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Linking enterprise information systems success to female employees' work–family enrichment in China

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Abstract
The spread and application of enterprise information systems (EISs) has provided scholars and managers with a new perspective to enhance the work–family enrichment. Based on the work–family enrichment theory, this research aims to examine the ability of female employees to enhance their work–family enrichment by applying the resources accumulated through the use of EISs by combining the technology acceptance model with the DeLone & McLean Information Systems Success Model. The findings based on a survey of 823 full-time female employees in China indicated that the information systems quality factors (including information quality, system quality, and service quality) were positively associated with female employees' work–family enrichment. In addition, the chained mediating effect of perceived ease of use and perceived usefulness was examined. The results can help female employees to perform positively in both work and family spheres and provide positive support for the promotion of the social fertility policies.

Keywords: enterprise information systems; female workforce; work–family enrichment; D&M information system success model; technology acceptance model

Introduction

As women's social status and participation increase in the 21st century, unlocking the potential of female employees' productivity is crucial to the improvement of overall social productivity. According to the China Statistical Yearbook, women accounted for 49.41% and 48.95% of those with undergraduate and graduate higher education in 2020, respectively, and this proportion has gradually increased over the past 5 years to nearly 50%. However, the difficulty of reconciling the dual roles of work and family for female employees has become one of the core factors that confines their employment and productivity. In the context of three-child policy in China from 2021, there is a risk of further intensifying the core conflict between companies' fundamental goal of maximizing economic benefits and the operational pressures brought by female employees' pregnancy and childbirth (Shen & Jiang, 2020). Companies not only need to pay for the direct costs of maternity leave, such as wages and job vacancies, but also have to bear the indirect losses caused by the possible decline of job skills and lack of updated knowledge after returning to work after childbirth. Therefore, despite the increasing number of female employees entering the labor market, managing the relationship between work and family remains an important and complex challenge.

Compared to Western societies, Chinese employees are more willing to integrate work and family roles due to collectivist attitudes (Ashforth & Fugate, 2000) and therefore experience less work–family conflict and more work–family enrichment (Spector et al., 2007). Many scholars have suggested that

positive work–family enrichment relationships are predominant among female employees (Aryee, Srinivas, & Tan, 2005; Mcnall, Masuda, & Nicklin, 2009). In 2006, Greenhaus and Powell (2006) defined work–family enrichment as 'occurring when resources from work area contribute to the more effective functioning of family area.' Although existing scholarship has extensively explored how enterprises could lead to work–family enrichment for female employees, including work flexibility (Carlson, Grzywacz, & Kacmar, 2010), positive leadership styles (Wu, Kuo, Lin, Hu, Wu, & Cheng, 2020), employee identity (Wayne, Randel, & Stevens, 2006), and workaholic personalities (Taheri, Asarian, & Shahhosseini, 2020), it has overlooked the fact that the skills acquired in the work environment could also improve their family experiences. For example, the time management skills that female employees acquire in their work roles can directly improve their childcare roles (Nicklin & Mcnall, 2013). Similarly, the European Working Conditions Survey (European Foundation for the Improvement of Living and Working Conditions, 2007) suggests that the availability and use of information technology may also affect the interactions between employees' work and family. The latest study found through field experiments with employees in German public agencies that corporately provided mobile devices decrease work–life conflict (Lemmer, Jahn, Chen, & Niehaves, 2023). However, few studies to date have examined the impact of female employees' use of information technology in the work domain on their family domain from a theoretical or empirical perspective.

The rapid development and widespread use of information systems as a core resource of enterprises marks the gradual informatization and intelligence of employees' work style, which provides ideas for coordinating the work–family relationship of female employees. According to China's Fourth National Economic Census, 83.9% of surveyed enterprises made investments in information technology, with a total amount of about 653.35 billion yuan in 2018. An enterprise information system (EIS) is a combination of hardware, software, and network services built to collect, process, organize, store, and disseminate information, such as supply chain management systems, customer relationship management systems, enterprise resource planning systems, and e-learning systems. From the theoretical perspective of work–family enrichment, the development of EIS provides a valuable resource for employee skill enhancement, which can directly help employees with family-related issues. For example, organizations use Information and Communication Technology and Internet technologies to develop online courses and training programs and supplement training opportunities missed by female employees due to maternity leave through e-learning systems (Cheng, 2012). In addition, the use of tele-conferencing systems provides communication and meeting capabilities for communicators from different locations, reducing the time and cost of business activities for female employees (Park, Rhoads, Hou, & Lee, 2014). From the perspective of information systems success, although most studies have examined the positive effects of information systems success on corporate profits, costs, or market share at the organizational level (Asmussen & Moller, 2020; Pan, Nunes, & Peng, 2011; Tian & Xu, 2015; Zhu, Li, Wang, & Chen, 2010) and have also explored the relationship between information systems success and employee satisfaction with information systems use and intention to use it (Laumer, Maier, & Weitzel, 2017; Lee & Kim, 2017), whether EIS could positively enrich the work–family relationship of female employees still needs to be further tested.

