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Corporate social capital and enterprise performance of technology-based SMEs: The mediating role of knowledge integration ability

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Abstract: How to improve enterprise performance has been a research topic widely studied by scholars for a long time. As economic globalization deepens, the business competition becomes increasingly harsh. Technology-based small and medium-sized enterprises (SMEs) play an important role in the rapid development of the country's economy, especially in China. This study aims to investigate the mediating effect of knowledge integration capability in the relationship between corporate social capital and enterprise performance. The sample group used in this study were 300 technology-based SMEs in China. The research tool was a questionnaire adapted from previous scholars, which passed assessment in terms of content validity and reliability. Data were analyzed using structural equation modelling. The results show that: 1) corporate social capital has a positive impact on enterprise performance, but the impact differs between well-performing and poor-performing enterprises; and 2) knowledge integration ability plays a mediating role in the relationship between corporate social capital and enterprise performance, and the mediating role is the same for both well-performing and poor-performing enterprises. But it played a partial mediating role in the good-performance comparison group and a complete mediating role in the poor-performance comparison group. This study is useful for enterprise management in cultivating and developing the abundant social capital of enterprises and expanding channels for knowledge integration ability to increase enterprise performance.

Keywords: corporate social capital; knowledge integration ability; enterprise performance; technology-based SMEs

1. Introduction

The rapid development of economy, science and technology has promoted the continuous updating of enterprise products and technology, making the competition between enterprises more and more complex, from the competition of individual enterprises in the past to the competition of the social network in which enterprises are located. The internal resources of an enterprise can no longer satisfy its survival and development in the competition, and it is necessary for the enterprise to obtain resources from the outside, acquire and use external knowledge as much as possible and form its own competitive advantage to improve enterprise performance. Under the background of economic globalization, where product life cycle is shortened and technology is constantly updated, enterprises are increasingly focused on maintaining, utilizing and developing social capital (Lu, 2019).

Many researchers have confirmed that corporate social capital provides a lot of resources and information for the development of enterprises. For example, Collins and Clark (2003) believed that with the help of social capital, enterprises can obtain more sufficient human, financial and technical resources that are conducive to

promoting enterprise development. Deng (2010) pointed out that corporate social capital can have a certain impact on the economic benefits, management level, technological innovation and competitive advantages of enterprises. However, some scholars put forward different views. For example: Florida et al. (2002) believe that there is even an inverse relationship between corporate social capital and innovation performance. They believe that organizations with high social capital scores will hinder innovation due to complacency or isolation from external information. Liu (2006) found in his research on corporate social capital that there is not a strong positive correlation between the cost of building a social network and enterprise performance as people expect. Li (2012) divided corporate social capital into political, financial, market and regional social capital, and his research conclusions showed that political social capital is not conducive to enterprise performance.

In the knowledge economy age, the total amount of knowledge is expanding rapidly and the transmission speed is accelerating. The knowledge possessed by enterprises can no longer meet the needs of innovative activities. Therefore, the competitive advantage of enterprises depends more on their ability to acquire and utilize new knowledge. The ability of enterprise knowledge integration is the ability of collecting and utilizing knowledge which the enterprise needs for long-term development. Knowledge integration can bring together knowledge resources from different fields and help enterprises form innovative thinking and ability. How to make full use of social capital to obtain resources and improve the utilization rate of knowledge, so as to improve enterprise performance has gradually become the focus of enterprises. Therefore, it is of great social value to conduct empirical research on how corporate social capital improves enterprise performance.

Small and medium-sized enterprises (SMEs) have grown rapidly in China throughout the last 40 years of reform and opening up. According to relevant data, China's SMEs currently account for 99.7% of the total number of enterprises in the country, create products and services that account for 60% of GDP, and pay taxes about 50% of the country's total tax revenue (Liu and Meng, 2016). As a new force in the ranks of SMEs, technology-based SMEs in China are a crucial component of China's national economy and an important force for China's sustained economic growth and technical innovation. Relevant data show that technology-based SMEs are far superior to large enterprises in solving social employment and creating economic benefits. Among the 168 national high-tech development zones in the country, technology-based SMEs account for more than 70%, about 3.28 billion. Technology-based SMEs actively contribute over 65% of the country's patented inventions, more than 70% of technological innovations, and more than 80% of new products.

By combing the literature, we know that the empirical research on the influence of corporate social capital on enterprise performance has important social value. In the era of knowledge economy, enterprises need to make full use of resources if they want to obtain competitive advantages in the market. Only by continuously absorbing external knowledge and making full use of it can enterprises improve their performance and maintain their competitive advantages. In fact, knowledge itself can not directly bring competitive advantage to enterprises, enterprises must apply

knowledge to enterprise development through a series of complex knowledge integration process to adapt to the ever-changing external environment. Therefore, this study introduces the intermediate variable of knowledge integration ability, proposes a theoretical model of “corporate social capital-knowledge integration ability-enterprise performance”, explores the interrelationships between variables and explores the mediating role of knowledge integration ability.

