

# *The Influence Study of Corporation-Institute-University Cooperation Relationship Quality and Relationship Reciprocity on Corporation Innovation Performance: Based on Intermediary Effect of Knowledge Share*

Jing Zhang, Lingling Zheng

*School of Management, Changchun University, Changchun, 130022, China*

**Keywords:** Corporation-Institute-University, Cooperation, Relationship Quality, Relationship Reciprocity, Knowledge Share, Innovation Performance

**Abstract:** As an important innovation mechanism, industry-university-research cooperation can enhance the independent innovation ability of enterprises, which is an important way to promote the transformation of economic development mode. Based on the background of industry-university-research cooperation, this paper constructs a relational model of relationship quality, relationship reciprocity, knowledge sharing and innovation performance. The mechanism of relationship quality and relationship reciprocity on innovation performance and the mediating effect of knowledge sharing are empirically studied. The result shows that both relationship quality and relationship reciprocity have effect on knowledge share and innovation performance, while knowledge share is an intermediary factor in the effect of relationship quality and relationship reciprocity on innovation performance.

## 1. Introduction

With the increasingly fierce market competition, it is hard for firms to master the latest knowledge comprehensively and to develop all technologies independently. Instead, survival and development of firms must depend on ability of independent innovation. As the important innovative mechanism, corporation-institute-university cooperation enables firms to enhance capacity for independent innovation. The social network composed of corporation-institute-university cooperation forms abundant social capital, which contains two important relationship dimensions, including relationship quality and relationship reciprocity. Both of them have a great influence on corporation-institute-university cooperation. Relationship quality contributes to sharing implicit knowledge with the higher embedability among universities, institutes and firms, reinforcing mutual trust, and reducing occurrence of opportunism. Relationship reciprocity enables both parties to pay more attention to long-term cooperative planning, improve knowledge share aspiration, and increase knowledge share frequency.

Though corporation-institute-university cooperation in China has acquired lots of achievements in recent years, it still has a great number of problems in the innovation mechanism, such as skepticism of firms on marketization of scientific achievements in colleges, insufficient trust in cooperation,

short-termism of corporation-institute-university, the majority of short-term cooperation in projects, shortage of long-term research and tracking in relevant technical field, and significant technical difficulties, and so on.

Based on the background, the following questions are proposed in the paper: (1) based on the background of corporation-institute-university cooperation, how can corporation-institute-university cooperation relationship quality and relationship reciprocity improve corporation innovation performance? Whether firms can improve innovation performance through knowledge share? (2) Will corporation-institute-university cooperation relationship quality and relationship reciprocity have an influence on corporation innovation performance directly or indirectly through knowledge share? The paper will discuss the mechanism among corporation-institute-university cooperation relationship quality, relationship reciprocity, and corporation innovation performance.

## **2. Theoretical Review**

### **2.1 Literature Review of Relationship Quality**

Holmlund (2001) indicated that relationship quality means comprehensive evaluation and cognition on commercial intercourse effects judged by both cooperative parties in commercial relations according to some standards [1]. Smith (1998) thinks that relationship quality is a high-order concept composed of various positive relationship results to reflect overall strength of a relationship and to meet demands and expectations [2]. Crosby et al., proposed the study on relationship quality as early as 1990 and indicated that satisfaction and trust should be internal variables for relationship quality by studying workers and customers in Life Insurance [3]. Henning and Klee (1997) even divided relationship quality into overall quality perception, trust and promise [4]. Roberts (2003) showed relationship quality is a part of the total perceived quality of customers or enterprises [5].

### **2.2 Literature Review of Relationship Reciprocity**

The study on reciprocity was dated from behavioral economics and indicates that preference of altruism is brought into the revenue function in modern economic society. It will give both considerations to benefits of others to some extent and consider happiness of others as their own happiness in most of situations. It also cares about social equality, equality and fairness.

The influence study of reciprocity on knowledge management activities mainly involves in organizational learning, knowledge transfer, knowledge conversion and knowledge share. It is widely proven in academic circles that reciprocity motivation contributes to knowledge share. Zhang Tongjian showed that reciprocity preference enables enterprise members to realize self-transcendence in continuous learning, so that firms will be capable of gaining more comprehensive knowledge skills and it also can improve knowledge conversion and learning efficiency.