Over the past three decades, a large number of studies related to management information systems have assessed the success of building an EIS from the perspective of end users (i.e., employee perceptions). Scholars have commonly adopted the D&M information system success model proposed by Delone and Mclean (2003), which proposes to assess the net benefits of information systems through three dimensions of information systems quality, including information quality, system quality, and service quality. Although a large body of research has explored the mechanisms by which perceived EISs quality affects employee satisfaction with information systems use, intention to use, and job performance using the D&M Information System Success Model (D&M ISSM), such as enterprise content management systems (Laumer, Maier, & Weitzel, 2017), social network services systems (Lee & Kim, 2017), and cloud financial information systems (Li & Wang, 2021), it has consistently failed to link EISs success to employee performance in non-work domains or in work–home interactions. The technology acceptance model (TAM), proposed by Davis in 1986, provides a framework for assessing

employees' cognitive responses to information systems, including perceived usefulness and perceived ease of use. The model provides an important theoretical underpinning for this study to explore whether building corporate information systems improves employees' skills or mindsets and thus their work–family relationships. Therefore, in order to link the construction of corporate information systems with employees' positive work–family relationships, this study combines the TAM and D&M information system success models to comprehensively assess the success of corporate information systems in terms of two dimensions: employees' perceived information systems quality and information systems cognitive responses, and to analyze in depth the specific mechanisms by which the successful construction of corporate information systems affects the process of female employees' work–family enrichment.

Overall, this study aims to examine the contribution of applying EIS to female employees' work–family enrichment in China and provide insight into the mechanism of this impact in terms of multidimensional success factors including information systems quality and users' perceptions. This investigation makes two major contributions. First, we enriched and complemented the lack of positive effects of skill-enhancing resources in studies of the antecedents of work–family enrichment. Second, we bridged the gap between enterprises' technology resources to employees' psychosocial factors by linking EIS and employees' work–family relationship, which could help companies and female employees cope with the challenges of dual work–family role adaptation brought by maternity policy.

Conceptual background and hypotheses

Evaluating framework of information systems success

From the perspective of socio-technical system theory, both technical and social factors need to be included in any model that indicates the success of an information system (Bostrom & Heinen, 1977). In the last three decades of information systems research, scholars have generally used two theoretical models to assess the success of an EIS at both the technical and user levels. On the one hand, Delone and Mclean (2003) proposed the updated D&M ISSM and used three separate dimensions: information quality, system quality, and service quality to assess the success of information systems at the technical level. Information quality assesses whether the system ensures that the information is transmitted as intended; system quality assesses whether the system produces information accurately and efficiently; and service quality refers to the overall support provided by the service provider. On the other hand, the TAM proposed by Davis (1986) provides a framework for assessing users' cognitive responses to information systems, including perceived usefulness and perceived ease of use. Perceived usefulness refers to 'the extent to which a person believes that using a particular system will improve his/her performance,' while perceived ease of use refers to 'the extent to which a person believes that using a particular system requires no physical or mental effort'. Early research has demonstrated that perceived usefulness is a meaningful measure of the success of information systems in voluntary and compulsory use environments (Seddon & Kiew, 1996).

This study combines the D&M ISSM and TAM to examine the success of information systems and their consequences by considering information quality, system quality, and service quality of information systems as technical dimensions and perceived information systems usefulness and ease of use as user dimensions. In a large number of previous studies, information systems quality factors have been shown to be related to user perceived usefulness and ease of use. First, for information quality, earlier studies have found a statistically significant relationship between information quality and perceived usefulness (Teo & Wong, 1998), and Chen (2010) and Alsabawy, Cater-Steel, and Soar (2016) also found a significant relationship between information quality and perceived usefulness towards e-learning systems. Similarly, existing studies have also found that information quality directly affects perceived ease of use in online shopping systems (Ahn, Ruy, & Han, 2004), hospital information systems (Chen & Hsiao, 2012), and cloud enterprise resource planning (ERP) systems

(Kuo, Kang, & Yang, 2023). Therefore, this study argues that the information quality of an EIS can positively predict employees' perceived usefulness and ease of use of the information systems.

Hypothesis 1a: Information quality is positively related to perceived usefulness.

Hypothesis 1b: Information quality is positively related to perceived ease of use.

Second, a large number of studies have addressed system quality as a prerequisite for usefulness and/or ease of use, as system design characteristics are directly linked to enhanced perceived usefulness and perceived ease of use (Liaw, 2008; Sabherwal, Jeyaraj, & Chowa, 2006; Wixom & Todd, 2005). Seddon and Kiew (1996) have consistently shown in their studies that system quality is an important determinant of perceived usefulness. Chiou and Fang's (2005) study found that system quality has a significant impact on the perceived ease of use of Internet users. Judicial workers, nurses, and university lecturers also intend to perceive usefulness and ease of use when the system qualities of e-justice systems (Oktal, Alpu, & Yazici, 2016), nursing process information systems (Ho, Ho, & Chung, 2019), and learning management systems (Sulaiman, Mahomed, Rahman, & Hassan, 2023) are high, respectively. Indeed, high levels of system quality can produce a comfortable usage environment where users can effectively identify functional groups of information systems and efficiently navigate through the materials provided by the information systems, such as online retailing systems (Ahn, Ryu, & Han, 2007), hotel front office systems (Kim, Lee, & Law, 2008), and land registration information systems (Abab, Wakjira, & Negash, 2021). Therefore, this study argues that the system quality of an EIS positively predicts employees' perceived information systems usefulness and ease of use.

Hypothesis 2a: System quality is positively related to perceived usefulness.

Hypothesis 2b: System quality is positively related to perceived ease of use.

