGFI	CFI	RMSEA
First-order factor analysis	594.129	209	2.842	0.846	0.896	0.942	0.076
Second-order factor analysis	641.235	223	2.875	0.835	0.895	0.937	0.079
Recommended value			<5	>0.8	>0.8	>0.9	0.084

Table 7
Path relationship.

Path Relationship	Unstad.	S.E.	C.R.	P	Stad.
DL→HI-HRMP	0.830	0.054	15.420	***	0.872
HI-HRMP→EDC	1.279	0.132	9.705	***	0.808
DL→EDC	0.074	0.112	0.658	0.511	0.049
EDC→EDP	0.353	0.044	7.949	***	0.557
DL→EDP	-0.043	0.073	-0.583	0.560	-0.045
HI-HRMP→EDP	0.352	0.099	3.558	***	0.351

Table 8
Bootstrap mediation effect.

Path relationship	Point estimate	Product of coefficient		Bootstrapping				
		SE	Z	Bias-corrected		Percentile 95 % CI		
				Lower	Upper	Lower	Upper	
Mediation effects, direct effects, and total effects testing								
DistalIE	DL→HIHRMPL→EDCL→EDP	0.375	0.081	4.630	0.242	0.543	0.242	0.547
EIIE	DL→HI-HRMP-EDP	0.292	0.113	2.584	0.087	0.540	0.078	0.523
SATIE	DL→EDC→EDP	0.026	0.054	0.481	-0.078	0.138	-0.084	0.130
TIE	DistalIE + EIIE + SATIE	0.693	0.089	7.787	0.533	0.890	0.528	0.874
DE	DL→EDP	-0.043	0.085	-0.506	-0.239	0.100	-0.218	0.111
TE	DE + TIE	0.650	0.059	11.017	0.549	0.773	0.548	0.771
Comparison of mediation effects.								
EIDIEdiff	EIIE VS. DistalIE	-0.083	0.164	-0.506	-0.382	0.259	-0.405	0.232
SATDIEdiff	SATIE VS. DistalIE	-0.349	0.120	-2.908	-0.621	-0.141	-0.623	-0.143
EISATdiff	EIIE VS.SATIE	0.266	0.131	2.031	0.030	0.550	0.027	0.549
Proportion of mediation effect								
P1	DistalIE/TIE	0.541	0.140	3.864	0.332	0.858	0.341	0.873
P2	EIIE/TIE	0.422	0.126	3.349	0.157	0.657	0.137	0.643
P3	SATIE/TIE	0.037	0.081	0.457	-0.107	0.207	-0.120	0.197
P4	TIE/TE	1.066	0.133	8.015	0.854	1.408	0.834	1.354
P5	DE/TE	-0.066	0.133	-0.496	-0.408	0.146	-0.354	0.166

requires the involvement of mediator variables. For instance, job satisfaction [54], employee innovation [23,60], artificial intelligence [82] and others mediate digital leadership and employee performance. This study aligns with past research in demonstrating a similar consistency, which implies that digital leadership in SMEs cannot directly motivate employees to achieve performance goals. Therefore, the findings of this study indicate that the primary characteristics of digital leaders lie in strategic guidance, collaboration with managers, and dynamic management capabilities [29]. Furthermore, digital leaders in SMEs do not rely on rules to capture the audience’s attention; Instead, they focus on sharing information, coaching and achievement, and enhancing encouragement [47]. Moreover, Previous research has shown that digital leadership affects organizational effectiveness. However, there is a significant disparity in research findings across different industries [20,21,23]. This study demonstrates the alignment between digital leaders and HI-HRMP in influencing employee-based resources, implying that achieving employee digital performance requires the assistance of