### **2.3 Literature Review of Knowledge Share**

Due to different angles on knowledge share, domestic and overseas scholars also have statements from diverse perspectives. There are lots of research directions about knowledge share, such as knowledge share system development direction, which contains encoding of knowledge and system development, etc., organizational structure direction, which involves in virtual organizations and network organizations, etc., as well as organizational culture direction, which includes trust relationship of knowledge share parties and interpersonal relationship, etc.

Generally speaking, the majorities of studies regard knowledge share as outcome variables. When knowledge share is regarded as the intermediate variable, antecedent variables include target

orientation, Chinese culture factors, distributed innovation and service outsourcing, etc. Outcome variables include employee creativity, innovation performance, innovative behaviors and outsourcing performance, etc. Knowledge share has a significant influence on enterprise performance and it is generally studied from multiple research angles, providing the abundant theoretical bases for studying knowledge share and corporation innovation performance in the paper. However, seldom scholars study relationship quality, relationship reciprocity, knowledge share, and corporation innovation performance as an integrated model.

### 3. Conceptual Model and Mechanism of Corporation-Institute-University Cooperation Relationship Quality and Relationship Reciprocity Affecting Corporation Innovation Performance

#### 3.1 Conceptual Model of Corporation-institute-university Cooperation Relationship Quality and Relationship Reciprocity Affecting Corporation Innovation Performance

The paper aims to explore influences of corporation-institute-university cooperation relationship quality and relationship reciprocity on corporation innovation performance through knowledge share. Based on the analysis, the conceptual model is constructed as shown in Figure 1:

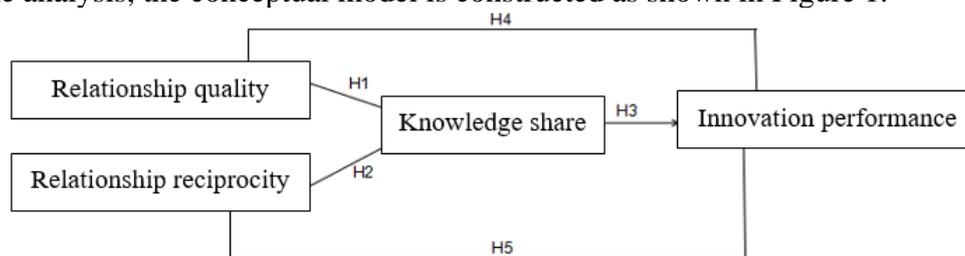


Figure 1: Conceptual Model

#### 3.2 Mechanism of Corporation-institute-university Cooperation Relationship Quality and Relationship Reciprocity Affecting Corporation Innovation Performance

##### 3.2.1 Influences of Relationship Quality on Knowledge Share

Corporation-institute-university cooperation is a relationship based on trust, satisfaction and reciprocity, which means that communications among colleges, institutes and firms will be more frequent, and they will have an increasing number of knowledge share with the higher quality. Tsai showed that with the increase of familiarity, community members will know more about social contact standards in interactive process and have more intention to do resource exchange and integration, promoting users to share relevant knowledge and experience [6]. Based on the above-mentioned analysis, the following hypothesis is proposed in the paper:

H1: Relationship quality has a significant positive influence on knowledge share.

##### 3.2.2 Influences of Relationship Reciprocity on Knowledge Share

The empirical study of Bock, Zmud, Kim & Lee (2005) found that organizational climate, sense of self-value and expected reciprocity will have an influence on attitude towards knowledge share through subjective norms [7]. Generally speaking, institutes are regarded as an important means to improve core competitiveness. With the corporation-institute-university cooperation, firms improve enterprise performance through technical innovation, while institutes can seize the market dynamics in time and commercialize theoretical achievements. Therefore, such reciprocity promotes institutes

and firms to improve effort intention of knowledge share.