2. Research hypothesis and conceptual framework

2.1. Research variables and definitions

Scholars define corporate social capital from their own professional fields. According to different research needs, some scholars directly equate entrepreneurs’ personal social capital with corporate social capital, others simplify corporate social capital into corporate credit, and more scholars try to comprehensively define corporate social capital from multiple dimensions. According to the need, this research collates the viewpoints of some scholars and adopts the multi-dimensional definition of corporate social capital. When studying the relationship between social capital, intellectual capital and enterprise value creation, Nahapiet and Ghoshal (1998) divided social capital into three dimensions: structural dimension, relational dimension and cognitive dimension. This research uses this method to divide the dimensions of corporate social capital.

Knowledge integration ability refers to the ability of an enterprise to integrate the new knowledge collected from different channels and carriers with its existing knowledge, update its knowledge system, and thus improve its market competitiveness. It is an important ability for the long-term operation and development of an enterprise. Based on the views of relevant scholars, this study will divide knowledge integration ability into three dimensions: knowledge acquisition ability, knowledge transfer ability and knowledge utilization ability. The research scale developed in this paper will be measured by referring to the maturity scale of relevant scholars.

Enterprise performance is the use of some quantitative or qualitative indicators to analyze the enterprise’s operating efficiency and development in a certain period of operation. This paper hopes to discuss the relationship between corporate social capital and enterprise performance. Therefore, the measurement of enterprise performance is evaluated from two aspects: innovation performance and financial performance. With reference to the existing research results, financial performance and innovation performance were respectively measured by referring to the maturity scales of relevant scholars.

By reviewing relevant literature, most of the research results confirm the positive role of corporate social capital on enterprise performance, while some scholars also find the negative role of corporate social capital. After obtaining quantitative research results, this study boldly hypothesized whether the verification results would be related to the performance of the enterprise itself. Therefore, this study divided the investigation enterprises into two groups, namely good-performing and poor-performing, and analyzed whether the influence relationship between variables was different between the two groups. Performance will be grouped

according to the median of the average score of the measured data of the enterprise performance items in the questionnaire. 150 enterprises above the median are considered to have good performance, and 150 enterprises below the median are considered to have poor performance, and a conclusion will be drawn through quantitative analysis.

2.2. Corporate social capital and enterprise performance

Cooke and Clifton (2002) explored the relationship between social capital and the performance of British SMEs, and demonstrated that corporate social capital has a significant role in promoting the launch of new products and new processes and the achievement of quality standards, and it can increase the proportion of new product output value in total sales revenue. Zheng and Chen (2002) studied the relationship between social capital and corporate innovation from the perspectives of the internal and external aspects of the enterprise, and found that social capital can improve the innovation performance of enterprises. Zheng and Cai (2005) pointed out that the richer the social capital of an enterprise, the lower the transaction cost will be. The sense of trust established by the enterprise and other enterprises can help the enterprise acquire knowledge and resources, thereby improving the innovation performance of the enterprise. As a result, this article claims that corporate social capital can improve enterprise performance and proposes the following hypothesis:
H1: Corporate social capital has a positive effect on enterprise performance.

2.3. Corporate social capital and knowledge integration ability

Xie et al. (2007) established a model to study 151 enterprises, and obtained the research results that the internal social capital of enterprises can have a positive impact on knowledge integration. Chen et al. (2008) selected internal social capital, knowledge integration and core competencies of enterprises for research. The research results show that internal social capital has a significant impact on knowledge integration. Although scholars have realized that the relationship between corporate social capital and knowledge integration has a positive effect on corporate development, the specific relationship between the two is still not clearly defined. Judging from the current literature, there are relatively few literatures that specifically study the ability of social capital and knowledge integration. Based on the previous learning, the following hypothesis is advanced in this paper:
H2: Corporate social capital has a positive effect on knowledge integration capabilities.

2.4. Knowledge integration ability and enterprise performance

Jian et al. (2008) believes that knowledge integration is beneficial for enterprises to respond to market changes and various needs in a timely manner. Through empirical research, it is concluded that knowledge integration can help enterprises innovate and improve enterprise performance. Luo and Zhang (2015) believe that the new knowledge system generated by the enterprise's knowledge integration can bring competitive advantages to the enterprise, therefore increasing the enterprise's competitiveness. Hou and Xue (2017) believe that enterprises can

improve their innovation performance by acquiring knowledge from outside and absorbing and utilizing it. Based on the previous learning, the following hypothesis is advanced in this paper:

H3: Knowledge integration ability has a positive effect on enterprise performance.