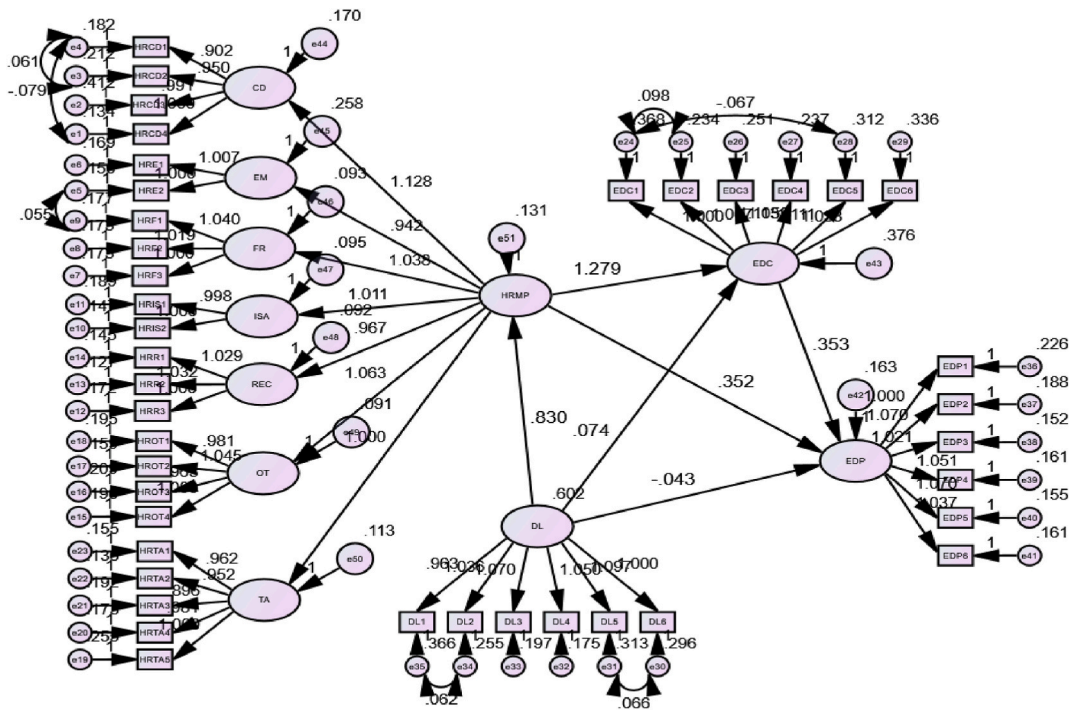


Fig. 2. Research framework.

HI-HRMPs [14]. This also suggests that digital leadership in Chinese SMEs may encourage managers to better understand the use of digital technology in alignment with the company’s business orientation. Digital leadership can guide the concept of how to manage digital technology centrally and create innovation opportunities using digital technology, rather than directly achieving employee performance [20].

Hypothesis H2 was proposed, suggesting a significant relationship between digital leadership and HI-HRMP. These results are consistent with similar research findings [37,47,60]. Researchers point out that digital leadership has a strong impact on HRMPs. Digital leaders can promote digital development by implementing HI-HRMP, such as strategic planning, fair rewards, happiness, occupational safety and health [47]. Therefore, digital leaders must also collaborate with HR managers and empower employees to boost employee performance. They should use dialogue-based open HR management plans to win over employees. Previous empirical research shows that digital leaders’ dynamic management capabilities have an important impact on middle managers’ implementation of best management practices. Therefore, digital leadership significantly affects HI-HRMP.

Hypothesis H3 was proposed, suggesting that HI-HRMP mediates the relationship between digital leadership and employee digital performance. This research outcome indicates a similar consistency with conclusions drawn from past studies [70,39]. Moreover, HI-HRMP accounts for 42.2 % of the total mediation effect (P2), indicating that in SMEs, in the relationship between employee digital performance and digital leadership, HI-HRMP is a key mediating factor. The results indicate that the alignment between digital leaders and HRMPs in SMEs will facilitate the achievement of employee digital performance. Therefore, in the process of digital transformation in Chinese SMEs, digital leaders need to engage in open dialogue with middle managers to better stimulate the emergence of employee-based resources and enhance employee digital performance. Moreover, digital leaders need to engage in open dialogue with middle managers to better stimulate the emergence of employee-based resources and improve employee digital performance. The mediating role of HI-HRMP suggests that visionary digital leaders should provide employees with opportunities for skill development, empowerment, information sharing, recognition, fair rewards, and access to technology to ensure the achievement of employee digital performance.