Finally, in response to service quality, Lin and Wu (2002) found that reliable and accurate service, willingness to help customers, knowledge, courtesy, and personalized attention to customers by the information systems department and IT support staff increased users' perceived ease of use. In addition to this, Ngai, Poon, and Chan (2007) empirically demonstrated a significant positive effect between service quality and perceived usefulness. Wang and Wang (2009) similarly reported a direct positive effect of service quality on system perceived usefulness, where system perceived usefulness is part of the user satisfaction construct. Recent studies have focused on several emerging information systems, such as e-procurement systems (Brandon-Jones & Kauppi, 2018), artificial intelligence-enabled clinical decision support systems (Ji et al., 2021), and behavioral electronic health records systems (Yoo et al., 2022), all of which have verified the essential role of service quality in improving perceived ease of use and usefulness. Therefore, this study concluded that the service quality of an EIS can positively predict employees' perceived information systems usefulness and ease of use.

Hypothesis 3a: Service quality is positively related to perceived usefulness.

Hypothesis 3b: Service quality is positively related to perceived ease of use.

Meanwhile, perceived usefulness and ease of use, the two main dimensions that reflect users' cognitive responses to information systems, have been applied in more than 30 of the 39 high-quality articles that have applied the TAM as of 2005, indicating that users' perceived ease of use has a positive impact on perceived usefulness (Hung, Liang, & Chang, 2005). Recently, Mishra, Shukla, Rana,

Currie, and Dwivedi ([2023](#)) utilized a meta-analytic structural equation modelling (SEM) to further review 84,343 samples from 214 independent studies, confirming the direct impact of perceived ease of use on perceived usefulness. Therefore, this paper argues that perceived ease of use of information systems can positively predict perceived usefulness of information systems.

Hypothesis 4: Perceived ease of use is positively related to perceived usefulness.

Work–family enrichment theory and information systems success

Greenhaus and Powell ([2006](#)) propose a theoretical model of work–family enrichment based on augmentation theory in terms of multi-role involvement and resource sharing and transfer. The work–family enrichment theory summarizes five work or family resources that contribute to work–family enrichment: skills and ways of thinking (referring to a range of task-related cognitive and interpersonal skills, coping skills, multi-tasking skills, and knowledge gained from role experiences), psychological and physical resources (e.g., self-efficacy, self-esteem, and optimism), social capital resources (e.g., online socialization), work flexibility (e.g., flexible work adjustments), and material resources (e.g., money and gifts).

 While the impact of gains across domains is bidirectional (Carlson, Kacmar, & Williams, [2000](#)), i.e., work-to-family and family-to-work, this study focuses on the direction of enrichments from work-to-family. First, recent literature suggests that the antecedents of work-to-family enrichment come from the work domain rather than the family domain, such as employees' perceptions of family support organizations (Carlson, Ferguson, Kacmar, Grzywacz, & Whitten, [2011](#)). And, work-to-family enrichments are more likely to be influenced by organizational practices (Halpern, [2006](#); Wang & Walumbwa, [2007](#)). In contrast, family-to-work enrichments are more influenced by family structures, resources, and processes (Shockley & Singla, [2011](#)). Furthermore, as high levels of work–family enrichment are associated with positive career attitudes (e.g., higher organizational commitment) and behaviors (e.g., lower turnover rates), work-to-family enrichments tend to realize potential gains for both the employee and the organization (Anderson, Coffey, & Byerly, [2002](#); Casper, Harris, Taylor-Bianco, & Wayne, [2011](#); Russo & Buonocore, [2012](#)). Therefore, this study explores the impact of variables originating in the work domain, i.e., the success of EISs, on work–family enrichment rather than family–work enrichment.

 According to the definition of work–family enrichment, as a prerequisite for gaining from the work domain to the family domain, female employees must integrate their work into the family domain to some extent (Matthews & Barnes-Farrell, [2010](#)). There is no doubt that the application of EIS has made it possible to significantly dilute the boundaries between work and family, and female employees can easily switch between work and family roles, thus managing both work and family roles at the same time (Wu, Hunter, & Sublett, [2021](#)). For example, research has shown the convenience and practicality of e-learning systems in balancing work and family for international female students (Kibelloh & Bao, [2014](#)). In addition, the spread of EIS has placed greater demands on female employees' problem-solving, communication and collaboration, and information processing skills (Kozanoglu & Abedin, [2020](#)). For example, a few investigations have shown that the success of an organization's supply chain management system is closely related to the employees' skills and knowledge related to the use of information technology (Dehgani & Navimipour, [2019](#); Jiang, Tian, Malayeri, & Balali, [2020](#)).

 As important predictors of work–family enrichment, the skills and ways of thinking gained in the work domain are resources that female employees can draw upon when they need to solve problems or cope with challenging events, such as childcare (Daniel & Sonnentag, [2016](#)). It has been shown that employees with higher skill diversity are more motivated and self-efficacious, able to demonstrate better performance and manage demand better (Fried & Ferris, [1987](#)). Improving skills in fully operating and implementing information device functions can also stimulate employees' knowledge
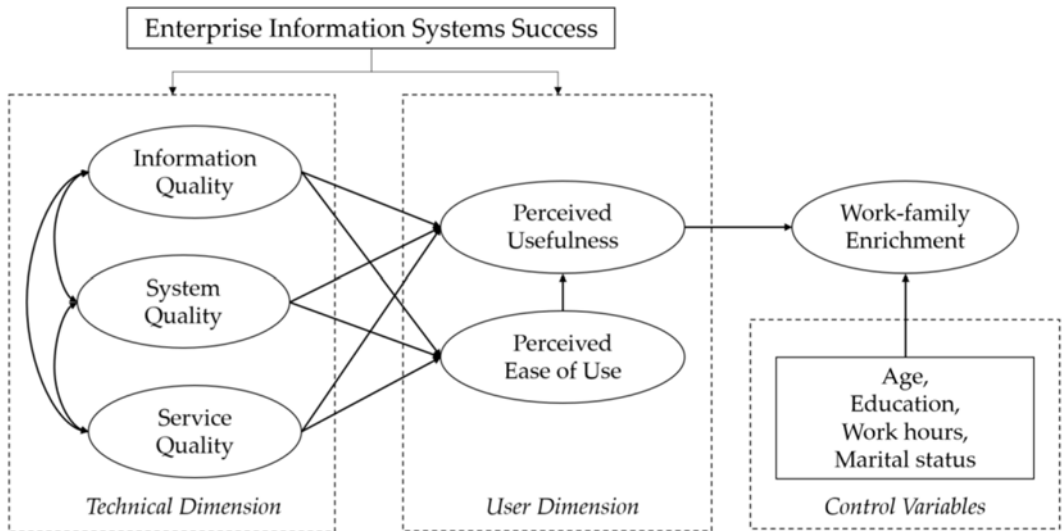
Figure 1. The theoretical model.