2.5. The mediating role of knowledge integration ability

The research of Xie et al. (2007) shows that knowledge integration ability plays a complete mediating role in the influence of learning orientation on technological innovation and management innovation. Jiang et al. (2013) investigated the effect of knowledge integration capability in the relationship between market orientation and the competitive advantage or organizational innovation of small, medium and micro enterprises. When Wu and Dai (2013) conducted an empirical exploration of entrepreneurial social capital and technological innovation performance, they took knowledge integration ability as an intermediate variable, discussed the impact of knowledge integration ability on technological innovation performance, and concluded that knowledge integration ability has a positive effect on technological innovation performance. At the same time, it plays a mediating role in the impact of social capital on technological innovation performance. Therefore, this paper believes that knowledge integration ability has a mediating role in the relationship between corporate social capital and enterprise performance, and proposes the following hypothesis:

H4: Knowledge integration ability has a mediating role between corporate social capital and enterprise performance.

2.6. Study of two groups of corporate with different performance

From the literature, it is generally believed theoretically that corporate social capital can make positive contributions to the improvement of enterprise performance. However, the empirical research results of Florida et al. (2002) show that there is even an inverse relationship between social capital and innovation performance. Gong and Lin (2007) defined the social capital of the relationship dimension from two aspects of relationship operation and relationship cognition, and found that the social capital of the relationship dimension not only failed to effectively increase sales and profit margins, but even played a negative role. The impact of corporate social capital on enterprise performance has both positive and negative effects. Thus, this study proposes that for different enterprise operating characteristics, the effects of corporate social capital on enterprise performance varies. Therefore, the sampled enterprises are divided into two groups, namely the technology-based SMEs with good performance and the technology-based SMEs with poor performance and the hypothesis are proposed as follows:

H5: The impact of corporate social capital on enterprise performance differs between well-performing and poor-performing enterprises.

H6: The impact of corporate social capital on knowledge integration ability differs between well-performing and poor-performing enterprises.

H7: The impact of knowledge integration ability on enterprise performance differs between well-performing and poor-performing enterprises.

H8: The mediating role of knowledge integration ability in the relationship between corporate social capital and enterprise performance differs between well-performing and poor-performing enterprises.

In summary, this paper aims to investigate the mediating effect of knowledge integration ability on the relationship between corporate social capital and enterprise performance. From the quantitative research methodology, the conceptual framework has been established as shown in **Figure 1**.

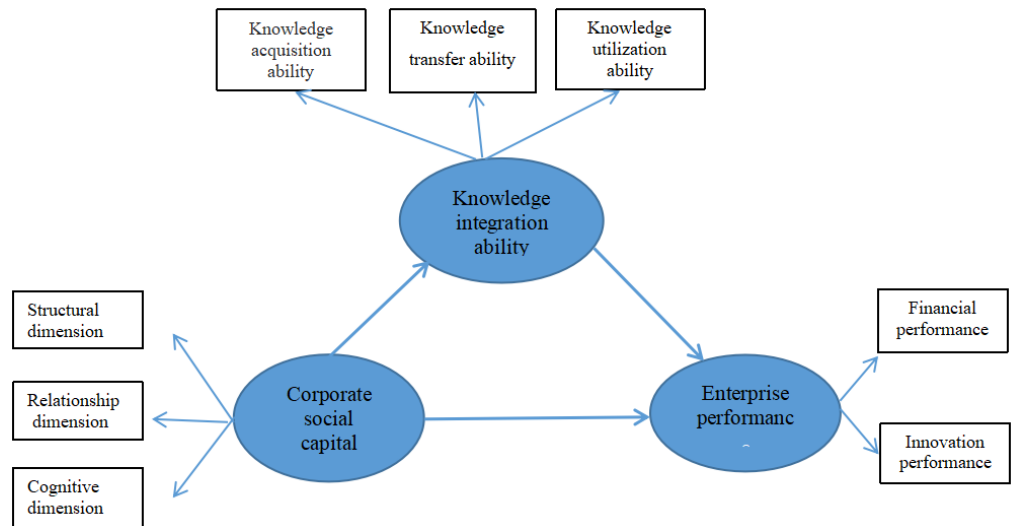


Figure 1. Conceptual framework of the study.

3. Methodology

3.1. Research design

The goal of this study is to investigate the impact of corporate social capital on enterprise performance in the hopes of clarifying the importance of corporate social capital in improving enterprise performance and testing whether knowledge integration ability plays an intermediate role in this relationship. At the same time, the survey enterprises are divided into two groups for comparative study, that is, the good performance of technology-based SMEs and the poor performance of technology-based SMEs. Both quantitative and qualitative research methods are used to verify whether the impact of corporate social capital on enterprise performance is different between the two groups, and whether the mediating role of knowledge integration ability is different between the two groups.