Hypothesis H4 suggests digital leadership does not directly affect employee dynamic capabilities. The results of this study resemble those of other scholars [37,61,68]. Although past research has shown that Digital leadership has both direct and indirect consequences on dynamic capabilities, there is significant differentiation between dynamic capability and employee dynamic capability [41]. Firstly, from a conceptual standpoint, dynamic capability refers to an organization’s ability to acquire, integrate, and utilize resources in dynamic environments to achieve sustained competitive advantage [39]. Secondly, employee dynamic capability refers to employees’ ability to contribute to the organization in dynamic markets [41]. Therefore, the main distinction between the two concepts lies in the entities responsible for achieving organizational performance goals, one being the organization itself, and the other being the employees. Furthermore, SMEs exhibit strategic operation, adaptation, and flexibility, allowing them to make rapid adjustments in uncertain settings [44]. Digital leaders are primarily responsible for strategic planning and dynamic management, with little interaction with employees.

Hypothesis H5 suggested that employee dynamic capability does not serve as a mediator in the relationship between digital leadership and employee digital performance. The conclusions of this study align with the results of other researchers' studies [18,37,61]. Moreover, past literature suggests that the managerial cognition of CEOs contributes to explaining when the implementation of human resource management initiatives can bring about more organizational-level employee resources, and when companies can effectively manage and coordinate these resources to achieve production objectives [37]. Furthermore, empirical research indicates that different leadership styles, through their influence on the HR system, are directly or indirectly positively correlated with dynamic capabilities (perceiving, seizing, and reconfiguring) [61]. The research findings indicate that the dispersed geographical locations, small scale, low resilience to risk, and high costs of digital transformation in Chinese SMEs have increased the difficulty of digital transformation [18]. Chinese SMEs require digital leaders to establish clear digital transformation objectives and directions. Additionally, they need to engage in extensive communication with HR managers to maximize the activation of employee dynamic capabilities to achieve the development of SMEs. Therefore, in Chinese SMEs, digital leaders driving the emergence of employee-based resources necessitate the implementation of consistent HRMPs.

Hypothesis H6 proposed that employee dynamic capability and HI-HRMP serve as chain mediators between digital leadership and employee digital performance. They account for a total mediation effect of 54.1 % (P2). First, this indicates that digital leadership is the driving force behind the relationship between HI-HRMP and employee dynamic capability, as digital leaders formulate visions, strategies, and cultures that promote the digital transformation of SMEs. Their commitment to digital excellence inspires the entire organization. HI-HRMP practices serve as the first mediators in this chain. Through a series of practices such as capacity development, empowerment, information sharing, organizational trust, recognition, and empowerment, as well as the use of technological innovation, they create an environment conducive to the development of digital skills and motivation. These practices facilitate employees in acquiring the essential abilities, improving their capacity to efficiently apply these talents, and encouraging information exchange. Ultimately, this fosters the development of employee dynamic capability, which is a crucial element in achieving employee digital performance. Secondly, the chain-mediated pathway of HI-HRMPs in the relationship between digital leadership and employee dynamic capability suggests that managers can employ different HR systems to harness different dynamic capabilities resulting from the behavior of employees. By defining and implementing suitable HR systems to create ideal dynamic capabilities, HR managers can enhance the strategy of their departments and provide the necessary support for business success and competitive advantage. Lastly, the emphasis on digital leadership as a catalyst for promoting HI-HRMPs underscores how it attracts employees and enhances employee dynamic capabilities. On one hand, it explains how digital leadership can strengthen HI-HRMP, thereby increasing employee engagement, empowerment, and enthusiasm. On the other hand, in the digital age, improving HI-HRMPs will contribute to enhancing the competitive advantage of SMEs.

6. Conclusions

Digital leadership has the characteristics of strategic orientation and dynamic management in Chinese SMEs. This characteristic determines that digital leaders do not directly participate in the management of employees. Digital leadership cannot directly affect employee dynamic capabilities and employee digital performance, nor can it affect employee digital performance through the mediation of employee dynamic capabilities. However, HI-HRMP can mediate the relationship between digital leadership and employee digital performance, suggesting that digital leaders investing in HRMPs are more likely to witness improvements. The significant contribution of this study demonstrates that when the strategic dynamic management capabilities of digital leaders effectively align with those of HR managers, it can enhance employee dynamic capabilities and improve their digital performance. Moreover, the chain mediation path "DL → HI-HRMPs → EDCs → EDP" is the most significant, explaining a substantial portion of the total effect (54.1 %). This underscores the crucial position of HI-HRMPs in achieving employee digital performance.