Based on the above-mentioned analysis, the following hypothesis is proposed in the paper:

### **3.2.3 Influences of Knowledge Share on Corporation Innovation Performance**

Effort for knowledge share is the intention and precondition to realize knowledge share. Due to heterogeneity, parties in corporation-institute-university cooperation are equipped with precondition of knowledge share. If both parties have the stronger share intention, they will share knowledge positively and actively. The number and quality of knowledge share will cause a positive influence on knowledge share performance. Domestic and overseas scholars proved that outcome variables of knowledge share include enterprise performance, individual performance, enterprise technical capacity and personal creativity through the empirical study. Song Zhihong et al (2010) showed that knowledge share has a close relation with innovation ability [8]. Based on above-mentioned analysis, the following hypothesis is proposed as follows:

H3: Knowledge share has the significantly positive influence on corporation innovation performance.

### **3.2.4 Influences of Relationship Quality on Corporation Innovation Performance**

Firms establish a long-term stable relation with colleges and institutes in corporation-institute-university cooperation, which will drive the success of cooperation and enhance corporation innovation performance. Wang Anning proposed that relationship quality of both parties has an important influence on knowledge and cooperation performance. Based on the above-mentioned analysis, the following hypothesis is proposed as follows:

H4: Relationship quality has a significantly positive influence on corporation innovation performance.

### **3.2.5 Influences of Relationship Reciprocity on Corporation Innovation Performance**

By studying multinational joint venture companies, Xie Hongming and Wang Xianbiao et al., (2008) found that reciprocity degree of network relation has a significant influence innovation ability [9]. By investigating high-tech enterprises, the higher reciprocity of firms with scientific research institutions is, the stronger dependency will be. As a result, it is easy to understand existing problems and meet mutual demands. This is good for both parties to share knowledge effectively and improve innovation performance. Based on the above-mentioned analysis, the following hypothesis is proposed in the paper:

H5: Relationship reciprocity has a significantly positive influence on corporation innovation performance.

### **3.2.6 Intermediary Effect of Knowledge Share on Relationship Quality Affecting Innovation Performance**

Corporation-institute-university cooperation is a long-term cooperative relationship based on trust, which is able to promote member communication, enhance knowledge share intention of knowledge transfer, and promote knowledge share in creative activities, especially for implicit knowledge. The cooperation relationship quality can impact effort degree for knowledge transfer to transmit knowledge and for knowledge recipient to learn knowledge. Both parties have the higher relationship quality, thus they will share the higher number and quality of knowledge, causing a significantly positive influence on corporation innovation performance. Based on the above-mentioned, the following hypothesis is proposed in the paper:

H6: Knowledge share plays the intermediary effect on relationship quality affecting innovation performance.

### **3.2.7 Intermediary Effect of Knowledge Share on Relationship Reciprocity Affecting Innovation Performance**

In view of social exchange theory, the expected reciprocity and mutual benefits are the foundation of resource exchange. Knowledge owners are expected to get returns or mutual benefits from the knowledge recipient, thus they are willing to share knowledge. The good cooperation relationship is a direct support for technical innovative activities for enterprises. It is reported that reciprocity is good for maintaining and developing the partnership. Based on the above-mentioned analysis, the following hypothesis is proposed as follows:

H7: Knowledge share plays the intermediary effect on relationship reciprocity affecting innovation performance.

## **4. The Empirical Study**

### **4.1 Sample Selection and Data Acquisition**

The questionnaire is selected in the paper to do data acquisition. Survey methods give priority to field questionnaire interview, e-mail and WeChat message, etc. The score of the investigation involves in Jilin, Sichuan, Zhejiang, Beijing, Guangdong, Shanghai, Hebei, Hunan, Yunnan and Jiangsu, etc., ranging from manufacturing industry, IT and communication industry, chemical industry, pharmaceutical industry and automobile industry, etc. The study grants a total of 300 questionnaires, recycled 285 questionnaires, including 243 of effective questionnaires and 81% of effective recovery.

### **4.2 Variable Measurement and Research Method**

The study involves in the following variables, including corporation-institute-university cooperation relationship quality, relationship reciprocity, and corporation innovation performance, etc., which variables are difficult to be quantified or may contain trade secret of respondents, thus it is impossible to obtain real information. As a result, measurement of variables applies Likert seven-grade scale. 1-7 means “totally agree”, “totally disagree”, “relatively disagree”, “general”, “relatively agree”, “agree” and “totally agree”.

