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Team internal social capital and entrepreneurial learning: a dual-path exploration in new venture teams

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The mechanisms of team internal social capital and entrepreneurial learning relationships in new venture teams (NVT) are relatively under-studied. This study investigates the association between internal social capital and entrepreneurial learning and the mediating roles of shared mental models and organisation-based self-esteem. Study 1 collected data from 284 participants from 111 NVTs in Eastern China. The hypotheses were tested using a multilevel structural equation modelling technique. The findings showed that (1) team internal social capital positively influenced entrepreneurial learning, and (2) shared mental models and organisation-based self-esteem both mediated this relationship, unveiling a dual-process mechanism. In Study 2, we conducted semi-structured interviews with a convenience sample of 14 participants from 6 NVTs in Eastern China. The results showed that internal social capital shared mental models, and organisation-based self-esteem influenced entrepreneurial learning in NVTs. This study is one of the first to use qualitative and quantitative analyses to investigate the mechanisms underlying the relationship between team internal social capital and entrepreneurial learning. The results suggest that team internal social capital promotes positive entrepreneurial behaviour, highlighting the importance of team internal social capital and entrepreneurial learning in organisational development. It can also provide indicators for those wanting to support new ventures.

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Introduction

New small and mid-sized ventures have recently proliferated in China (Tong and Rahman, 2022). However, the competitive disadvantages of new ventures result in high failure rates. According to the 2021 Enterprise Survey for Innovation and Entrepreneurship in China, only 5% of sampled new ventures could operate successfully (Zhang, 2021). Therefore, new ventures that fail to adapt to the changing environment are phased out. Entrepreneurial learning is the process of seeking, developing, and expanding entrepreneurial knowledge (Cope, 2005). This learning is crucial for new ventures to enhance their knowledge reserves, foster innovative capabilities, and promote successful entrepreneurship (Winkler et al. 2023). Therefore, the mechanisms of entrepreneurial learning require further exploration to promote the sustainable development of new ventures.

Social capital is a resource derived from a network of relations and social connections among entities. It is categorised into internal and external social capital (Adler and Kwon, 2002; Nahapiet and Ghoshal, 1998). Recent studies show that the effective use of the internal social capital embedded in the new venture team (NVT) is key to developing new ventures (Ge and Xu, 2021; Song et al. 2023). For instance, internal social capital enhances team collaboration and resource sharing, helping new ventures avoid being phased out. Strong trust and close connections enable new ventures to adapt quickly to market changes, allowing the venture to excel in competitive environments (Dai et al. 2019). Prior research has focused on a single dimension of team internal social capital—the impact of trust on entrepreneurial learning (Mckeown, 2010). In contrast, a comprehensive understanding of the impact of team internal social capital remains elusive. Thus, the underlying mechanism of team internal social capital on entrepreneurial learning must be explored in-depth.

This study aims to answer how the team's internal social capital influences entrepreneurial learning through mediators such as shared mental models and organisation-based self-esteem. Scholars propose an input-mediator-output (IMO) framework to better understand team processes (Chen and Zhang, 2021; Klotz et al. 2014). The framework seeks to understand outputs (O) as a result of inputs (I) and the mediators (M) that determine them. Scholars also believe mediators should include cognition and motivation (Klotz et al. 2014). Furthermore, the social cognitive theory underscores the significant effect of individual factors in the learning process, particularly cognitive factors (Bandura, 1989). In line with the IMO framework and social cognitive theory, this study investigates the cross-level effects of team internal social capital (input) on entrepreneurial learning (output) using shared mental models as team-level indicators and organisation-based self-esteem as individual-level indicators (mediators).

This study uses quantitative and qualitative methods to examine the relationship between team internal social capital and entrepreneurial learning. A quantitative survey of 284 entrepreneurs from 111 NVTs was conducted for Study 1. A multilevel dual-path model was designed to test our hypotheses. In Study 2, semi-structured qualitative interviews were conducted with 14 entrepreneurs from six NVTs. This mixed-methods design aimed to triangulate findings, providing a comprehensive understanding of how team internal social capital influences entrepreneurial learning and offering practical suggestions for the future management of new ventures.

The innovations and contributions of this study are as follows: First, this study explores the underlying mechanism of team internal social capital on entrepreneurial learning. This enhances our understanding of entrepreneurial learning and enriches the existing literature on entrepreneurship. Second, the study applies

the IMO framework and the social cognitive theory to team internal social capital and entrepreneurial learning. From a cognitive perspective, the study examines the effectiveness of the IMO framework in entrepreneurial learning and provides new insights into entrepreneurship research. Third, it proposes a dual-path mechanism underlying the relationship between team internal social capital and entrepreneurial learning. This dual-path mechanism involves shared mental models as team-level indicators and organisation-based self-esteem as individual-level indicators, along with comprehensive suggestions for management practices in the entrepreneurial context.

Theoretical framework and hypothesis development

Team internal social capital and entrepreneurial learning.

Internal social capital refers to the sum of resources derived from internal social networks, including structural, relational, and cognitive dimensions (Adler and Kwon, 2002; Nahapiet and Ghoshal, 1998). Social networks are important in entrepreneurial learning (Hao et al. 2018) because most entrepreneurial knowledge and expertise are derived from social networks (Haneberg, 2019). Therefore, internal social capital provides conditional support for entrepreneurial learning in NVTs.

From the structural dimensions perspective, internal social capital enables more frequent interactions and connections among team members (Chen et al. 2022). The interactions and connections between team members provide sufficient time and opportunities for knowledge exchange and create conditions for entrepreneurial learning (Liu and Ren, 2022; Peng, 2024). Likewise, from the perspective of relational dimensions, internal social capital increases team members' identification with their peers, fostering a high level of trust and accountability (García-Sánchez et al. 2019). Trust among team members can promote psychological safety, facilitating entrepreneurial learning (Dai et al. 2019). Finally, from the cognitive dimensions perspective, internal social capital helps team members establish a common vision and goal, which increases their communication and decreases team knowledge conflict (Stollberger et al. 2023). It also increases willingness to engage in entrepreneurial learning (Liu et al. 2023). In this context, we propose the following hypothesis:

H1: *Team internal social capital is positively correlated with entrepreneurial learning.*

The mediating role of shared mental models. Shared mental models are common knowledge constructs that team members hold regarding how they should behave in difficult situations (Cannon-Bowers et al. 1993). Some researchers divide shared mental models into two subtypes: teamwork and taskwork mental models (Mathieu et al. 2000). Previous literature suggests that team internal social capital promotes positive communication patterns and shared common visions and goals among team members. This facilitates holding a common schema of task concepts and forming taskwork-shared mental models (Lyndon and Pandey, 2019). Additionally, internal social capital within a team aids members in understanding team operations and their colleagues, fostering a collaborative atmosphere that nurtures shared teamwork mental models (Nie, 2017).