6.1. Theoretical contributions

This study clarifies how HI-HRMPs mediate digital leadership and employee digital performance. It underscores the significance of HI-HRMPs as a bridge that translates leadership initiatives into tangible outcomes, emphasizing their mediating role. This study examines multiple pathways, including direct and indirect impacts, and provides a more comprehensive perspective on how digital leadership, HI-HRMPs, employee dynamic capability, and employee digital performance are interrelated. This integrated approach enriches the theoretical framework in this field. Firstly, leadership strategy and HRMPs contribute to the competitive advantage of companies by creating greater organizational-level rare and valuable employee resources. While this mediating model has received early empirical support, previous research has largely overlooked two key aspects of the RBV perspective. Existing research have, on one hand, not been able to sufficiently explain the continuation of variations in employee-based resources among firms implementing the same HR approach at the corporate level [37]. On the other hand, this study subject has mainly ignored current viewpoints on the RBV, which hold that employee-based resources only generate a competitive advantage when they complement other organizational capacity. This alignment helps the business to efficiently allocate these resources for uses in production. The theoretical contribution of this study is that SMEs should fully leverage VRIN resources (HRMPs), meaning that the alignment between digital leaders' management strategies and HI-HRMP strategies can lead to the emergence of more employee resources and thereby generate sustained competitive advantage. Secondly, although the DCT has been extensively studied in the past, the academic community has not yet distinguished between DCT and employee dynamic capability. This study essentially distinguishes between dynamic capability and employee dynamic capability, so completely capturing the relevance of employee dynamic capability in dynamically changing digital marketplaces and extending the applicability of DCT. Additionally, the uniqueness of this study lies in applying HI-HRMP and EDC as

chain mediating variables in the digital market. This approach extends the application of HRMPs and DCT, providing theoretical guidance and decision support for the digital operations of SMEs.

6.2. Practical implications

This article goes beyond previous research by emphasizing the necessity of cultivating digital leadership combined with HI-HRMP, while also highlighting the importance of different HRMPs aligned with digital leadership. Therefore, digital leadership can be seen as positive, as it motivates HR managers and gives meaning to their work. When digital leadership is aligned with HRMPs, it actively promotes the realization of employee dynamic capability. The conclusions of this study suggest that digital leadership and HI-HRMPs have become effective tools for acquiring employee dynamic capability. Digital leaders may facilitate various directions of the HR system, thereby guiding the organization to acquire comprehensive capabilities. These findings also provide crucial insights for HR managers. The various mediating roles of HRMPs in the relationship between digital leadership and employee dynamic capability suggest that managers can apply different HRMPs to leverage employee resources, thereby generating distinct dynamic capabilities. This enables HR managers to better comprehend the strategic contributions of their departments. The significance of this study is in demonstrating how digital leaders, through the implementation of HI-HRMPs (capability development, empowerment, information sharing, recognition, and employee involvement), can identify which management strategies cultivate optimal employee resources (employee dynamic capability) and subsequently enhance performance goals. In the future, different industries and cultural contexts can tailor their leadership styles and HRMPs to optimize enterprise management. The practical significance of this study lies in providing direction for effective HRMPs.

6.3. Future research

Firstly, the subjects investigated in this study are specific to certain industries in SMEs, which poses some limitations. In the future, combining self-reported data with objective measurements or qualitative assessments can reduce measurement bias and provide a more comprehensive understanding of the phenomenon under study. Secondly, while this study demonstrates that the alignment between digital leaders' management strategies and HI-HRMP in Chinese SMEs can lead to the emergence of employee resources and ultimately improve employee digital performance, it is limited to a specific region in China. Therefore, this study proposes HRM strategies at a specific developmental stage. Future research can further expand the universality of the research model in two aspects. Firstly, exploring different leadership types such as transformational leadership, servant leadership and shared leadership according to different countries and industries. Secondly, while this study adopts HI-HRMPs because in the digital age, HI-HRMP has been demonstrated to aid employees in adapting to technology, future research can explore more HR practices, such as high-commitment HRMPs, in different industries to make the research model more widely applicable across different countries and industries. In conclusion, while this study has provided valuable insights, future research can still address its limitations and further advance our understanding of digital leadership, HI-HRMP, employee dynamic skills, and employee digital performance in various organizational contexts.

Ethics statement

This study was reviewed and approved by the Research Ethics Committee of Putra Malaysia University with reference number: JKEUPM-2024-061.

All participants provided informed consent to participate in the study.