transfer behavior (Yuan et al., 2017), which may include purposeful knowledge sharing across individual boundaries, such as work and family. Powell et al. similarly verified that the skills employees learn on the job may lead to a happier and more fulfilling family life (Powell, Francesco, & Ling, 2009).

Therefore, we assume that the success of EIS enables female employees to develop new skills and perspectives, which enable them to perform their job duties more effectively and to be able to apply it to their families in a way that is consistent with family role expectations. Since perceived usefulness reflects the extent to which a person believes that using a particular system has improved his/her job performance (Seddon, 1997), we suggest the following hypothesis and the research framework was shown in Fig.1.

Hypothesis 5:   Perceived usefulness is positively related to work–family enrichment.

Hypothesis 6:   Perceived usefulness mediates the association between perceived ease of use and work–family enrichment.

Hypothesis 7a: Perceived usefulness mediates the association between information quality and work–family enrichment.

Hypothesis 7b: Perceived usefulness mediates the association between system quality and work–family enrichment.

Hypothesis 7c: Perceived usefulness mediates the association between service quality and work–family enrichment.

Hypothesis 8a: Perceived ease of use and perceived usefulness conduct as orderly chain structure, mediating the association between information quality and work–family enrichment.

Hypothesis 8b: Perceived ease of use and perceived usefulness conduct as orderly chain structure, mediating the association between system quality and work–family enrichment.

Hypothesis 8c: Perceived ease of use and perceived usefulness conduct as orderly chain structure, mediating the association between service quality and work–family enrichment.

Methods

Participants and procedure

We conducted our survey from several state-owned and multinational enterprises in mainland China, which were generally more advanced in terms of information technology construction. In addition, front-line employees accounted for a larger proportion of the total workforce in the research enterprises. The career development problems of female employees due to childbirth were more prominent within these labor-intensive enterprises. Therefore, we took full-time female employees in several departments of the research enterprises, such as the production department, quality department, R&D department, and administration department, as the whole sample, and randomly select them according to the employee numbers to ensure the integrity and objectivity of the data. We conducted an online survey and sent links of the questionnaire to all participants. Before participants formally answered the questions, the questionnaire would inform them that their participation was completely voluntary, anonymous, and confidential in order to avoid bias in the participants' responses. In addition, the questionnaire was designed with the independent and dependent variables placed in separate sections to minimize common method bias (Podsakoff, Mackenzie, Lee, & Podsakoff, 2003). A total of 1,500 questionnaires were distributed and 1,266 questionnaires were received, with a return rate of 84.4%. Since the online survey required all questions to be answered before submission, the response rate of all returned questionnaires was 100%. After the questionnaires were collected, 823 valid questionnaires were finally obtained after screening and elimination, and the utilization rate of the questionnaires was 65%.

Table 1 shows the demographic characteristics of the surveyed participants. Of the final sample, 100% were women, 71.57% of whom were married with children. About 86.02% of the female employees were between the ages of 26 and 45 and faced challenges in maintaining their skills and competitiveness at work during childbirth or parenting. In terms of education, only 21.51% of female employees had a bachelor's degree and 48.72% had a junior high school degree or less. About 94.41% of the respondents were front-line or general employees within their departments and 72.78% of female employees work more than 70 hr per week, which meant more than 10 hr per workday. In general, the majority of the participants were front-line female employees with lower education and longer working hours, who often had more difficulty balancing work and family and played the most basic role in safeguarding the operation and development of the enterprises, and therefore need enterprises to explore richer work resources to enhance their work–family enrichment level.

Measures

We applied a 5-point Likert-type measurement to measure the key variables (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). All of the key measurements were in Chinese. Due to the different types and efforts of information systems construction in various surveyed enterprises, this study did not limit the specific types of EIS, such as supply chain management systems or enterprise resource planning systems, in order to explore the generally extended impact of enterprise technology resources on the work–family interactions of female employees, which is consistent with previous empirical studies in the field of information systems (Lee, Fogliasso, Jung, Shin, & Shum, 2023; Rahman, Hossain, Chowdhury, & Hoque, 2022; Turetken, Ondracek, & IJsselsteijn, 2019).