According to social cognitive theory (Bandura, 1989), learning is a socialisation process influenced by environmental and cognitive factors. Shared mental models embedded in team operations, such as team cognition, may influence entrepreneurial learning. Specifically, shared mental models promote members' understanding of their team's developmental needs and weaknesses (Heinbucher and Bucher, 2022). Furthermore, shared

mental models make team members more aware of the purpose and direction of learning (Jeong, 2020), which increases entrepreneurial learning. Therefore, team internal social capital indirectly influences entrepreneurial learning through taskwork-sharing and teamwork-sharing mental models in NVTs. Therefore, we put forward the following hypotheses:

H2a: *Taskwork-shared mental models mediate the relationship between a team’s internal social capital and entrepreneurial learning.*

H2b: *Teamwork-shared mental models mediate the relationship between a team’s internal social capital and entrepreneurial learning.*

The mediating role of organisation-based self-esteem.

Organisation-based self-esteem refers to the self-evaluations made by organisational members regarding their values and competence in the context of an organisation (Pierce and Gardner, 2004). An individual’s organisation-based self-esteem is shaped by the work environment and other colleagues (Zhang et al. 2018). Some studies find that employees’ trust (Wang et al. 2024) and organisational identification (Nanyangwe et al. 2021) can predict organisation-based self-esteem. In contrast, trust and organisational identification are important components of team internal social capital (Xie and Zhang, 2014). These studies provide support for the relationship between team internal social capital and organisation-based self-esteem. On the one hand, team internal social capital strengthens the ties between team members and fosters the development of trust among them (Yen et al. 2015). This creates a reciprocal and mutually supportive team environment, which subsequently enhances team members’ sense of value and importance, promoting their organisation-based self-esteem development (Lee, 2003). On the other hand, internal social capital motivates team members to align their values and fosters a shared sense of organisational purpose, thus enhancing their organisational identification (Yen et al. 2015). Members with high organisational identification are more likely to contribute to the organisation, facilitating work competence and performance (Shamir and Kark, 2004). This helps employees increase their sense of self-worth, impacting organisation-based self-esteem (Bergami and Bagozzi, 2000).

Furthermore, NVT members with high organisation-based self-esteem are more likely to engage in behaviours that show their values to maintain their good profiles (Kim and Qu, 2023). Entrepreneurial learning is a crucial mechanism for entrepreneurs to expand their knowledge, refine their management techniques, and enhance their decision-making skills. This process helps them sustain their value and maintain a significant role within the

team (Shan et al. 2014). Based on social cognitive theory (Bandura, 1989), learners may use their cognitive factors, such as self-efficacy, self-esteem, and environmental factors, to engage in their behaviours. Organisation-based self-esteem has positive effects on learning behaviours (Hahn and Mathews, 2022) as employees realise that it is a strategy to maintain their good profiles by constantly acquiring new knowledge and skills (Ye et al. 2019). Therefore, internal social capital indirectly influences entrepreneurial learning through organisation-based self-esteem. In this context, we propose the following hypothesis:

H3: *Organisation-based self-esteem mediates the relationship between team internal social capital and entrepreneurial learning.*

The basic framework is shown in Fig. 1.

Study 1

Methods

Sample and procedure. Questionnaires were administered to 130 NVTs in Eastern China. The respondents were obtained through the researchers’ social networks using snowball sampling. With the support of management, researchers explained the study’s purpose and procedures. The researchers distributed the questionnaires personally to core team members. Participants were assured that the data would be strictly confidential and that they could withdraw at any time. The University Ethics Committee approved this survey. Three hundred paper-based questionnaires were distributed to the team members and all were recovered. The final data sample included 284 entrepreneurs from 111 NVTs, excluding questionnaires that were incorrectly completed or showed substantial data loss. The questionnaire recovery efficiency was 94.67%.

Participants were from different industries, including wholesale and retail (45.3%), education (14.6%), manufacturing (13.2%), financial and property (7.0%), online services (5.9%), and others (13.9%). The team age ranged from one to eight years. Regarding team size, 51.9% had fewer than eight members, and 48.1% had more than eight. Of the participants, 91.2% were under the age of 46, 54.9% had entrepreneurial experience, and 59.2% were male. Regarding education level, most participants had a bachelor’s degree (39.4%). Table 1 shows the other demographic statistics.

Measures

Team internal social capital. Team internal social capital was assessed using the Entrepreneurial Team Internal Social Capital Questionnaire (Xie and Zhang, 2014). It comprises sixteen items, each rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), with a higher score representing

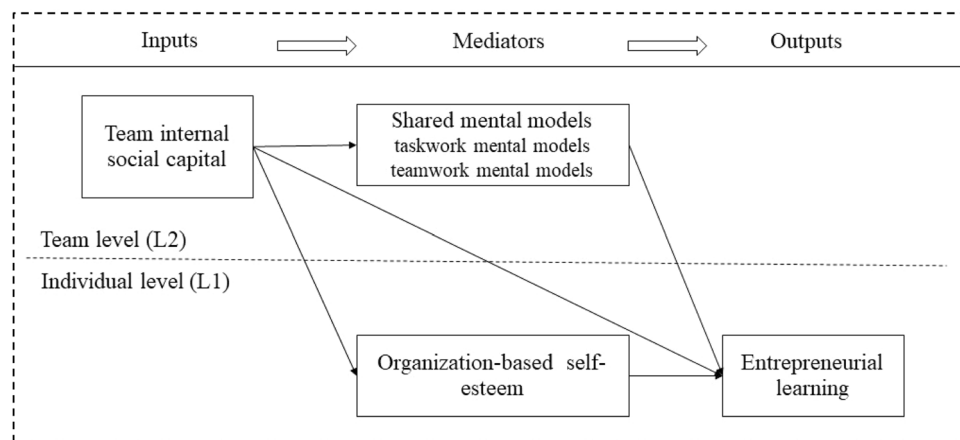


Fig. 1 Theoretical model.

Table 1 Sample demographics.

Variables	Total	
	NO.	%
Gender		
Male	168	59.2
Female	116	40.8
Age group		
Between 18 and 25 years	36	12.7
Between 26 and 35 years	135	47.5
Between 36 and 45 years	88	31.0
46 years and more	25	8.8
Education		
Secondary education and below	47	16.5
Senior high school education	86	30.3
Bachelor education	112	39.4
Master's education and above	39	13.7
Entrepreneurial experience		
No	128	45.1
Yes	156	54.9

better team internal social capital. For example, 'The team has a clear development goal that we have recognised.'

Entrepreneurial learning. Entrepreneurial learning was assessed using the Entrepreneurial Learning Scale (Shan et al. 2014). It comprises twelve items, each rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), with a higher score representing better entrepreneurial learning. For example, 'Failure is important for me to accumulate experience.'