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CRedit authorship contribution statement

Guifang Wang: Writing – review & editing, Writing – original draft, Supervision, Software, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Zuraina Dato Mansor:** Supervision. **Yee Choy Leong:** Supervision.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A Table A1. Scale items

Table 1
Variables operationalization

NO	Items	Source
Digital leadership		
1	The leaders in our company recognize the network character by identifying the competencies and contacts of individual employees.	[20]
2	In our firm, leaders develop trust in the employees.	
3	In our firm, leaders provide necessary information to employees.	
4	In our firm, leaders act as learning guides and coaches.	
5	Leaders are open to critique, feedback, and new ideas.	
6	Leaders have high confidence in their capabilities because of the fast-changing environment.	
High-involvement human resource management practice (HI-HRMP)		
1	Competency development (CD): Formal training and competency development activities are available in my organization.	[58]
2	Competency development (CD): Comprehensive training and development programmer are available in my organization.	
3	Competency development (CD): My organization has training programmers for new hires.	
4	Competency development (CD): My organization provides training and competency development for problem-solving ability.	
5	Empowerment (EMP): I am given considerable latitude for the organization of my work.	
6	Empowerment (EMP): I have considerable freedom regarding the way I carry out my work.	
7	Fair rewards (FR): I estimate my rewards as being fair internally.	
8	Fair rewards (FR): My reward is fair in comparison with what is offered for a similar job elsewhere.	
9	Fair rewards (FR): My reward level adequately reflects my level of responsibility in the organization.	
10	Information sharing (IS): I am regularly informed of my performance.	
11	Information sharing (IS): I am regularly informed of updated information of my organization.	
12	Recognition (REC): When I do good quality work, my organization appreciates me.	
13	Recognition (REC): My supervisor tangibly recognizes my efforts in different ways.	
14	Recognition (REC): My colleagues congratulate me in recognition of my efforts.	
15	Organizational trust (OT): Management at my organization is sincere in its attempts to meet the workers' point of view.	
16	Organizational trust (OT): My management can be trusted to make sensible decisions for the organization's future.	
17	Organizational trust (OT): My management at work seems to do an efficient job.	
18	Organizational trust (OT): I feel quite confident that my organization will always try to treat me fairly.	
19	Technology adaptation (TA): I have skillfully used the tools and applications the new technology provides.	
20	Technology adaptation (TA): I have quickly become familiar with the new technology.	
21	Technology adaptation (TA): It was easy for me to adjust myself to the new technology introduced in my organization.	
22	Technology adaptation (TA): I have accurately managed all the facilities the new technology provides.	
23	Technology adaptation (TA): I consider myself a frequent user of my organization's technology.	
Employee dynamic capability (EDC)		
1	Change sensitivity item 1: I quickly notice and successfully recognize in the environment (both inside and outside of the organization) opportunities and threats (including early warning signals) that can affect the work I do.	[41]
2	Change adaptation—item 1: I adapt effectively to the opportunities and threats appearing in the environment (both inside and outside the organization). I undertake preventive actions that will enable me to carry out the tasks entrusted to me despite changes in the environment.	
3	Change sensitivity—item 2: I quickly notice and successfully recognize problems appearing at the workplace.	
4	Problem-solving and innovative approach—item 1: I quickly solve problems appearing, I do it on my own or seek support (within the scope of knowledge and information) that allows me to perform assigned tasks.	
5	Problem-solving and innovative approach—item 2: I generate innovative ideas and original solutions to problems.	
6	Personal development—item 1: I constantly develop my competencies and raise my qualifications. I develop myself through my work.	
Employee digital performance (EDP)		
1	I find solutions to work problems after performing analytics with the big data generated by smart/digital technologies.	[14]
2	I need less time to complete job tasks by analyzing big data.	
3	The quality of my work has been improved with analytics of big data.	
4	I try out innovative ways to improve business performance or product/service quality through performing analytics of the big data generated by smart/digital technologies.	
5	I come up with creative solutions to task problems through data analytics.	
6	I try new and innovative ideas at work when performing analytics with big data.	