In order to ensure reliability and validity of measurements, the study refers to the used scales by settling domestic and overseas exhibiting literatures. By modifying these scales according to research demands, a scale of the study is finally formed. SPSS20.0 statistical software is used to do reliability and validity analysis, and factor analysis of variables in the hypothesis model, and then AMOS21.0 is applied to fit and verify the model.

The explained variable—measurements of corporation innovation performance: Innovation performance refers to effects brought by all kinds of innovative behaviors in firms. Though domestic scholars discuss measurements of innovation performance, this is no recognized indicator system. Some of them consider from both single items and multiple items. Others measure from subjective assessment and objective evaluation. Based on the background of corporation-institute-university cooperation, the study applies multiple-item indicator system to measure corporation innovation performance. At the same time, in order to avoid from revealing trade secret, the study applies subjective indicators in the questionnaire to measure corporation innovation performance. In the paper, the author studies from two dimensions to measure it: product innovation and process innovation.

Explanatory variables—relationship quality and relationship reciprocity: at present, the cognition on the relationship quality measurement is not unified, so the paper combines with the background of corporation-institute-university and selects satisfaction, trust, and propose as dimensions of relationship quality. The scale refers to studies of Beatson, Lings & Gudergan (2008), Ganesan & Hess (1997), and Anderson & Weitz (1992) and is modified based on the study. The scale includes 3 items for satisfaction, one item for promise, and 3 items for trust. The scale of relationship reciprocity is modified according to studies of Tichy (1979), Fang Shijie (1999) and Zhu Mei (2007), including sense of identity, coordinative intention and expected consistency, etc.

Intermediary variable—knowledge share: dimensions of knowledge share mainly include single dimension, double dimensions and three dimensions. Based on William R. King & Peter V. Marks Jr (2008), the scale divides dimensions of knowledge share into knowledge share effort and knowledge share frequency, thus forming six items in two-dimensional scale of knowledge share, 4 items for measuring knowledge share effort, and one item for measuring knowledge share frequency[10].

### 4.3 Reliability and Validity

#### 4.3.1 Reliability Analysis

SPSS20.0 software is used to do reliability analysis on the questionnaire. Calculated is as shown in Table 1.

Table 1: Reliability Test of Sub-scale

Latent variables	Deleted mean value	Total correlation of correction item	Cronbach's Alpha value	Latent variables	Deleted mean value	Total correlation of correction item	Cronbach's Alpha value
relationship quality	Q1-1	.873	0.958	innovation performance	Q5-1	.901	0.961
	Q1-2	.892			Q5-2	.883	
	Q1-3	.879			Q5-3	.878	
	Q1-4	.825			Q5-4	.879	
	Q1-5	.823			Q5-5	.852	
	Q1-6	.840			Q5-6	.868	
	Q1-7	.862					
relationship reciprocity	Q2-1	.865	0.922	knowledge share	Q3-1	.834	0.927
	Q2-2	.820			Q3-2	.902	
	Q2-3	.841			Q3-3	.874	
					Q3-4	.876	
					Q4-1	.616	

It can be observed from the reliability test of research variables that Cronbach's  $\alpha$  value of all sub-scale is greater than 0.9, indicating that reliability of each scale is favorable. Thus, it shows that measuring indicators of research variables have the higher internal consistency reliability and survey data are reliable.

#### 4.3.2 Validity Test

AVE index and factor analysis of latent variables are applied to test the conceptual validity of scales. The exploratory factor analysis (characteristic root>1) is applied to analyze items in relationship quality, relationship reciprocity, knowledge share and innovation performance. Inspection results of KMO and Bartlett are shown in Table 2. KMO of each variable is greater than 0.7, suitable for factor analysis. The significance probability of Bartlett ball inspection is 0.000,

indicating that data have correlation, suitable for factor analysis.

Table 2: KMO and Bartlett Inspection

Latent variables		relationship quality	relationship reciprocity	knowledge share	innovation performance
KMO value		.915	.757	.895	.922
Bartlett ball inspection	Approximate chi-square	1164.630	320.721	684.735	965.079
	DOF	21	3	10	15
	Significance probability	.000	.000	.000	.000

Factor analysis results are shown in Table 3. Every item can be loaded to the factor of expected measurements. The load coefficient of corresponding factor is greater than 0.5, between 0.5 and 0.95.