Shared mental models. Shared mental models were assessed using the Entrepreneurial Team Shared Mental Models Scale (Wang and Chen 2010), which has two sub-dimensions: taskwork-shared mental models and teamwork-shared mental models. It comprises 16 items, each rated on a seven-point Likert scale ranging from 1 (not at all) to 7 (very much so), with a higher score representing better taskwork/teamwork-shared mental models. For example, 'I share a common understanding with my team members about the team task.'

Organisation-based self-esteem. Organisation-based self-esteem was assessed using the Organisation-based Self-esteem Scale (Pierce et al. 1989). It comprises ten items, and each item is rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), with a higher score representing better organisation-based self-esteem. For example, 'I am an efficient worker in my team.'

Demographic variables. Participants were asked to provide their demographic details, such as age, gender, education level, and entrepreneurial experience, as well as team information, such as industry, team size, and the time of team establishment. Consistent with previous studies, age, gender, education level, team size, and industry were measured as control variables (Liu et al. 2023).

Analytical approach. We analysed the data using SPSS 26.0 and MPLUS 8.0. First, a reliability and validity analysis was conducted, and common method bias and data aggregation were examined. Second, descriptive statistics and a correlation matrix were constructed. Third, multilevel structural equation modelling was performed using MPLUS 8.0. Team internal social capital and shared mental models were aggregated at the team level using SPSS 26.0. We then examined the cross-level effects of team internal social capital on entrepreneurial learning and the

mediating roles of shared mental models and organisation-based self-esteem. Given that conventional bootstrapping methods are not applicable in the context of multilevel modelling, we adopted a Monte Carlo approach with 20,000 resamples to estimate the coefficients and 95% confidence intervals for the moderating effects (Preacher et al. 2010; Xie and Feng, 2024).

Results

Reliability and validity analysis. We conducted a factor analysis and found that some items had lower factor loadings, which could affect the scale's overall reliability (ranging from 0.40 to 0.83). Given that Cronbach's α was just above the minimum acceptable threshold of 0.70 (e.g., 0.74/0.78), we decided to remove the items with low factor loadings to enhance the internal consistency of the measurement. Table 2 presents the results before and after these modifications; they show an improvement in Cronbach's α to 0.85/0.89. The reliability of each scale was tested again, and the results showed that Cronbach's α and composite reliability (CR) were all above 0.8, indicating good reliability (Geldhof et al. 2014). Moreover, the validity of each scale was tested, and the results showed that the average variance extracted (AVE) of each scale was greater than 0.5, indicating good convergent validity (Fornell and Larcker, 1981). Finally, by comparing the fit indices of different models, we found that the five-factor model (Model 1) had better-fit indices than other models, indicating that the variables have good discriminant validity. Tables 2 and 3 show the specific results.

Common method bias. As all measures were evaluated using the same source, common method bias may have influenced the overall study results. Thus, Harman's single-factor test was used to assess common method bias. The explanatory variance of the first factor before rotation was 31.1%, which was less than the critical criterion of 50%. Therefore, the effect of common method bias on the current study was limited (Podsakoff et al. 2003).

Data aggregation. In this study, team internal social capital, taskwork-shared mental models, and teamwork-shared mental models represent team-level variables. Therefore, this study first converted the individual data to the team level. Intergroup variability (ICC) and Rwg were used to perform aggregation tests on the three variables (Bliese, 2000; James et al. 1984). Statistical analysis indicated that the Rwg, ICC (1), and ICC (2) values of the team's internal social capital were 0.95, 0.21, and 0.78, respectively. Additionally, the Rwg, ICC (1), and ICC (2) of the taskwork-shared mental models were 0.87, 0.63, and 0.67, respectively, and the Rwg, ICC (1), and ICC (2) of the teamwork-shared mental models were 0.94, 0.68, and 0.67, respectively. All variables met the criteria of Rwg exceeding 0.7, ICC (1) exceeding 0.05, and ICC (2) being higher than ICC (1).

Descriptive statistics and correlation analysis. Table 4 shows the descriptive statistics and correlation matrices of all the variables. Entrepreneurial learning was positively correlated with organisation-based self-esteem ($r = 0.34, p < 0.01$). Team internal social capital was positively correlated with taskwork-shared mental models ($r = 0.43, p < 0.01$) and teamwork-shared mental models ($r = 0.44, p < 0.01$). These results provide preliminary support for our research hypotheses.

Hypothesis testing. We used multilevel structural equation modelling to test the hypothesised model. First, a null model was established with entrepreneurial learning as the dependent variable. It was found that $\chi^2 = 0.17, p < 0.001$, and ICC (1) = 0.30 > 0.12, which allowed for the following multilevel analysis.

Table 2 Reliability and validity test.

Variables	Measure	Factor Loading	Cronbach's Alpha	CR	AVE
EL	EL1	0.64(0.65)	0.89(0.78)	0.86(0.82)	0.60
	EL2	(0.40)			
	EL3	0.79(0.78)			
	EL4	0.83(0.83)			
	EL5	0.59(0.58)			
	EL6	0.52(0.52)			
	EL7	0.53(0.53)			
	EL8	0.69(0.69)			
	EL9	0.55(0.54)			
	EL10	(0.44)			
	EL11	0.55(0.56)			
	EL12	0.82(0.81)			
TISC	TISC1	0.53(0.54)	0.85(0.74)	0.89(0.80)	0.56
	TISC2	0.60(0.60)			
	TISC3	0.69(0.71)			
	TISC4	0.60(0.60)			
	TISC5	(0.43)			
	TISC6	0.78(0.79)			
	TISC7	(0.46)			
	TISC8	0.66(0.66)			
	TISC9	0.69(0.70)			
	TISC10	0.72(0.72)			
	TISC11	0.73(0.72)			
	TISC12	0.76(0.76)			
	TISC13	0.70(0.69)			
	TISC14	0.72(0.71)			
	TISC15	0.68(0.68)			
	TISC16	0.59(0.59)			
OBSE	OBSE1	0.72	0.88	0.89	0.53
	OBSE2	0.77			
	OBSE3	0.74			
	OBSE4	0.68			
	OBSE5	0.61			
	OBSE6	0.79			
	OBSE7	0.76			
	OBSE8	0.74			
	OBSE9	0.75			
	OBSE10	0.71			
SMM1	SMM1	0.83	0.93	0.93	0.62
	SMM2	0.82			
	SMM3	0.82			
	SMM4	0.80			
	SMM5	0.78			
	SMM6	0.76			
	SMM7	0.79			
	SMM8	0.75			
SMM2	SMM9	0.74	0.91	0.91	0.60
	SMM10	0.76			
	SMM11	0.73			
	SMM12	0.72			
	SMM13	0.73			
	SMM14	0.87			
	SMM15	0.81			
	SMM16	0.79			

Figures in parentheses represent the values before the removal of items with low factor loadings.
 EL entrepreneurial learning, TISC team internal social capital, SMM1 taskwork-shared mental models, SMM2 teamwork-shared mental models, OBSE organisation-based self-esteem.