Information systems quality

Although current research has defined several factors that can reflect EIS information quality, system quality, and service quality, none of unified measurement index has been developed

Table 1. Demographic characteristics

Demographic characteristics	Sample ($N = 823$)	Percentage
Gender		
Female	823	100%
Age (years)		
25 and below	61	7.42%
26–35	386	46.90%
36–45	322	39.12%
Above 45	54	6.56%
Education level		
Middle school and below	401	48.72%
High school	142	17.25%
Junior college	83	10.09%
Bachelor's degree	177	21.51%
Master's degree and above	20	2.43%
Work hours per week (hours)		
40 and below	13	1.58%
41–50	99	12.03%
51–60	79	9.60%
61–70	33	4.01%
Above 70	599	72.78%
Marital status		
Single	191	23.21%
Married without children	43	5.22%
Married with children	589	71.57%
Position		
Frontline employees	504	61.24%
General employees	273	33.17%
Team leaders	18	2.19%
Managers	28	3.40%

(Liu & Arnett, 2000; Nelson, Todd, & Wixom, 2005; Sousa & Voss, 2006). Since this study does not focus on a specific EIS or information systems department, in order to obtain employees' overall quality evaluation of EIS quality, a 6-item scale originally developed by Pai and Huang (2011) with Chinese samples was applied to measure information systems quality, including information quality, system quality, and service quality, with two items for each quality. A sample item for information quality was 'The information systems can provide correct information.' The Cronbach's α for information quality scale was .85. A sample item for system quality was 'The information systems can be linked or integrated with the information of other systems.' The Cronbach's α for system quality scale was .90. A sample item for service quality was 'When I have a problem, the information center staff can help me solve it.' The Cronbach's α for system quality scale was .93.

Perceived usefulness and ease of use

Since this study is not specific to a particular information system and focuses on the changes in employee skills or work styles caused by EIS, a 4-item scale originally developed by Pai and

Huang (2011) with Chinese samples was applied to measure perceived usefulness and ease of use, with two items for each variable. A sample item for perceived usefulness was 'Information systems can improve my professional skills.' The Cronbach's α for perceived usefulness scale was .91. A sample item for perceived ease of use was 'The interface of the enterprise information systems is clear.' The Cronbach's α for perceived ease of use scale was .94.

Work–family enrichment

A 3-item scale originally developed by Fisher, Bulger, and Smith (2009) was applied to measure work–family enrichment. Sample items include 'After work, I have enough time to take care of my family affairs' and 'Outside of work, I still have the energy to do things with my family.' The Cronbach's α for work–family enrichment scale was .80.

Control variables

We controlled female employees' demographic variables: age (1 = 25 years and below, 2 = 26–35 years, 3 = 36–45 years, 4 = 46 years and above), education (1 = middle school and below, 2 = high school, 3 = junior college, 4 = bachelor's degree, 5 = master's degree and above), work hours per week (1 = 40 hr and below, 2 = 41–50 hr, 3 = 51–60 hr, 4 = 61–70 hr, 5 = 71 hr and above), and marital status (1 = single, 2 = married without child, 3 = married with child) because of their potential effects on work–family enrichment (Cooklin et al., 2014; Grzywacz & Marks, 2000; Wayne, Musisca, & Fleeson, 2004).

Analytical strategies

This study is based on covariance-based SEM (CB-SEM) – the preferred statistical tool for the assessing measurement and structural relationships in the social sciences over the past 40 years (Hair, 2022; Sarstedt, Hair, & Ringle, 2023) – to provide a measure of goodness of model fit, in order to achieve the purpose of hypothesis testing in theoretical models composed of reflective indicators. Compared to the ability of partial least squares SEM to make causal predictions for key variables in the exploration of complex models with relatively weak theoretical foundations and small sample sizes (Hair, Hult, Ringle, & Sarstedt, 2021; Hair, Ringle, & Sarstedt, 2011), the CB-SEM used in this study is based on a relatively mature theoretical framework and models, including D&M information system success model, TAM, and work–family enrichment theory, as well as a relatively large sample size.

Data preparation and all statistical analysis, including descriptive statistics and path analysis, were conducted using SPSS 26.0 (IBM Corp.: Armonk, NY, USA) and Amos 21.0 (IBM Corp.: Armonk, NY, USA). We performed descriptive statistical analysis of the research variables with the Pearson correlation test used to check the significance of the correlation between the study variables. Then, we conducted the confirmatory factor analyses to provide support for discriminant validity among the six constructs. The local fit of the model was assessed on the basis of the following criteria: factor reliability values of .60 or higher, $p < .05$ for all factor loadings; goodness normed fit index (GFI), comparative fit index (CFI), Tucker–Lewis index (TLI), and normed fit index (NFI) of .90 or higher; and root mean square error or approximation (RMSEA) less than .08.

After testing the model fit with the CB-SEM, a chained mediating model was established and tested the hypotheses using maximum likelihood estimation (Anderson & Gerbing, 1988; Hair et al., 2021, 2011) and bootstrapping technique (Edwards & Lambert, 2007). At least 1,000 bootstrap samples were used to accurately adjust the upper and lower limits of a 95% confidence interval for indirect effects, which were significant when it did not include zero.

Results

Confirmatory factor analyses

Considering that three quality factors and two perception factors of information systems reflect the technical and user dimensions, respectively, we used nested confirmatory factor analysis to assess the

Table 2. Results of confirmatory factor analyses for construct validity

Model	χ^2	df	RMSEA	CFI	TLI
Six-factor model	206.96	54	.06	.98	.98
Five-factor model PU and PE combined	601.59	58	.11	.94	.92
Four-factor model Three quality factors combined	1339.38	61	.16	.85	.81
Three-factor model PU and PE combined; three quality factors combined	1723.78	63	.18	.81	.77
Two-factor model PU, PE, and quality dimensions combined	1992.96	64	.19	.78	.73
One-factor model	2675.69	65	.22	.70	.64

Note: N = 823. PU = perceived usefulness; PE = perceived ease of use; RMSEA = the root-mean-square error of approximation; CFI = the comparative fit index; TLI = Tucker–Lewis index.