Appendix B

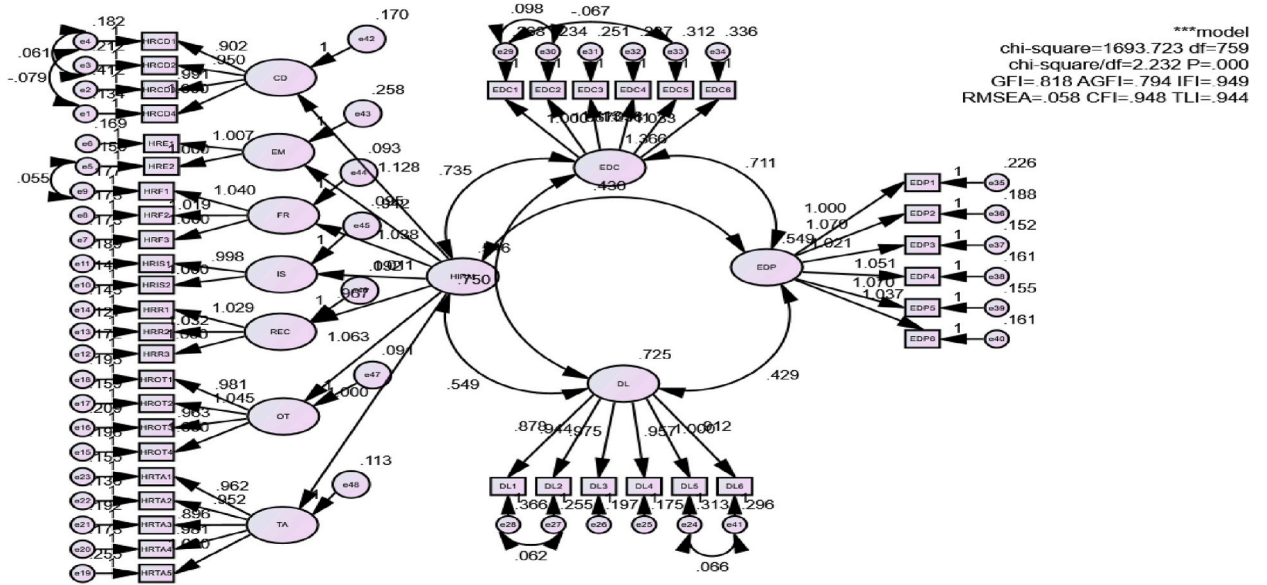


Fig. 3. Total fit mode.