Figure 2 shows that team internal social capital is positively related to entrepreneurial learning ($\beta = 0.31, p < 0.001$); the results support H1. This study tested the mediation effect and 95% bias-corrected Confidence Interval (CI) using the Monte Carlo approach based on 20,000 samples (Preacher and Selig, 2012). From the results presented in Table 5, the mediating effects

Table 3 Confirmatory Factor Analysis Results.

Model	χ^2/df	CFI	TLI	RMSEA
EL, TISC, SMM1, SMM2, OBSE	2.28	0.85	0.84	0.05
EL, TISC, SMM1 + SMM2, OBSE	2.50	0.82	0.80	0.06
EL, TISC + SMM1 + SMM2, OBSE	3.01	0.75	0.74	0.06
EL, TISC + OBSE, SMM1 + SMM2	3.24	0.73	0.72	0.07
EL, TISC + OBSE + SMM1 + SMM2	3.70	0.67	0.66	0.08
EL + TISC + OBSE + SMM1 + SMM2	4.22	0.61	0.60	0.10

EL entrepreneurial learning, TISC team internal social capital, SMM1 taskwork-shared mental models, SMM2 teamwork-shared mental models, OBSE organisation-based self-esteem.

of taskwork-shared mental models on the relationship between team internal social capital and entrepreneurial learning were significant (indirect effect = 0.20, SE = 0.10, 95%CI = [0.16, 0.07]). Moreover, teamwork-shared mental models mediated the relationship between team internal social capital and entrepreneurial learning, with significant indirect effects (indirect effect = 0.16, SE = 0.08, 95%CI = [0.08, 0.26]). Thus, H2a and H2b are supported.

Additionally, the mediating effect of organisational self-esteem on the relationship between team internal social capital and entrepreneurial learning was significant (indirect effect = 0.35, SE = 0.14, 95%CI = [0.15, 0.51]). These results support H3.

These findings are consistent with the results of Mckeown (2010), which identified the positive relationship between team internal social capital and entrepreneurial learning. However, our results emphasise the significant mediating roles of team-shared mental models and organisation-based self-esteem. This suggests that the mechanisms through which team internal social capital influences entrepreneurial learning are more complex, highlighting the need for further investigation into these mediating factors across different contexts. Building on this foundation, we now explore the qualitative findings of Study 2 to further enrich our understanding of these relationships.

Study 2 Methods

Sample and procedure. This study used face-to-face semi-structured interviews with 14 interviewees from six NVTs. Interviewees were from various industries, including wholesale and retail, education, psychological counselling, and online services. The teams had an age range of 1–5 years. Each team comprised two to three members (see Table 6). All NVTs were identified using convenience sampling from 130 NVTs that consented to participate in the study. The interviews lasted an average of 30–60 min, were audio recorded, and later transcribed.

This study designed an interview protocol based on the relationships between the variables. First, the content and purpose of the interview were described to the interviewee, and informed consent was provided. Subsequently, the interviews were conducted. The interview questions inquired about the following: (1) the interviewee’s previous entrepreneurial experience; (2) the reasons why the interviewee chose the present partner; (3) the communication style between the interviewee and the partner and the way to resolve conflicts; (4) the interviewee’s strengths and resources and their roles in the entrepreneurial process; (5) the degree of understanding of the interviewee and the partner; (6) the vision of the interviewee and the partner; and (7) the factors influencing interviewees’ entrepreneurial learning.

Data analysis. NVivo 12 was used to code the interview transcripts. The coding process began with open coding, through which first-level codes were generated. Axial coding was then

Table 4 Descriptive statistics and correlations between study variables.

Variable	N	M	SD	1	2	3	4	5	6
Individual level									
1 Gender	284	1.41	0.49	1					
2 Age	284	2.36	0.81	-0.15*	1				
3 Education level	284	2.51	0.93	-0.07	-0.05	1			
4 Entrepreneurial experience	284	1.45	0.50	0.10	-0.15*	0.06	1		
5 Organisation-based self-esteem	284	4.19	0.47	-0.09	0.15*	0.07	-0.21*	1	
6 Entrepreneurial learning	284	3.99	0.57	-0.05	-0.01	0.15*	-0.09	0.34**	1
Team level									
1 Team size	111	2.23	0.82	1					
2 Team establishment time	111	2.70	1.22	0.26**	1				
3 Industry	111	3.06	1.71	-0.80	-0.06	1			
4 Team internal social capital	111	3.96	0.60	-0.03	-0.02	0.09	1		
5 Taskwork-shared mental models	111	5.59	0.66	0.03	-0.02	0.02	0.43**	1	
6 Teamwork-shared mental models	111	5.58	0.67	0.03	-0.03	-0.09	0.44**	0.57**	1

*p < 0.05, **p < 0.01, ***p < 0.001.

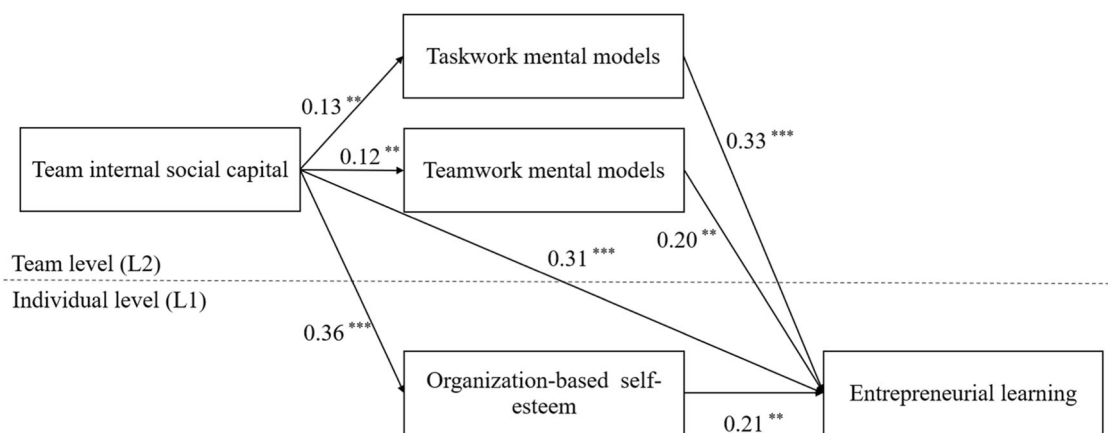


Fig. 2 Structure equation models. Note: *p < 0.05, **p < 0.01, ***p < 0.001.

Table 5 Detailed results of the mediating effect.

Paths	Effects	SE	95%CI	
			LLCI	ULCI
TISC → SMM1 → EL	0.20**	0.10	0.16	0.70
TISC → SMM2 → EL	0.16**	0.08	0.08	0.26
TISC → OBSE → EL	0.35**	0.14	0.15	0.51

EL entrepreneurial learning, TISC team internal social capital, SMM1 taskwork-shared mental models, SMM2 teamwork-shared mental models, OBSE organisation-based self-esteem. *p < 0.05, **p < 0.01, ***p < 0.001.