Table 3: Factor Analysis Table

	Items	Factor load coefficient	AVE
relationship quality	Q1-1	.907	0.803
	Q1-2	.921	
	Q1-3	.911	
	Q1-4	.870	
	Q1-5	.873	
	Q1-6	.886	
	Q1-7	.903	
relationship reciprocity	Q2-1	.942	0.866
	Q2-2	.919	
	Q2-3	.930	
knowledge share	Q3-1	.909	0.796
	Q3-2	.947	
	Q3-3	.931	
	Q3-4	.932	
	Q4-1	.722	
innovation performance	Q5-1	.933	0.838
	Q5-2	.920	
	Q5-3	.916	
	Q5-4	.917	
	Q5-5	.897	
	Q5-6	.909	

Table 4: The explained total variance

Components	Initial eigenvalues			Loaded by quadratic sum		
	Total	Variance %	Accumulated %	Total	Variance %	Accumulated %
relationship quality	5.620	80.282	80.282	5.620	80.282	80.282
relationship reciprocity	2.595	86.516	86.516	2.595	86.516	86.516
knowledge share	3.982	79.638	79.638	3.982	79.638	79.638
innovation performance	5.029	83.814	83.814	5.029	83.814	83.814

Extraction method: PCA (principal component analysis)

The explained total variance is shown in Table 4. The accumulated characteristic root of factors explains the value of overall variance is 80.282%, 86.516%, 79.638% and 83.814%, respectively. Factor analysis effects are very good. AVE is greater than 0.5, between 0.79-0.86, indicating that

each scale has the good convergent validity.

#### 4.4 Correlation Analysis

Correlation analysis is a statistical method to study whether there is correlation and strength of correlation in respondents. Correlation coefficient is the statistics to describe strength and direction of the linear relation, and the value range is [-1,1].

Table 5: Relevant Analysis Table of Influence Variables for Innovation Performance

		innovation performance	relationship quality	relationship reciprocity	knowledge share
innovation performance	Pearson correlation	1			
	Significance (both sides)				
	N	144			
relationship quality	Pearson correlation	.789**	1		
	Significance (both sides)	.000			
	N	144	144		
relationship reciprocity	Pearson correlation	.780**	.837**	1	
	Significance (both sides)	.000	.000		
	N	144	144	144	
knowledge share	Pearson correlation	.865**	.863**	.866**	1
	Significance (both sides)	.000	.000	.000	
	N	144	144	144	144

\*\* . Above.01 (both sides), it has the significant correlation).

It can be observed from the Table 5 that the correlation coefficient between relationship quality and innovation performance is 0.789. P of significance is 0.000, smaller than 0.05. It reaches the significance level, indicating that there is the significantly positive correlation between relationship quality and innovation performance. The correlation coefficient between relationship reciprocity and innovation performance is 0.780. P of significance is 0.000, smaller than 0.05. It reaches the significance level, indicating that there is the significantly positive correlation between relationship reciprocity and innovation performance. The correlation coefficient between knowledge share and innovation performance is 0.865. P P of significance is 0.000, smaller than 0.05. It reaches the significance level, indicating that there is the significantly positive correlation between knowledge share and innovation performance.

#### 4.5 SEM Model Fitting Analysis and Result Discussion

##### 4.5.1 Model Fitting Analysis

Global model fitting goodness indicator has absolute fitting goodness indicator (chi-square, chi-square DOF, GFI and AGFI), increment fitting goodness indicator (TLI and CFI) and approximate error indicator (RMR and RMSEA). The study refers to common fitting indicators used in previous studies, thus the study applies seven fitting indicators of chi-square/DOF, RMSEA, TLI, CFI, IFI, AGFI and PGFI to judge the fitting degree of the empirical model.