The research methods used in this study were mixed methods, that is, a combination of quantitative and qualitative research methods. In this study, the quantitative method was used as the main research method while the qualitative method was used to confirm the findings from the quantitative analysis. Questionnaires were used to collect quantitative data and in-depth interviews were used to collect qualitative data.

3.2. Sample and data

Population of this study is the technological-based SMEs in China. There are 328,000 technology-based SMEs in China. The samples were 300 technology-based SMEs in China. The questionnaire was sent to middle or senior management of the company, who have sufficient knowledge to answer the questions about various aspects of the company. One management from each sampled company was selected to complete the questionnaire. A total of 320 electronic questionnaires were distributed online to enterprise executives. A total of 315 questionnaires were returned, of which 300 complete questionnaires were used as research samples in the study. Structural equation model was applied for data analysis to obtain the studied results. Additionally, the sample group of 300 enterprises was divided into two groups based on the median of enterprise performance. 150 enterprises above the median are considered to have good performance, while 150 enterprises below the median are considered to have poor performance.

According to the size of the enterprise, a quota sampling method will be adopted to obtain 300 samples. 62 questionnaires have been collected from technology-based SMEs with the size of less than 50 people, 54 questionnaires have been collected from enterprises with the size of 51–100 people, 96 questionnaires have been collected from enterprises with the size of 101–200 people, and 88 questionnaires have been collected from enterprises with the size of 201–500 people. Questionnaires are distributed and retrieved in four main ways to ensure that the data obtained is reliable.

The first way is to issue electronic questionnaires through Master of Business Administration (MBA) alumni, and select some of the alumni who are middle and senior managers in the companies. The second method is to ask the staff of government agencies to help, directly send the electronic questionnaire to them, and make use of their contacts with the enterprise, and they will send the electronic questionnaire to the respondents of the relevant enterprise, and ask the respondents to fill in the questionnaire. The third way to distribute questionnaires is to use the advantages of work in college. Through students who participate in work, ask them to help forward the questionnaire as volunteers. The fourth way to distribute the questionnaire is to distribute and retrieve the questionnaire by the researcher. The researcher contacts enterprises through relatives and friends and went to relevant enterprises nearby to ask the interviewee to fill in the questionnaire on site.

The main quantitative analysis method in this research is structural equation modeling, which normally requires a large number of samples, but the exact number of samples is not determined. According to Gorsuch (1988), the number of samples should be kept at more than 5 times the number of measurement items, with 10 times or more being the best. Bagozzi and Yi (1988) considered that when using linear structural equations, the sample size should preferably be more than five times the estimated parameters. Anderson and Gerbing (1988) considered 100 to 150 samples to meet the bottom line of sample size when using structural equation modeling. Following Gorsuch's (1983) point of view, since the questionnaire of this study has 8 estimated parameters with 37 measurement items, the sample group of 300 enterprises is sufficient for the analysis. A management of each enterprise was asked

to evaluate 37 statements which the executives had to evaluate on a scale of 1 to 5. The scale evaluated the extent to which the respondent agreed with these analyzed statements, with 1 strongly disagree and 5 strongly agree.

Based on qualitative research, 20 informants from the top 10 enterprises with the highest score and the bottom 10 enterprises with the lowest score were selected as a sample to confirm the quantitative analysis results. The study used in-depth interviews to collect data and analyze the data by content analysis method.

3.3. Research variables and measurement

This study based on the three groups of variables as shown in the conceptual framework (**Figure 1**): corporate social capital, knowledge integration ability and enterprise performance. All variables are interval scales adapted from the mature scales of the relevant scholars. Closed-ended questions, based on a five-point Likert scale, from “1” to “5,” that is, “strongly disagree” to “strongly agree,” were applied to all items in the questionnaire.

This study adopts a resource-based concept of corporate social capital that consists of three components: structural dimensions, relational dimension and cognitive dimensions whereas knowledge integration ability is divided into three dimensions: knowledge acquisition ability, knowledge transfer ability and knowledge utilization ability. According to the enterprise performance, the measurements are assessed for both innovation performance and financial performance.

4. Research data analysis and empirical analysis

4.1. Test of measurement model

4.1.1. Reliability test

Cronbach α coefficient was used to test the internal consistency reliability of the collected data, and the specific measurement values were shown in **Table 1**. Reliability analysis results show that the Cronbach α coefficients of corporate social capital, knowledge integration ability and enterprise performance are all above 0.7, which indicates that the data obtained by the questionnaire survey met the internal consistency standard and met the requirements of further statistical hypothesis testing.