Table 6 Interview Sources.

Team Coding	Interviewees	Years of operation	Industry
TA	2	1	Psychological counselling
TB	2	3	Education
TC	3	4	Online services
TD	2	3	Online services
TE	3	3	Education
TF	2	5	Wholesale and retail

conducted to develop second-level codes and higher-order themes from the first-level codes (Miles et al. 2013). Finally, all coders discussed and reviewed the coding to ensure a consensus on coding results was reached (Tracy, 2018). Figure 3 shows the coding structure, and Table 7 presents representative quotes of the main themes.

Qualitative analysis findings. Based on the coding, we found the following: First, the qualitative evidence provides a deeper understanding of how team internal social capital influences entrepreneurial learning. Interviewees stated that trust, identification, and closeness in relationships with their partners were developed over a long period (i.e., Team relational internal social

capital). These factors increased their willingness to engage in entrepreneurial learning. For instance, one interviewee said:

'I am responsible for the management of the company, and my partner is accommodating to me in this process. When we are learning something, he always encourages and praises me, which reduces my anxiety and helps me to grasp new concepts easily.' (TC2).

Moreover, interviewees stated that frequent interactions among team members were crucial for entrepreneurial learning, highlighting how team structural internal social capital fosters a network of communication that enhances entrepreneurial learning. On the team cognitive internal social capital, interviewees emphasised the importance of common values and goals in

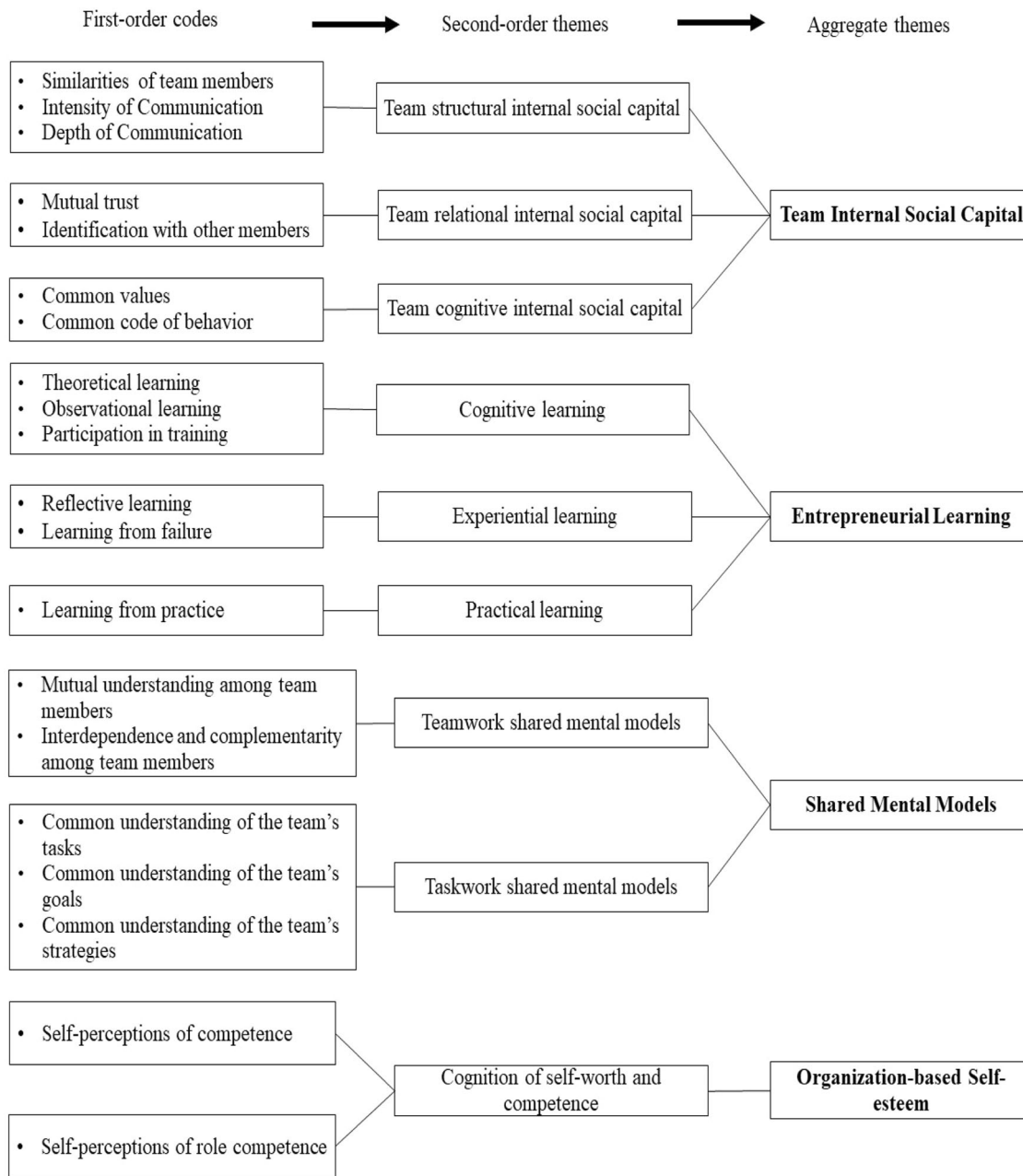


Fig. 3 Interview coding.

facilitating entrepreneurial learning. This demonstrates how cognitive internal social capital promotes a collective understanding that enhances entrepreneurial learning. For example:

'We have regular meetings where everyone shares their ideas and experiences. This strengthens our connections and stimulates learning behaviours.' (TA2).

'When we set our goals together, team members understand the direction we're heading. This clarity improves our communication and encourages us to share knowledge openly.' (TA1).

Second, the analysis highlights the relationships between shared mental models, team internal social capital, and entrepreneurial learning. NVT members are closely connected and trust each other, which builds a high level of internal social capital within the team. The team's unique resources have a

positive effect on the development of new ventures. Entrepreneurial team members develop a common understanding of the company's goals and share a vision of their roles and division of responsibilities within the team. Members have a common goal of clarifying their learning direction, which promotes entrepreneurial learning. As one interviewee noted:

'I believe she was able to work well in family psychology, and so we chose to work in the direction of our respective strengths or interests. This specialisation allows us to gain more professional knowledge, so we have clearer targets regarding theory or skills.' (TA1).

Another said:

'My partner and I share a common value for the company's development arising from our previous constant

Table 7 Themes and representative quotes.