AMOS software is applied to simulate the model and data. The operation results are shown in Table 6:

Table 6: Innovation Performance Model Fitting Results

Fitting inspection indicator	Ideal standards	Model results	Meet standards
CMIN/DF	<5(<3)	2.930	Yes
AGFI	>=0.8	0.810	Yes
CFI	>=0.9	0.835	Yes
TLI	>=0.9	0.917	Yes
RMSEA	<=0.1	0.096	Yes
IFI	>=0.9	0.911	Yes
PGFI	>=0.5	0.565	Yes

It can be observed from the table that the key indicator chi-square/DOF is 2.93, smaller than the strict standard value 3. IFI, PGFI, AGFI, CFI, TLI and RMSEA reach the ideal standards. As a whole, it shows that the model has a good fitting degree.

Table 7: Load Matrix of Innovation Performance

VAR		Latent VAR	Estimate
Q1_1	<---	relationship quality	.890
Q1_2	<---	relationship quality	.911
Q1_3	<---	relationship quality	.897
Q1_4	<---	relationship quality	.846
Q1_5	<---	relationship quality	.849
Q1_6	<---	relationship quality	.869
Q1_7	<---	relationship quality	.884
Q2_1	<---	relationship reciprocity	.907
Q2_2	<---	relationship reciprocity	.869
Q2_3	<---	relationship reciprocity	.905
Q4_1	<---	knowledge share	.628
Q3_4	<---	knowledge share	.922
Q3_3	<---	knowledge share	.919
Q3_2	<---	knowledge share	.926
Q3_1	<---	knowledge share	.909
Q4_6	<---	innovation performance	.884
Q4_5	<---	innovation performance	.861
Q4_4	<---	innovation performance	.897
Q4_3	<---	innovation performance	.904
Q4_2	<---	innovation performance	.906
Q4_1	<---	innovation performance	.930

According to Table 7, regression coefficient of latent variables is between 0 and 1. The numerical is closer to 1, indicating that latent variables of the observed variables become more reliable. At the same time, it can be observed that factor load coefficient is between 0.50 and 0.95, indicating that basic model fitness is good. In factor load matrix, load coefficient of variables is between 0.50 and 0.95, indicating that the model fitness is good.

To sum up, the model has good fitness with actual data and can be further analyzed.

#### 4.5.2 Model Operation Results and Discussion

Amos software is applied to analyze the model with the following results:

Table 8: Estimated Parameters of Latent Variables in the Measure Model (Relationship Quality, Relationship, Reciprocity, Knowledge Share and Innovation Performance).

Variables		Variables	Estimate	S.E.	C.R.	P
Q1_1	<---	relationship quality	1.000			
Q1_2	<---	relationship quality	.938	.055	17.119	***
Q1_3	<---	relationship quality	.920	.056	16.442	***
Q1_4	<---	relationship quality	.904	.063	14.429	***
Q1_5	<---	relationship quality	.830	.057	14.533	***
Q1_6	<---	relationship quality	.827	.054	15.272	***
Q1_7	<---	relationship quality	.851	.054	15.874	***
Q2_1	<---	relationship reciprocity	1.000			
Q2_2	<---	relationship reciprocity	.894	.057	15.583	***
Q2_3	<---	relationship reciprocity	.980	.057	17.229	***
Q4_1	<---	knowledge share	1.000			
Q3_4	<---	knowledge share	1.185	.132	9.008	***
Q3_3	<---	knowledge share	1.160	.129	8.988	***
Q3_2	<---	knowledge share	1.214	.134	9.035	***
Q3_1	<---	knowledge share	1.154	.129	8.921	***
Q4_6	<---	innovation performance	1.000			
Q4_5	<---	innovation performance	.916	.062	14.767	***
Q4_4	<---	innovation performance	1.028	.064	16.185	***
Q4_3	<---	innovation performance	1.072	.065	16.479	***
Q4_2	<---	innovation performance	1.047	.063	16.554	***
Q4_1	<---	innovation performance	1.032	.058	17.643	***

In the Table 8, standard estimate value of all parameters is moderate. Moreover, C.R. test value is greater than 1.96. The standard difference of parameter estimate is greater than 0, indicating that the model meets the basic fitting standards.