Table 1. Reliability test for all interval scale variables.

Variables and dimensions		Measurement items	Dimensional Cronbach α	Variable Cronbach α	Number of measurement items
Corporate social capital	Structural dimension	A1, A2, A3, A4	0.746	0.894	12
	Relationship dimension	B1, B2, B3	0.659		
	Cognitive dimension	C1, C2, C3, C4, C5	0.832		

Table 1. (Continued).

Variables and dimensions		Measurement items	Dimensional Cronbach α	Variable Cronbach α	Number of measurement items
Knowledge integration capability	Knowledge acquisition ability	D1, D2, D3, D4, D5, D6, D7	0.833		
	Knowledge transfer ability	E1, E2, E3, E4	0.805	0.925	16
	Knowledge utilization ability	F1, F2, F3, F4, F5	0.827		
Enterprise performance	Financial performance	Q1, Q2, Q3, Q4, Q5	0.861		
	Innovation performance	H1, H2, H3, H4	0.825	0.915	9

4.1.2. Validity test

According to the discussion in chapter 3, according to the discriminant criteria of factor analysis, it is acceptable for the factor load of each item of the measured variable in exploratory factor analysis to be greater than 0.5, while in confirmatory factor analysis, the factor load of each item of the measured variable should generally be greater than 0.7. This study is mainly based on questionnaire data, using confirmatory factor analysis (CFA) to measure the construct validity of the variables involved through Mplus8. Through reliability and validity analysis, it can be ensured that the measurement of each latent variable is reliable and effective. In confirmatory factor analysis, the effectiveness of the measurement model is judged by analyzing the fit of the model.

Through the confirmatory factor analysis of the model, the factor loads and residuals of 37 items contained in each dimension of the three variables are obtained. The measurement results show that each dimension of the variable corresponds to the factor load of each item above 0.7, indicating that each latent variable corresponds to the item with a certain representativeness. The average variance extracted (AVE) of the three dimensions of corporate social capital, the three dimensions of knowledge integration ability, and the two dimensions of corporate performance are all greater than 0.5, and the construct reliability (CR) is greater than 0.7. Therefore, the validity of the variable measurement scale meets the requirements.

In addition, this paper also measured the overall fitting index of the measurement model. The results of statistical analysis show that the fitting indexes of the model can be accepted.

According to CFA of corporate social capital, the overall fitting index of the measurement model is measured, and the model fitting index of corporate social capital scale is obtained through statistical analysis as follows: $\chi^2/df = 2.586$, CFI = 0.970, TLI = 0.961, RMSEA = 0.073, SRMR = 0.028. The results show that the structure validity of corporate social capital questionnaire is good and the model can be accepted.

Along with CFA of knowledge integration ability, the overall fitting index of the measurement model is measured, and the model fitting index of knowledge

integration ability scale is obtained through statistical analysis as follows: $\chi^2/df = 2.818$, CFI = 0.948, TLI = 0.938, RMSEA = 0.078, SRMR = 0.037. The results show that the questionnaire of knowledge integration ability has good structural validity, and the model can be accepted.

Together with CFA of enterprise performance, the overall fitting index of the measurement model is measured, and the model fitting index of enterprise performance scale is obtained through statistical analysis as follows: $\chi^2/df = 2.803$, CFI = 0.973, TLI = 0.962, RMSEA = 0.078, SRMR = 0.027. The results show that the structure validity of the enterprise performance questionnaire is good, and the model can be accepted.

4.2. Result of structural model

This study explores the impact of corporate social capital on enterprise performance and the mediating role of knowledge integration capabilities between corporate social capital and enterprise performance through structural equation model analysis. The overall model, model 1 (the enterprise itself has a good performance) and model 2 (the enterprise itself has a poor performance) are established, and their fitting indicators are obtained.

4.2.1. Analysis of overall structural equation model

The fitting indexes of the overall structural equation model are as follows: $\chi^2/df = 2.194$ is less than 3, RMSEA = 0.064 is less than 0.08, CFI is 0.990, TLI is 0.984 are all greater than 0.9, and SRMR is 0.020 less than 0.05, indicating that the model fit is good. At the same time, path coefficient **Table 2** is obtained. According to the analysis coefficient, corporate social capital has a significant positive impact on knowledge integration ability ($\beta = 0.649, p < 0.05$), so H2 is supported. Knowledge integration ability has a significant positive impact on enterprise performance ($\beta = 0.658, p < 0.05$), so H3 is supported. Corporate social capital has a significant direct impact on enterprise performance ($\beta = 0.154, p < 0.05$), so H1 is supported. Since the direct effect of corporate social capital on enterprise performance is significant, and the indirect effect of corporate social capital \rightarrow knowledge integration ability \rightarrow enterprise performance is significant (95% confidence interval does not include zero), it indicates that this model is a partial intermediary model with significant indirect effect and the intermediary effect size is 0.427, so H4 is supported.