Table 3. Means, standard deviations, and correlations of variables

Variable	1	2	3	4	5	6	7	8	9	10
1. Age										
2. Education	−.33**									
3. Work hours	.23**	−.79**								
4. Marital status	.43**	−.35**	.25**							
5. Information quality	.04	−.01	−.02	−.01	(.85)					
6. System quality	−.06	.19**	−.19**	−.07	.49**	(.90)				
7. Service quality	.04	−.04	.01	−.02	.64**	.43**	(.93)			
8. Perceived ease of use	.08*	−.16**	.12**	.02	.63**	.40**	.74**	(.94)		
9. Perceived usefulness	.02	−.05	.03	.00	.64**	.47**	.78**	.79**	(.91)	
10. Work–family enrichment	.09**	−.07*	−.01	.04	.35**	.19**	.41**	.39**	.39**	(.80)
Mean	2.45	2.12	4.34	2.48	3.52	3.29	3.60	3.61	3.52	3.17
SD	.73	1.29	1.15	.85	.72	.85	.73	.69	.73	.84

Note: N = 823. *$^*p < .05$, $^{**}p < .01$ (two-tailed).
Values in parentheses on the diagonal are the Cronbach's α value of each scale.

differential validity of the model structure and ensure that information quality, system quality, service quality, perceived ease of use, perceived usefulness, and work–family enrichment were independent variables that are different from each other. We constructed five alternative models by combining three quality factors or two perception factors to compare with the six-factor model. Table 2 shows that the six-factor model fitted the data well: $\chi^2(54) = 206.96$, GFI = .96; CFI = .98; RMSEA = .06; TLI = .98; NFI = .98. Therefore, this study considers information quality, system quality, service quality, perceived ease of use, perceived usefulness, and work–family enrichment as six different factors.

Descriptive statistics

Table 3 shows the means, standard deviations, and correlations of the studied variables. As expected, information systems quality was positively linked with perceived ease of use and usefulness

($r = .40$–$.78$, $p < .01$). In addition, perceived ease of use was positively linked with perceived usefulness ($r = .79$, $p < .01$). Finally, perceived usefulness was positively linked with work–family enrichment ($r = .39$, $p < .01$).

Hypotheses testing

To test hypotheses 1, 2, 3, 4, and 5, we estimated a CB-SEM in which work–family enrichment was predicted by perceived usefulness, and four control variables, and in which perceived usefulness was predicted by perceived ease of use, information quality, system quality, and service quality. The results were summarized in Fig.2 and the structural model fitted the data well: $\chi^2(102) = 371.48$, GFI = .95; CFI = .97; RMSEA = .06; TLI = .96; NFI = .96. The results showed that the information quality was positively linked with both perceived usefulness ($\beta = .08$, SE = .04, $p < .05$) and perceived ease of use ($\beta = .29$, SE = .04, $p < .01$), and hypothesis 1a and hypothesis 1b are both tested. The system quality only showed a significant positive effect on perceived usefulness ($\beta = .09$, SE = .02, $p < .01$) and a small effect on perceived ease of use ($\beta = .01$, SE = .02, $p > .05$); therefore, hypothesis 2a was tested and hypothesis 2b was not tested. The service quality significantly increased perceived ease of use ($\beta = .53$, SE = .04, $p < .01$) and perceived usefulness ($\beta = .40$, SE = .04, $p < .01$), and hypothesis 3a and hypothesis 3b were tested. There was a significant positive association between perceived ease of use and perceived usefulness ($\beta = .48$, SE = .04, $p < .01$), and hypothesis 4 was tested; perceived usefulness in turn had a significant positive effect on work–family enrichment ($\beta = .27$, SE = .03, $p < .01$), and hypothesis 5 was tested.

We used the multiplicative coefficient test and Bootstrap sampling method to further examine the chain mediating role played by perceived ease of use and usefulness between EIS information quality, system quality, service quality, and work–family enrichment, and the results are shown in Table 4. The total effect referred to the regression coefficient from the independent variable to the dependent variable when there are no chained mediating variables in the model (i.e., perceived ease of use and perceived usefulness); the direct effect referred to the regression coefficient from the independent variable to the dependent variable when mediating variables are added to the model; the indirect effect was obtained by multiplying the regression coefficients from the independent variable to the mediating variable and from the mediating variable to the dependent variable.

The results indicated that perceived usefulness played a significant mediating role between perceived ease of use (hypothesis 6; 95% CI = [.08, .27]), information quality (hypothesis 7a;
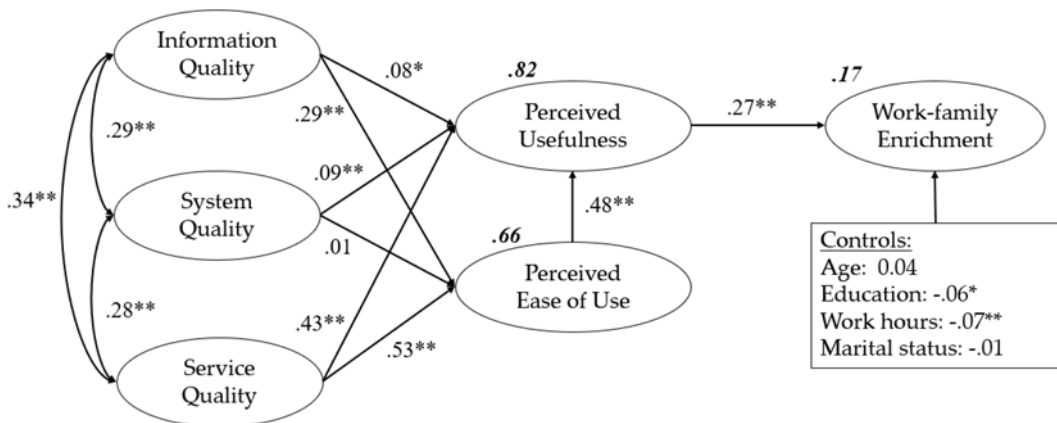