Table 9: Path Coefficients of Innovation Performance in Latent Variables

Variables		Variables	Estimate	S.E.	C.R.	P
innovation performance	<---	relationship quality	.382	.110	3.481	***
innovation performance	<---	relationship reciprocity	.427	.121	3.528	***
knowledge share	<---	relationship quality	.214	.064	3.334	***
knowledge share	<---	relationship reciprocity	.397	.082	4.840	***
knowledge share	<---	innovation performance	.251	.061	4.098	***

From Table 9, it shows that path coefficients of every latent variable reach the significance level. The standard path coefficients between innovation performance and relationship quality/relationship reciprocity/knowledge share reach 0.382, 0.427 and 0.251, respectively. The standard path coefficients between knowledge share and relationship quality/relationship reciprocity are 0.214 and 0.397, respectively. Every path coefficient is positive, indicating that relationship quality, relationship reciprocity and knowledge share have the significant positive influence on innovation performance. In addition, relationship quality and relationship reciprocity also have the significantly positive influence on knowledge share. The overall theory model is shown below:

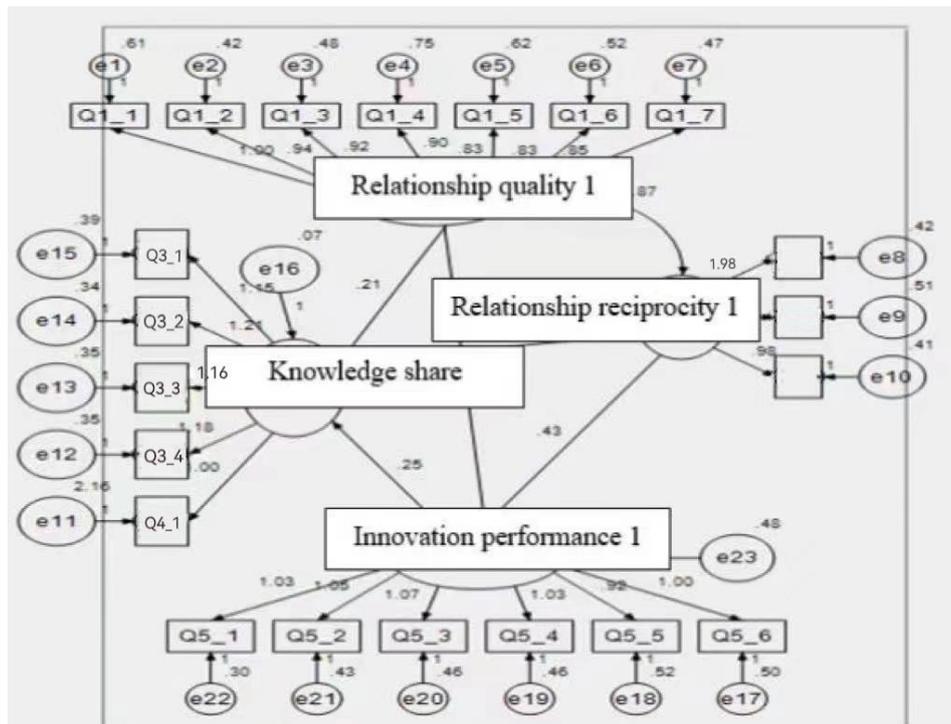


Figure 2: Overall SEM Model of the Relationship between Relationship Quality/Relationship Reciprocity/ Knowledge Share and Innovation Performance

Meanwhile, as the intermediary variable—knowledge share, it can be observed that knowledge share has the intermediary effect between relationship quality and innovation performance. The intermediary effect is  $0.251 \times 0.214 = 0.054$ , which plays some intermediary effect. Knowledge share has the intermediary effect between relationship reciprocity and innovation performance. The intermediary effect is  $0.251 \times 0.397 = 0.10$ , which plays some intermediary effect. To sum up, relationship quality and relationship reciprocity have the significant positive influence on innovation performance. Moreover, knowledge share plays some intermediary effect on the above-mentioned relationship.

By applying the SEM, the path relation analysis of interaction between relationship quality, relationship reciprocity and innovation performance indicates that relationship quality and relationship reciprocity don't act on innovation performance directly, but affect the intermediate factor—knowledge share, so as to improve innovation performance of enterprises. The mechanism is shown in Figure 2, which shows that relationship quality and relationship reciprocity have the following paths on corporation innovation performance influence mechanism, including relationship quality → knowledge share → innovation performance; relationship reciprocity → knowledge share → innovation performance.