Table 2. Path coefficient table.

Path	Estimate	SE	95% CL	Significance
Corporate social capital \rightarrow Knowledge integration capability	0.649	0.069	[0.509, 0.783]	Yes
Knowledge integration capability \rightarrow Enterprise performance	0.658	0.063	[0.513, 0.765]	Yes
Corporate social capital \rightarrow Enterprise performance	0.154	0.070	[0.014, 0.293]	Yes
Corporate social capital \rightarrow Knowledge integration capability \rightarrow Enterprise performance	0.427	0.058	[0.326, 0.557]	Yes

4.2.2. Comparative analysis of model 1 and model 2

The fitting index of model 1 with good performance of the enterprise itself is: $\chi^2/df = 1.750$ is less than 3, RMSEA = 0.076 is less than 0.08, CFI = 0.982, TLI = 0.970 are all greater than 0.9, SRMR = 0.031 is less than 0.05, indicating that the model fit is good. At the same time, get the path coefficient **Table 3**. The fitting index of model 2 with poor performance of the enterprise itself is: $\chi^2/df = 1.801$ is less than 3, RMSEA = 0.073 is less than 0.08, CFI = 0.983, TLI = 0.972 is greater than 0.9, SRMR = 0.035 is less than 0.08, indicating that the model fit is good. At the same time, the path coefficient **Table 4** is obtained.

Table 3. Path coefficient table.

Path	Estimate	SE	95% CL	Significance
Corporate social capital → Knowledge integration capability	0.619	0.090	[0.424, 0.778]	Yes
Knowledge integration capability → Enterprise performance	0.622	0.122	[0.415, 0.898]	Yes
Corporate social capital → Enterprise performance	0.397	0.129	[0.098, 0.618]	Yes
Corporate social capital → Knowledge integration capability → Enterprise performance	0.385	0.129	[0.220, 0.665]	Yes

Table 4. Path coefficient table.

Path	Estimate	SE	95% CL	Significance
Corporate social capital → Knowledge integration capability	0.517	0.113	[0.293, 0.727]	Yes
Knowledge integration capability → Enterprise performance	0.634	0.102	[0.435, 0.834]	Yes
Corporate social capital → Enterprise performance	-0.121	0.055	[-0.354, 0.093]	No
Corporate social capital → Knowledge integration capability → Enterprise performance	0.328	0.103	[0.177, 0.580]	Yes

It can be seen from **Table 3** that in model 1, corporate social capital has a significant positive impact on knowledge integration ability ($\beta = 0.619, p < 0.05$); knowledge integration ability had a significant positive impact on enterprise performance ($\beta = 0.622, p < 0.05$); corporate social capital has a significant direct impact on enterprise performance ($\beta = 0.397, p < 0.05$). Since the direct effect of corporate social capital on enterprise performance is significant, and the indirect effect of corporate social capital → knowledge integration capability → enterprise performance is significant (95% confidence interval does not include zero), it shows that the model is a partial mediation model, and the indirect effect is significant, the mediation effect size is 0.385.

It can be seen from **Table 4** that in model 2, corporate social capital has a significant positive impact on knowledge integration ability ($\beta = 0.517, p < 0.05$); knowledge integration ability has a significant positive impact on enterprise performance ($\beta = 0.634, p < 0.05$); corporate social capital has no significant direct impact on enterprise performance ($\beta = -0.121$). Since the direct effect of corporate social capital on enterprise performance is not significant, but the indirect effect of corporate social capital \rightarrow knowledge integration ability \rightarrow enterprise performance is significant (95% confidence interval does not include zero), indicating that this model is a fully mediating model with significant indirect effect and an intermediary effect size of 0.328.

Through the analysis of model 1 and model 2, we learned that the performance of the corporate itself will make a difference in the impact of the corporate social capital on enterprise performance; the performance of the corporate itself will not make a difference in the impact of corporate social capital on knowledge integration ability; the performance of the corporate itself will not make a difference in the impact of knowledge integration ability on enterprise performance. In model 1, when the performance of the corporate is good, the knowledge integration ability plays a partial mediating role; when the performance of the corporate in model 2 is poor, the knowledge integration ability plays a completely mediating role.

However, further analysis is needed to statistically explain the differences between the two groups.