Figure 2. Results of hypothesized model, with standardized maximum likelihood estimates (numbers not in bold are standardized regression coefficients and numbers in bold explain variability; $\chi^2 = 371.48$, $p = .00$; GFI = .95; CFI = .97; RMSEA = .06; TLI = .96; NFI = .96).

Table 4. The mediating role of perceived usefulness between information systems quality and work–family enrichment

Path	Total effect	Indirect effect	Direct effect	95% Boot CI	Percentage of mediating effect (%)
PE→PU→WFE	.47**	.21**	.26**	.08–.27	44.15
IQ→PU→WFE	.41**	.20**	.21**	.11–.24	49.42
IQ→PE→PU→WFE	.41**	.08**	.17**	.07–.09	
SQ→PU→WFE	.18**	.18**	.01	.14–.23	100
SQ→PE→PU→WFE	.18**	.06**	.00	.05–.08	
SEQ→PU→WFE	.47**	.16**	.31**	.06 ∼ .22	34.26
SEQ→PE→PU→WFE	.47**	.04**	.26**	.04–.06	

Note: $N = 823$; **$p < .01$, *$p < .05$; IQ = information quality; SQ = system quality; SEQ = service quality; PU = perceived usefulness; PE = perceived ease of use; WFE = work–family enrichment; 95% Boot CI denotes the 95% confidence interval calculated by Bootstrap sampling.

95% CI = [.11, .24]), system quality (hypothesis 7b; 95% CI = [.14, .23]), and service quality (hypothesis 7c; 95% CI = [.06, .22]) with work–family enrichment. Furthermore, perceived ease of use and usefulness played a significant chain mediating role between information quality (hypothesis 8a; 95% CI = [.07, .09]), system quality (hypothesis 8b; 95% CI = [.05, .08]), and service quality (hypothesis 8c; 95% CI = [.04, .06]) with work–family enrichment. Among them, perceived usefulness fully mediates the relationship between system quality and work–family enrichment (percentage of mediating effect = 100%). In the other paths, the mediating effect of perceived usefulness was partially mediated with effect of 44.15% (path PE→PU→WFE), 49.42% (path IQ→PE→PU→WFE), and 34.26% (path SEQ→PE→PU→WFE), respectively.

Discussion

This study investigates the mechanism of EIS success on the work–family enrichment in the Chinese context by using the work–family enrichment theory as a conceptual framework and combining the D&M ISSM and the TAM to evaluate the information systems success. The results show that the information quality, system quality, and service quality of EIS have a positive impact on the perceived ease of use and usefulness, among which the perceived ease of use has a positive impact on the perceived usefulness, and then the perceived usefulness has a positive impact on the work–family enrichment of female employees. By verifying how the success of EIS can enrich the work–family relationship of female employees, it not only helps to promote theoretical understanding of work–family domain research among management scholars but also is crucial for human resource managers to develop relevant policies to improve employee and corporate productivity.

First, the most important contribution of this study is to build a theoretical bridge between the success of EIS and the positive work–family relationship of female employees, to innovatively connect the technological resources provided by companies with the psychosocial factors of employees' responses. In studies exploring the predictors of work–family enrichment, skills resources still have a large theoretical gap compared to other widely validated workplace resources. From the firm's perspective, since the introduction of the work–family enrichment theory in 2006, most scholars have explored the role of firm-provided work–family support policies (Butts, Casper, & Yang, 2013), flexible work environments (Wang, Wang, Yao, Hsu, & Lawler, 2019), and positive leadership support (Wu et al., 2020) in enhancing work–family enrichment for female employees. By contrast, this paper is the first to suggest that the skills resources such as enhancing employees' information processing skills, knowledge, and experience transfer capabilities (Yu-Hsi et al., 2017) that female employees can harvest through the use of EIS can be applied to the family domain to enhance their family functions, such as becoming more proficient in use information or communication technology, think more sharply and address the needs of their family members. Similar studies have also found that cultivating employees'

cybersecurity awareness during the use of enterprise systems can enhance their security behavior at home (Goel, Zhang, & Williamson, 2023) and the high quality of information technology support for physicians, such as introduction of electronic medical record systems would leads to work–life balance (Bardoel & Drago, 2016). In the long run, positive EIS cognitive responses and higher levels of work–family enrichment are more likely to keep female employees engaged and committed to their organizations (Daniel & Sonnentag, 2016; Shih, 2003). Therefore, female employees can benefit from the process of building EIS, as long as they find them useful.