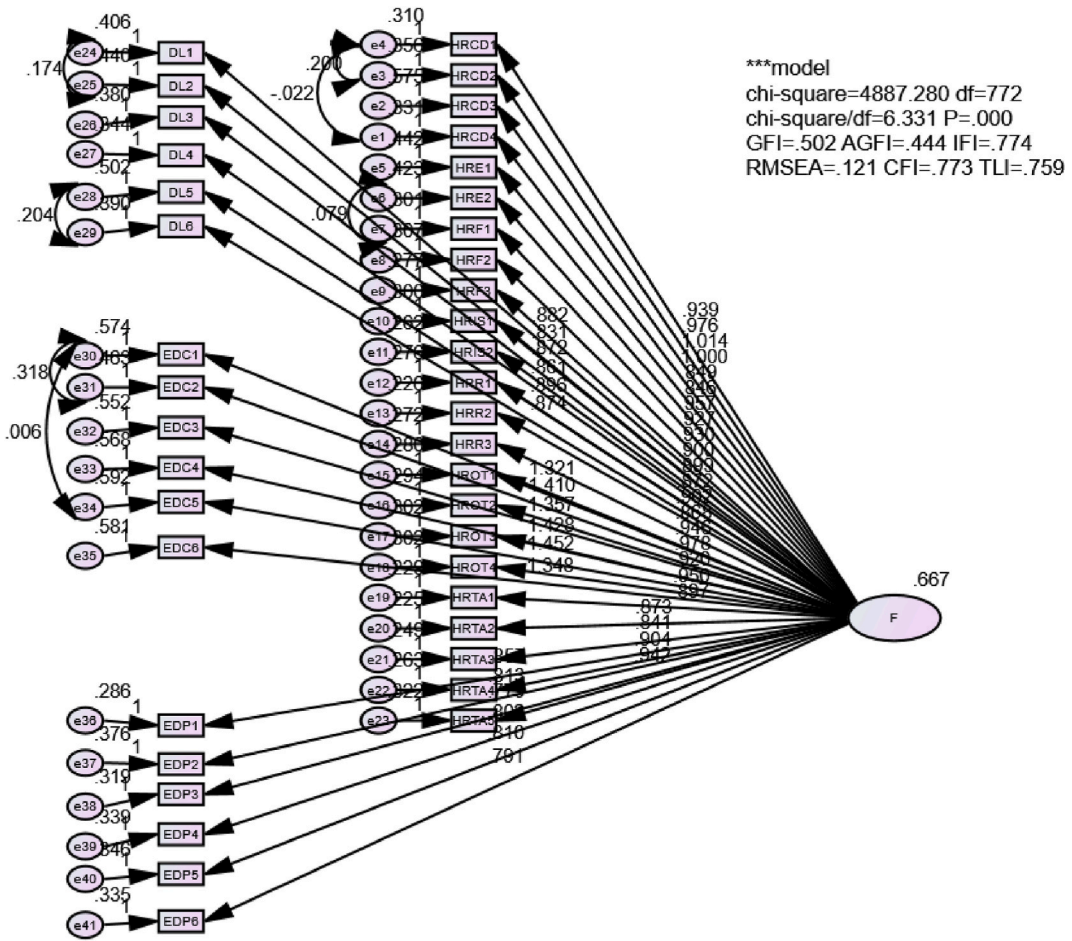


Fig. 4. Fitting the indicator model.

Appendix C

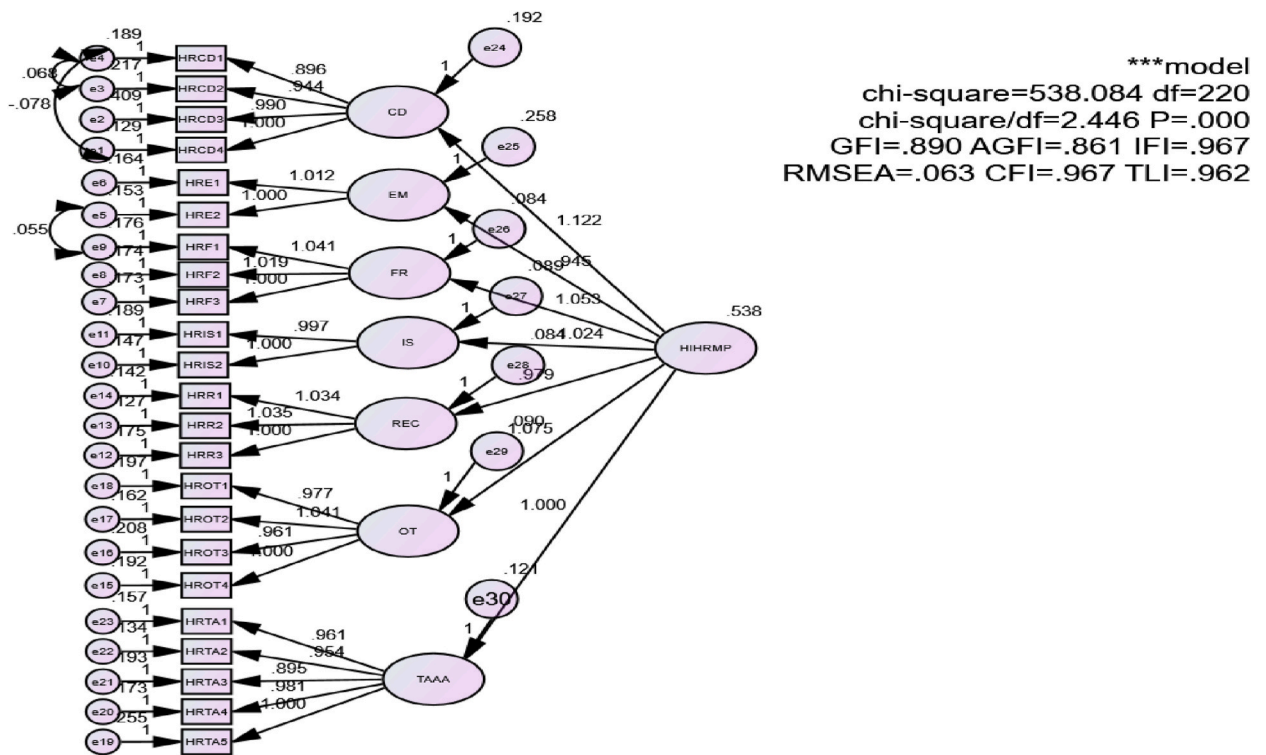


Fig. 5. Second-order fit model.

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