Themes	Representative quotes
Team structural internal social capital	We have weekly meetings and regular heart-to-hearts, and we communicate with each other intimately (TA2).
Team relational internal social capital	I think we trust each other, both in financial matters and other matters. We would not have worked together for as long as we did if we didn't trust each other (TF1).
Team cognitive internal social capital	We must have a common system of values for what we do (TA1).
Cognitive learning	We have an industry learning sharing meeting every three months or so, and we attend every time and get quite a lot out of it (TF2).
Experiential learning	The experience I've obtained is that you do this one reflection at a time and find something new in each one (TD1).
Practical learning	I think management is still learned through practice because many things depend on the person and the situation (TC2).
Teamwork-shared mental models	We probably understand each other very well, and I usually don't ask much about his decisions because I know how he thinks about things (TA2).
Taskwork-shared mental models	We share the common goal of developing the company (TE2).
Cognition of self-worth and competence	Having been in business for so many years prior, having mastered a great deal, and knowing the current market very well, I'm still good at this job (TF2).

communication. I think our short-term goals determine the main direction of my learning, and the company's future development motivates me to increase my knowledge.' (TB2).

Finally, the qualitative study highlighted the relationships between organisation-based self-esteem, team internal social capital, and entrepreneurial learning. The organisation-based self-esteem of NVT members is their perception of their importance in the team. It is influenced by their level of closeness, trust, and identification with each other. Additionally, interviewees indicated that their actions and words played important roles in both the team and the company. Thus, they are more willing to learn because they can assume responsibility. This is illustrated in the following:

'Learning is necessary. I attend a great deal of training, and I influence other colleagues.' (TB1).

Another interviewee noted:

'Sometimes, I don't want to reflect on what I have learned, but I remind myself that everyone's progress and the company's growth rely on my support. I appreciate that they accepted such a low salary to work with me, and I think it's important for me to mentor them.' (TE1).

Discussion

Summary of findings and discussion. Entrepreneurial learning is essential in adapting to changes in the NVT market, benefiting the sustainable development of new ventures (Winkler et al. 2023). Despite recognising the significance of entrepreneurial learning (Ge and Xu, 2021), research addressing the underlying mechanism of team internal social capital in entrepreneurial learning remains limited. To enhance our understanding, this study examined the cross-effects of team internal social capital on entrepreneurial learning and the mediating roles of shared mental models and organisation-based self-esteem. Overall, the results supported our hypotheses.

First, consistent with previous research, our results demonstrate that team internal social capital is positively associated with entrepreneurial learning in NVTs. Previous studies primarily focus on the impact of trust as a single dimension (Mckeown, 2010), but our findings suggest that a more comprehensive view is necessary. Team internal social capital encompasses trust, shared vision, and positive communication (Adler and Kwon, 2002), which provide the foundation for knowledge exchange and learning (Dai et al. 2019). This suggests that, within NVTs, intra-team social capital is essential for facilitating entrepreneurial learning.

Second, the mediating role of taskwork-shared mental models and teamwork-shared mental models was significant. While previous research has identified the role of internal social capital in promoting the development of shared mental models (Lyndon and Pandey, 2019), it has overlooked how the specific dimensions of these shared mental models further enhance entrepreneurial learning in NVTs. Social cognitive theory (Bandura, 1989) suggests that learning is influenced by situational and personal cognitive factors. On the one hand, members with high taskwork-shared mental models can clearly understand the team's task goals and weaknesses (Heinbacher and Bucher, 2022), which promotes a higher level of entrepreneurial learning. On the other hand, in NVTs, high internal social capital promotes effective communication and cooperation among members (Kroll et al. 2019), influencing the development of shared mental models (Nie, 2017). Furthermore, teamwork-shared mental models enable members to organise their team behaviour more easily (Müller and Antoni, 2022), such as entrepreneurial learning. Therefore, our findings highlight the importance of nurturing both taskwork and teamwork-shared mental models as essential mechanisms through which internal social capital influences entrepreneurial learning in NVTs.

Finally, the mediating role of organisation-based self-esteem was significant in this study. While prior research argues that organisation-based self-esteem is influenced by environmental factors (Zhang et al. 2018), our findings extend this understanding by highlighting how team internal social capital positively influences organisation-based self-esteem. Internal social capital increases team members' self-value and organisational identification (Nanyangwe et al. 2021; Wang et al. 2024), promoting organisation-based self-esteem. According to social cognitive theory (Bandura, 1989), organisation-based self-esteem has positive effects on organisational behaviours (Hahn and Mathews, 2022; Kim and Qu, 2023). Our study further explored the positive relationship between organisation-based self-esteem and entrepreneurial learning among NVTs. Members with high organisational self-esteem are externally motivated to preserve their personal image (Ye et al. 2019) or internally motivated to promote the organisation's development. Thus, our findings underscore the importance of fostering organisation-based self-esteem in NVTs as it supports individual development and improves team learning atmosphere.

Theoretical implications. This research offers important theoretical contributions. First, the literature on team internal social capital and entrepreneurial learning within NVTs is enriched in this study. Entrepreneurial learning is an important research topic; however, existing literature often lacks a comprehensive

understanding of its underlying mechanisms. This study specifically examines the cross-level effects of a team's internal social capital on entrepreneurial learning, revealing unique insights that differentiate it from previous studies (Mckeown, 2010). By highlighting these cross-level dynamics, our findings contribute to a deeper understanding of how team internal social capital influences entrepreneurial learning, enriching the existing literature on entrepreneurship.

Second, this research expands the application of the IMO framework to entrepreneurial learning. We found that team internal social capital (input) directly influences entrepreneurial learning (output) and may also indirectly influence it by increasing shared mental models and organisation-based self-esteem (mediators). This contribution addresses the calls from scholars to explore the input-to-output relationships in the functioning of NVTs (Chen and Zhang, 2021; Klotz et al. 2014), thereby filling a gap in the literature regarding the mechanisms that drive entrepreneurial learning.

Third, this study expands the application of social cognitive theory to entrepreneurial learning and explores the positive association of team internal social capital with entrepreneurial learning from a cognitive perspective. This finding supports the value of cognitive factors in management research and provides new ideas for future entrepreneurship research. Focusing on the role of cognitive variables, our research provides a deeper understanding of how team social capital influences entrepreneurial learning.

Managerial implications. This study also has managerial implications. First, from a team cognition perspective, it reveals that shared mental models mediate the relationship between team internal social capital and entrepreneurial learning. This study recommends that leaders focus on the positive role of cognitive resources in team management. Specifically, leaders should enhance team members' cognitive abilities through regular team training and activities, which promote knowledge-sharing and experience exchange. Additionally, leaders can establish knowledge-sharing platforms to ensure team members can easily access and share important information and resources, fostering entrepreneurial learning behaviours. Through these initiatives, leaders can actively guide the transformation of internal social capital into a shared mental model and increase members' entrepreneurial learning behaviours.

Second, from an individual cognition perspective, this study explored the mediating roles of organisation-based self-esteem in the relationship between team internal social capital and entrepreneurial learning. This study suggests that entrepreneurs or team members should rationally use resources in internal team networks and focus on developing organisation-based self-esteem to promote entrepreneurial learning. For example, entrepreneurs should actively participate in team activities or knowledge-sharing sessions to share their perspectives and success expertise. By taking the initiative to engage, individuals can enhance their sense of self-identity and self-worthwhile fostering a positive learning atmosphere within the team.