Second, this study combined the quality dimension of D&M ISSM and the user dimension of TAM to assess the impact of EIS success. The results showed that the quality factors of EIS had a significant positive impact on both perceived usefulness and ease of use of them. Research on EIS success has been of interest to research and practice in the field of information systems and technology for decades. Combining the quality of an EIS with the perceived response to it provides a comprehensive picture of employee evaluations and attitudes, which was first proposed by Seddon in 1997 when he extended the information system success model (Seddon, 1997). After that, this evaluating framework has been validated by scholars to evaluate e-learning systems (Chen, 2010; Wang, Wei, Chen, & Wang, 2023), business process management systems (Poelmans, Reijers, & Recker, 2013), enterprise resource planning systems (Chung, Skibniewski, & Kwak, 2009), and electronic health records systems (Ebnehoseini, Tabesh, Deghatipour, & Tara, 2022). We collected data from different types of enterprises, taking the EIS as a whole, and examined the technological factors of the EIS that could positively impact the user dimension, providing a theoretical basis for the subsequent EIS success as an important workplace resource that could be utilized. From the perspective of business managers, we suggest enterprises invest sufficient time and effort in the quality of their information systems construction programs and make it a key goal to stimulate user perceived usefulness of information systems, for example by increasing user involvement in the system development and implementation process (Petter, DeLone, & McLean, 2013).

Finally, the third contribution of this study is to highlight the importance of studying and practicing work–family related issues of female employees in the Chinese context. According to the most recent meta-analysis in 2020, despite the growing number of empirical studies on work–life research in the West, there is still limited attention to the Asian workforce in this area, especially the Chinese workforce (Le, Newman, Menzies, Zheng, & Fermelis, 2020). According to the scores of the 5-point Likert scale in this study, the overall work–family enrichment score for female employees is 3.17 and the score for employees under 30 years old is 3.11. Therefore, the level of work–family enrichment remains low in the Chinese female employees, especially for young women. Nowadays, the people's sense of gain and harmonious work–family relationships are important for Chinese employees (Ashforth & Fugate, 2000). In this context, profit maximization is no longer the only indicator of corporate competence, and the inability to reconcile employees' work and family relationships has become an important factor that seriously affects corporate competitiveness. This study expands the predictors of work–family enrichment for female employees in the context of the policy environment in China, which helps management scholars to better understand the work–family relationship issues of female employees in China from a theoretical perspective, and helps human resource and business managers to formulate policies to improve the work–family enrichment of them.

Practical implications

From the perspective of business managers, further attention should be paid to the functionality of EISs and the format and structure of the information they use, a process that is not only of high importance when changing a new system, although these factors are still important in systems that users are all very familiar with using (Leidner & Kayworth, 2006). The provision of adequate resources is important because the development of high-quality EISs is by nature quite time-consuming and dynamic, requiring frequent changes (Goodhue, Kirsch, Quillard, & Wybo, 1992). Organizations should invest sufficient time and effort in the quality and complexity of their information systems

building programs, including the allocation of sufficient human and financial resources, etc., as a way to enhance positive feedback from employees on the quality of information systems. In addition, although the ultimate goal of business managers in adopting EISs is to improve the competitiveness and productivity of the business, they must first focus on the end-user level, i.e., the cognitive response level of employees. Finally, in the family-centered Chinese society, profit maximization is no longer the only indicator of corporate competence, and the inability to reconcile employees' work and family relationships has become an important factor that seriously affects corporate competitiveness. Companies should begin by breaking down the perception of work and family as separate or conflicting role areas and instead see the family sphere of working women as an integral part of the role of management policy. It is, therefore, the manager's job not only to focus on whether employees are performing positively in the work area as a result of the interventions of management policy but also to help them establish long-term, mutually beneficial exchange relationships between the organization and the family.

Limitations and future directions

There are four main limitations in this study as follows. First, although this study avoided common method bias to the greatest extent possible, all questionnaires were self-assessed and single-sourced, and the variables investigated in this study were inherently correlated. Therefore, no causal conclusions can be drawn. A multi-point measurement approach may be more accurate, such as measuring variables related to the EIS success during work time and measuring work–family enrichment during family time. Another suggestion is to capture perceived work–family enrichment from multiple sources (e.g., spouse, supervisor, and coworker) to mitigate the problem of common method bias. Second, although this study bundled all EIS together to create a measure with greater variability and broader impact, it may implicitly assume that these information systems have equal impact on users. Future research could be specific to different EIS, such as supply chain management systems, customer relationship management systems, or enterprise resource planning systems, to provide more focused results and responses. Third, the samples in this study were all from China, but there was a lack of consideration of contextual variables specific to China, such as leadership and traditional Chinese culture. We suggest that future research further consider whether employees respond differently to EIS in different cultural contexts, which may provide promising results for management practitioners in managing cross-cultural differences. Finally, although this study used a heterogeneous sample, which contributes to statistical power, caution should be exercised in generalizing the results beyond the current study. We suggest that future studies be replicated for specific industries or organizations to test and extend the applicability of existing research models.

Conclusion

In the context of the implementation of the 'three-child' policy and the rapid development of enterprise information technology, this paper empirically investigates the influence mechanisms of female employees' use of EIS in their work roles to accumulate resources for their family enrichment. Specifically, using the three dimensions (i.e., information quality, system quality, and service quality) of the D&M ISSM to evaluate the quality of EIS and the two dimensions (i.e., perceived usefulness and ease of use) of the TAM to evaluate the cognitive responses of EIS users, this study estimates that EIS success has a significant positive contribution to the level of work–family enrichment of female employees. In addition, perceived ease of use and perceived usefulness play a chain mediating role between quality factors and work–family enrichment. Both human resource managers and individual employees can take this as a lesson to intervene in the construction level of EIS and work–family enrichment level, so as to help female employees alleviate the stress of both work and family roles, encourage them to make full use of the resources of EIS to develop their knowledge and skills, and apply the skill enhancement in the workplace to enrich their family functions.

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