Through the independent sample T test on the two sets of data, $p = 0.000 < 0.05$, indicating that there is a statistically significant difference in enterprise performance between companies with good enterprise performance and companies with poor enterprise performance. The average value of companies with good performance is 4.4009, the average value of companies with poor performance is 3.2656. Therefore, this study uses group analysis to compare the differences of each path under different performance groups. The result shows that on the path of corporate social capital to enterprise performance, the impact coefficient of good enterprise performance is significantly greater than that of poor performance, and the P value is less than 0.05, indicating that when enterprise performance is good, corporate social capital has a greater impact on enterprise performance. And in the comparison of other path differences, the P values are all more than 0.05, showing that there is no significant difference. Therefore, H5 is supported, and H6, H7, and H8 are not valid.

4.3. Results of qualitative research

In the qualitative analysis, this paper selects the research method of in-depth interview, adopts the method of “purpose sampling” to select appropriate research objects, and selects 10 representative enterprises with good performance and 10 enterprises with poor performance from the survey enterprises to conduct telephone interviews. The main results are as follows: (1) the relationship between corporate social capital and enterprise performance of technology-based SMEs is clarified; (2) clarify the mediating role of knowledge integration ability. The results of qualitative verification were consistent with those of quantitative analysis.

5. Empirical research conclusions and practical significance

This study collected data through questionnaire survey and used SPSS21 and Mplus8 analysis software for empirical analysis. The main conclusions and practical significance are as follows:

(1) Technology-based SMEs should actively cultivate and develop corporate social capital.

The theoretical model of the impact of corporate social capital on enterprise performance is analyzed and constructed. The key elements of corporate social capital, knowledge integration ability and enterprise performance are integrated into a framework, and the micro-mechanism of enterprise performance improvement through social capital and knowledge integration ability is thoroughly revealed. According to the findings of quantitative and qualitative research, corporate social capital has a considerable positive impact on the performance of technology-based SMEs. Many researchers have studied the impact of corporate social capital on enterprise performance from different perspectives. For example, Maskell (1999) found that corporate social capital can effectively reduce the transaction costs between internal departments and between enterprises, so as to improve their own innovation performance. Therefore, corporate social capital is an important channel for companies to obtain various information, knowledge and resources needed for innovation, which can effectively promote the improvement of enterprise performance.

In addition, in the empirical analysis, this study conducted an in-depth discussion on the impact mechanism of related variables, and conducted an exploratory analysis from the perspective of the performance of the enterprise itself, which improved the effectiveness of the empirical analysis results, and made new discoveries different from the past. The study divides the 300 surveyed enterprises into two groups with good performance and poor performance, and conducts verification analysis respectively, and finds that the impact of corporate social capital on enterprise performance will show differences due to the performance of the company itself. In the full sample analysis, corporate social capital has a significant direct impact on enterprise performance ($\beta = 0.154$). In addition, corporate social capital can also indirectly affect enterprise performance by informing knowledge integration ability, with an indirect effect size of 0.427. In the case of good performance of the corporate itself, this influence is shown as a direct positive impact ($\beta = 0.397$). In addition, corporate social capital can also indirectly affect the performance of the enterprise by informing knowledge integration ability, and the indirect effect size is 0.385, indicating that the better the performance of the enterprise itself, the management pays more attention to the role of corporate social capital in improving the enterprise performance. In the case of poor performance of the corporate itself, the impact of corporate social capital on enterprise performance is mainly realized through knowledge integration capabilities, and the indirect effect size is 0.328. This is an important contribution point of this study, and it is also a new discovery different from previous studies.

To sum up, based on the positive correlation between corporate social capital and enterprise performance verified by this study, from the perspective of improving

enterprise performance, it is necessary to actively cultivate and develop corporate social capital, so that rich capital can better serve the improvement of enterprise performance.

(2) Enterprises should broaden the channels of knowledge integration and get a move on the speed of knowledge integration.

Corporate social capital is a kind of long-term asset. Through the establishment of external relationship network and the development of internal relationship, companies can better obtain information, gain trust, strengthen collective consistency, and improve corporate knowledge integration capabilities. The three dimensions of corporate social capital (CSC) can promote the acquisition, transformation and utilization of corporate knowledge. For example, enterprise members provide channels for knowledge transfer through social interaction with external knowledge sources by attending academic or industry conferences, visiting customers and suppliers, etc. With the rapid development of knowledge management theory, more and more academics have found that the knowledge in the knowledge base usually does not exist alone, but is connected with each other through certain dependencies (Feng and Cheng, 2020). Guo and Cai (2017) based on the knowledge-based view and the organizational ambidexterity view, found that ambidexterity knowledge integration promotes enterprise performance by affecting entrepreneurial capabilities. Therefore, the verification results of this study are consistent with this result.