Limitations and future directions. This study has some limitations. First, it is limited to examining team internal social capital; another potential area for future research is to measure team external social capital. Future research should examine the impacts of both internal and external social capital in NVTs and compare how they influence entrepreneurial behaviour. Second, this study used a cross-sectional design, which only reveals correlations among variables. Future studies should adopt a longitudinal design to identify the causes of entrepreneurial learning. Finally, the study participants were limited to Chinese entrepreneurial team members, which restricts the generalizability of the results. Since entrepreneurial

behaviour is strongly related to cultural factors, future studies should compare our findings across different cultures.

Data availability

The datasets generated for this study can be requested from the corresponding author.

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References

- Adler PS, Kwon SW (2002) Social capital: prospects for a new concept. *Acad Manag Rev* 27(1):17–40. <https://doi.org/10.2307/4134367>
- Bandura A (1989) Human agency in social cognitive theory. *Am Psychol* 44(9):1175–1184. <https://doi.org/10.1037/0003-066x.44.9.1175>
- Bergami M, Bagozzi RP (2000) Self-categorization, affective commitment and group self-esteem as distinct aspects of social identity in the organization. *Br J Soc Psychol* 39(4):555–577. <https://doi.org/10.1348/014466600164633>
- Bliese PD (2000). Within-group agreement, nonindependence, and reliability: implications for data aggregation and analysis. In: Klein KJ, Kozlowski SWJ (eds) *Multilevel theory, research, and methods in organizations: foundations, extensions, and new directions*. Jossey-Bass
- Cannon-Bowers JA, Salas E, Converse S (1993). Shared mental models in expert team decision making. In: Castellan NJ Jr (ed) *Individual and group decision making: current issues*. Lawrence Erlbaum Associates, Incorp, p 221–246
- Chen GQ, Wang JJ, Dong ZY, Zhang XT (2022) How does authentic leadership promote taking charge: the mediating effect of team social capital and the moderating effect of absorptive capacity. *Front Psychol* 13:1046914. <https://doi.org/10.3389/fpsyg.2022.1046914>
- Chen Y, Zhang Y (2021) Fostering resilience in new venture teams: the role of behavioral and affective integration. *Group Organ Manag* 46(4):773–816. <https://doi.org/10.1177/10596011211033164>
- Cope J (2005) Toward a dynamic learning perspective of entrepreneurship. *Entrep Theor Pr* 29(4):373–397. <https://doi.org/10.1111/j.1540-6520.2005.00090.x>
- Dai WL, Yang JP, Li QM (2019) Internal social capital, binary learning and R and D team creativity. *Sci Res Manag* 40(1):159–169. <https://doi.org/10.19571/j.cnki.1000-2995.2019.01.016>
- Fornell C, Larcker DF (1981) Structural equation models with unobservable variables and measurement error: algebra and statistics. *J Mark Res* 18(3):382–388. <https://doi.org/10.1177/002224378101800313>
- García-Sánchez P, Díaz-Díaz NL, De Saá-Pérez P (2019) Social capital and knowledge sharing in academic research teams. *Int Rev Admin Sci* 85(1):191–207. <https://doi.org/10.1177/0020852316689140>
- Ge BS, Xu LY (2021) Three-dimensional moderating effect: how does social capital reshape the entrepreneurship internally? *Jilin Univ J Soc Sci Ed* 61(05):55–66 + 236. <https://doi.org/10.15939/j.jujss.2021.05.jj5>
- Geldhof GJ, Preacher KJ, Zyphur MJ (2014) Reliability estimation in a multilevel confirmatory factor analysis framework. *Psychol Methods* 19(1):72–91. <https://doi.org/10.1037/a0032138>
- Hahn HJ, Mathews MA (2022) Learning behaviors as a linkage between organization-based self-esteem and in-role performance. *J Manag Organ* 28(5):1100–1115. <https://doi.org/10.1017/jmo.2018.17>
- Haneberg DH (2019) Entrepreneurial learning as an effectual process. *Learn Organ* 26(6):631–647. <https://doi.org/10.1108/TLO-04-2018-0064>
- Hao G, Sun Q, Ding Y (2018) Research on the relationship between entrepreneurship learning and entrepreneurship ability based on social network. *Geo-Spat Knowl Intell* 849:746–759. https://doi.org/10.1007/978-981-13-0896-3_73
- Heinbucher D, Bucher J (2022). Team creativity: the interplay of shared mental models and the ideation process. *Int J Technol Manag* 88(2/3/4). <https://doi.org/10.1504/IJTM.2022.121508>
- James LR, Demaree RG, Wolf G (1984) Estimating within-group interrater reliability with and without response bias. *J Appl Psychol* 69(1):85–98. <https://doi.org/10.1037/0021-9010.69.1.85>
- Jeong H (2020) The structural relationship among collaborative self efficacy for group work, task related shared mental model, team member related shared mental model, satisfaction, and team performance in college team learning. *Korea Educ Rev* 26(2):279–308. <https://doi.org/10.29318/KER.26.2.12>
- Kim H, Qu HL (2023) Exploring the antecedents and consequences of hospitality employees' organization-based self-esteem. *J Hum Resour Hosp Tour* 22(4):613–634. <https://doi.org/10.1080/15332845.2023.2208000>
- Klotz AC, Hmieleski KM, Bradley BH, Busenitz LW (2014) New venture teams: a review of the literature and roadmap for future research. *J Manag* 40(1):226–255. <https://doi.org/10.1177/0149206313493325>

- Kroll A, DeHart-Davis L, Vogel D (2019) Mechanisms of social capital in organizations: how team cognition influences employee commitment and engagement. *Am Rev Public Adm* 49(7):777–791. <https://doi.org/10.1177/0275074019851894>
- Lee J (2003) An analysis of the antecedents of organization-based self-esteem in two Korean banks. *Int J Hum Resour Manag* 14(6):1046–1066. <https://doi.org/10.1080/0958519032000106207>
- Liu S, Ren B (2022) A process-based approach to entrepreneurial team dynamics and decision-making: a research review. *Future Dev* 46(04):74–84. <https://doi.org/10.3969/j.issn.1003-0166.2022.04.012>
- Liu X, Yuan Y, Sun R et al. (2023) Influence of entrepreneurial team knowledge conflict on ambidextrous entrepreneurial learning—a dual-path perspective of entrepreneurial resilience and fear of failure. *J Innov Knowl* 8(3):100389. <https://doi.org/10.1016/j.jik.2023.100389>
- Lyndon S, Pandey A (2019) Shared leadership in entrepreneurial teams: a qualitative study. *J Indian Bus Res* 12(3):427–441. <https://doi.org/10.1108/JIBR-06-2019-0196>
- Mathieu JE, Heffner TS, Goodwin GF et al. (2000) The influence of shared mental models on team process and performance. *J Appl Psychol* 85(2):273–283. <https://doi.org/10.1037/0021-9010.85.2.273>
- Mckeown I (2010) No more heroes: entrepreneurial learning in the SME management team. *Ind High Educ* 24(6):429–441. <https://doi.org/10.5367/ihe.2010.0012>
- Miles MB, Michael Huberman A, Saldana J (2013). *Qualitative data analysis. A methods sourcebook*. 3rd ed. SAGE
- Müller R, Antoni CH (2022) Effects of ICT shared mental models on team processes and outcomes. *Small Group Res* 53(2):307–335. <https://doi.org/10.1177/1046496421997889>
- Nahapiet J, Ghoshal S (1998) Social capital, intellectual capital, and the organizational advantage. *Acad Manag Rev* 23(2):242–266. <https://doi.org/10.2307/259373>
- Nanyangwe CN, Wang H, Cui Z (2021) Work and innovations: the impact of self-identification on employee bootlegging behaviour. *Creativity Innov Manag* 30(4):713–725. <https://doi.org/10.1111/caim.12455>
- Nie FY (2017) Research on subject service team efficacy based on shared mental model. *Inf Stud Theor Appl* 40(9):77–81. <https://doi.org/10.16353/j.cnki.1000-7490.2017.09.015>
- Peng MYP (2024) Breaking down barriers: exploring the impact of social capital on knowledge sharing and transfer in the workplace. *Humanit Soc Sci Commun* 11(1):1007. <https://doi.org/10.1057/s41599-024-03384-9>
- Pierce JL, Gardner DG (2004) Self-esteem within the work and organizational context: a review of the organization-based self-esteem literature. *J Manag* 30(5):591–622. <https://doi.org/10.1016/j.jm.2003.10.001>
- Pierce JL, Gardner DG, Cummings LL et al. (1989) Organization-based self-esteem: construct definition, measurement, and validation. *Acad Manag J* 32(3):622–648. <https://doi.org/10.2307/256437>
- Podsakoff PM, MacKenzie SB, Lee JY et al. (2003) Common method biases in behavioral research: a critical review of the literature and recommended remedies. *J Appl Psychol* 88(5):879–903. <https://doi.org/10.1037/0021-9010.88.5.879>
- Preacher KJ, Selig JP (2012) Advantages of Monte Carlo confidence intervals for indirect effects. *Commun Methods Meas* 6(2):77–98. <https://doi.org/10.1080/19312458.2012.679848>
- Preacher KJ, Zyphur MJ, Zhang Z (2010) A general multilevel SEM framework for assessing multilevel mediation. *Psychol Methods* 15(3):209–233. <https://doi.org/10.1037/a0020141>
- Shamir B, Kark R (2004) A single-item graphic scale for the measurement of organizational identification. *J Occup Organ Psychol* 77(1):115–123. <https://doi.org/10.1348/096317904322915946>
- Shan BA, Cai L, Lu XF et al. (2014) The definition, dimensions and measurement of entrepreneurial learning. *Stud Sci Sci* 32(12):1867–1875. <https://doi.org/10.16192/j.cnki.1003-2053.2014.12.013>
- Song JF, Wang D, Sun XM (2023) The impact of boundary-spanning and resource bricolage on the sustainable competitive advantage based on resource arrangement theory. *Sci Technol Manag Res* 43(13):179–191. <https://doi.org/10.3969/j.issn.1000-7695.2023.13.021>
- Stollberger J, Ali Al-Atwi A, De Cremer D (2023) Untangling the team social capital–team innovation link: the role of proportional task conflict as well as group- and differentiated individual-focused transformational leadership. *Hum Relat* 76(6):871–900. <https://doi.org/10.1177/00187267221080995>
- Tong T, Rahman AA (2022) Effect of innovation orientation of high-tech SMEs “small and mid-sized enterprises in China” on innovation performance. *Sustainability* 14(14):8469. <https://doi.org/10.3390/su14148469>
- Tracy SJ (2018) A phonetic iterative approach to data analysis in qualitative research. *Qual Res* 19(2):61–76. <https://doi.org/10.1002/9781118901731.icrm0187>
- Wang H, Huang Q, Xu X et al. (2024) Employees’ feeling trusted, self-concept and creativity in collectivistic cultures. *Curr Psychol* 43(10):8972–8988. <https://doi.org/10.1007/s12144-023-04938-x>
- Wang LY, Chen J (2010) A study on influencing mechanism of R&D team creativity: the mediating role of team shared mental model. *Stud Sci Sci* 28(03):420–428. <https://doi.org/10.16192/j.cnki.1003-2053.2010.03.002>
- Winkler C, Fust A, Jenert T (2023) From entrepreneurial experience to expertise: A self-regulated learning perspective. *J Small Bus Manag* 61(4):2071–2096. <https://doi.org/10.1080/00472778.2021.1883041>
- Xie H, Feng X (2024) Feeling stressed but in full flow? Leader mindfulness shapes subordinates’ perseverative cognition and reaction. *J Manag Psychol* 39(3):323–351. <https://doi.org/10.1108/JMP-03-2022-0140>
- Xie YP, Zhang JL (2014) Research on the relationship between entrepreneurial team social capital and new venture performance. *Manag Rev* 26(7):104–114. <https://doi.org/10.14120/j.cnki.cn11-5057/f.2014.07.052>
- Ye L, Yu BB, Guo M (2019) Relationship between job insecurity and informal workplace learning: based on moderated mediation model. *Technol Econ* 38(7):82–90. <https://doi.org/10.1016/j.tsec.2019.04.017>
- Yen YF, Tseng JF, Wang HK (2015) The effect of internal social capital on knowledge sharing. *Knowl Manag Res Pr* 13(2):214–224. <https://doi.org/10.1057/kmrp.2013.43>
- Zhang S, Ke X, Frank Wang XH et al. (2018) Empowering leadership and employee creativity: a dual-mechanism perspective. *J Occup Organ Psychol* 91(4):896–917. <https://doi.org/10.1111/joop.12219>
- Zhang XB (2021). *Enterprise survey for innovation and entrepreneurship in China (ESIEC)*

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Author contributions

Tingting Song: conceptualization, methodology, software, investigation, writing-original draft preparation, writing—review and editing; Liuqi Sun: software, analysis or interpretation of data, writing-review and editing; Jiaxin Wang: data curation, polish the language and modify the logic, writing-review and editing; Chengyan Li: project administration, resources, supervision, validation, writing-review and editing, funding acquisition.

Competing interests

The authors declare no competing interests.

Ethical approval

The Human Participants Ethics Committee of the Shanghai Normal University reviewed and approved this study (numbered 2023086). All procedures performed in studies involving human participants are per the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. This study did not use clinical/personal patient data. Administrative permissions and/or licences for accessing clinical/personal patient data were not acquired.

Informed consent

Informed consent was obtained from all individual participants included in the study.

Additional information

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