The introduction of knowledge integration ability as an intermediary variable enriches and expands the realization path of technology-based SMEs to improve performance, which is also one of the study's theoretical contributions. In the full sample analysis, knowledge integration ability plays a partial mediating role in the influence of corporate social capital on enterprise performance. In the case of good performance of the enterprise itself, knowledge integration ability plays a partial mediating role in this model, the indirect effect size is 0.385, and the total effect size is 0.782. In the case of poor performance of the enterprise itself, knowledge integration ability plays a complete intermediary role in this model. The influence of CSC on enterprise performance is mainly realized through knowledge integration ability, with an indirect effect size of 0.328. This study uses group analysis to compare the differences of each path under different performance groups. There is no significant difference in the resulting path coefficients. So, the mediating effect of knowledge integration ability was not different between the two groups. Therefore, enterprises should broaden the channels of knowledge integration and speed up the speed of knowledge integration.

Through empirical analysis, it is not difficult to see that the management of enterprises with good performance pay more attention to the role of CSC in improving enterprise performance, so that they actively use corporate social capital to promote knowledge integration capabilities, further solve the resource constraints faced by technology-based SMEs at all times, and achieve the purpose of improving enterprise performance.

With the increasing complexity of technology, the growth and diffusion of knowledge are increasing rapidly, and scattered and disordered knowledge fragments are difficult to play a role. Knowledge integration capability has gradually become an important way for enterprises to acquire innovative ideas and knowledge.

Knowledge integration capability verified by this study plays an important role in improving enterprise performance. Enterprises can broaden knowledge integration channels and speed up knowledge integration in the following ways:

- 1) Enterprises should establish a knowledge sharing platform and create an online platform for employees to share and exchange knowledge and experience, such as internal blogs, forums, social media, etc.
 - 2) Inter-departmental cooperation is advocated within the enterprise. Regular inter-departmental meetings are held to encourage cooperation and collaborative work between different departments to promote knowledge transfer and integration. Through cooperation, enterprises can gain knowledge and share experience in various fields, promote knowledge integration and innovation, and share each other's knowledge and resources.
 - 3) Enterprises should create an expert network that brings together professionals and domain experts within the organization so that employees can contact and consult quickly.
 - 4) In the era of big data, enterprises should use various digital tools to broaden knowledge integration channels, such as internal online collaboration tools, knowledge management systems and virtual team platforms. This can promote collaboration and knowledge sharing between different departments and employees, and promote the integration and dissemination of knowledge.
- (3) The impact of corporate social capital on enterprise performance varies with the performance of the corporate itself.

This study adopts the grouping analysis of survey data to conduct exploratory analysis from the perspective of the performance of the enterprise itself, which improves the effectiveness of the empirical analysis results and makes new discoveries different from the previous ones, which is also an important contribution of this study. In the empirical analysis, the 300 surveyed enterprises are divided into two groups with good performance and poor performance, and the analysis shows that the impact of corporate social capital on enterprise performance varies depending on the performance of the enterprise itself, that is, the performance of the enterprise may play a moderating role in the impact of corporate social capital on enterprise performance. To be specific, good performance will increase the reputation and credibility of the enterprise, enhance the recognition of the enterprise in the society, and then increase the social capital of the corporate. These social capital can bring more business opportunities and resources to the corporate, thus promoting the further development of the corporate. Therefore, the relationship between the influence of corporate social capital on enterprise performance is complex. Good enterprise performance can promote the development and progress of corporate, improve the internal management effect of enterprises, stimulate the work motivation and enthusiasm of employees, and play a positive role in promoting the competitiveness and sustainable development of enterprises.

6. Limitations and recommendations for future research

Although this study has drawn some meaningful conclusions, there are still some limitations in the research process. The first is a cross-industry comparative

study. Due to the limitations of manpower, material resources and time, the survey sample of this study is limited to technology-based SMEs. Although it includes multiple industries, whether the conclusion can be applied to other fields still needs further study. Under possible conditions, follow-up research can conduct comparative research by industry, which is conducive to discovering the characteristics of each industry and providing guidance for companies in different industries with more reference value; secondly, the impact of CSC on enterprise performance may be a dynamic process. The data used in this study are cross-sectional data, and what is carried out is a relatively static empirical analysis. Therefore, future research can consider longitudinal research design to examine whether the relationship between corporate social capital, knowledge integration capability, and enterprise performance changes over time; third, this study did not explore the impact of control variables. For example, under different scales or ages of enterprises, the impact of CSC on enterprise performance may be different. This aspect can be analyzed in future studies; fourth, this study only discussed the relationship between corporate social capital, knowledge integration ability and enterprise performance and the mediating role of knowledge integration ability, without in-depth analysis of whether the influence relationship between variables is moderated by other potential factors. For example, can we fully verify whether the performance of the corporate itself regulates the influence relationship between the three? Are there other potential moderating variables? Therefore, in the future research, relevant regulating variables will be introduced for in-depth analysis, and the influence relationship between the three will be clearly expounded.

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