## 5. Conclusions and Enlightenment

The paper constructs a research model through literature research. The author applied SEM to analyze the mechanism path relationship between corporation-institute-university cooperation relationship quality/ relationship reciprocity/knowledge share and corporation innovation performance. The analysis indicates that relationship quality and relationship reciprocity don't act on innovation performance directly, but improve corporation innovation through the intermediate factor—knowledge share. Knowledge share plays some intermediary effect on relationship quality, relationship reciprocity and corporation innovation performance. Specific conclusions are shown as

follows:

(1) Relationship quality and relationship reciprocity have the significant positive influence on knowledge share.

If corporation-institute-university cooperation has the precondition of reciprocity and mutual benefits and both parties trust in each other, satisfy with each other and abide by promise, it means that colleges, institutes and enterprises have the higher frequency of communication and more knowledge share. High trust and satisfaction make both parties have the stronger knowledge share intention, especially for implicit knowledge. In addition, high promise between both parties is good for reducing friction and conflict in cooperative process, so as to improve effects of knowledge share. As a result, as cooperating with colleges and institutes, firms should improve relationship quality as much as possible, establish a stable and trusting relation and promote knowledge innovation.

(2) Relationship quality and relationship reciprocity have the significant positive influence on innovation performance.

Colleges, institutes and enterprises have background heterogeneity. Facing to the rapid market changes, colleges and institutes should use advantages of abundant research strength and intensive knowledge intelligence to support for firms powerfully. Knowledge share and innovation should be applied to drive enterprise products and process innovation, so as to improve enterprise performance. The higher satisfaction and promise degree can reduce innovation risk caused by opportunism caused by technical and market uncertainty. This is good for sharing critical implicit knowledge and improving innovation performance.

(3) Knowledge share plays some intermediary effect on relationship and relationship reciprocity affecting innovation performance.

Trust can improve knowledge share intention, promote occurrence of share behaviors and decrease worries of both parties about knowledge share. Enterprises should build an atmosphere for knowledge share, improve knowledge share intention, reinforce interaction between employees and workers in institutes, and enhance knowledge share frequency between enterprises and institutes, which is good for knowledge innovation, so as to improve innovation performance.

The study has the positive significance on the theory and practice development of corporation-institute-university cooperation. Through corporation-institute-university cooperation, to improve independent innovation capacity is an important way to change the manufacturing power to the innovative state. The key lies in promoting knowledge share among firms, colleges and institutes. Though good promise and trust mechanism can create a good environment for knowledge share, if firms are short of powerful knowledge share intention and insufficient communication, knowledge share after all can come to naught. In China, many enterprises participate in corporation-institute-university cooperation for short-term benefits, such as reduction of development costs, share governmental expenditure resources, patent permission and facility use right of colleges and institutes, etc. However, they are lack of effort intention to reinforce core technology through cooperation, resulting in poor knowledge share. In corporation-institute-university cooperation, firms should change knowledge learning into internal demands from the perspective of sustainable development and make corresponding preparations for knowledge share in technologies and management.

In the paper, the author studied influence mechanism of relationship quality, relationship reciprocity and knowledge share on corporation innovation performance, verified the intermediary effect of knowledge share on relationship quality, relationship reciprocity affecting innovation performance, verified previous studies and also supplemented previous research achievements. However, the study also has some limitations. For example, the empirical study didn't involve in all industries for sample selection or didn't classify the industry involved. It failed to study whether different industries will have a different influence on corporation innovation performance. The future studies can involve in diverse industries and consider influence mechanism of different corporation-

institute-university cooperation on corporation innovation performance.

## References

- [1] Holmlund, Maria. *The D&D Model: Dimensions and Domains of Relationship Quality Perceptions*. *Service Industries Journal*. 2001, 21(3): 13-36.
- [2] Smith J, Brock. *Buyer- Seller Relationships: Similarity, Relationship Managements, and Quality*. *Psychology& Marketing*. 1998, 15(1): 321.
- [3] Crosby, Lawrence A, Evans, Kenneth R, Cowles, Deborah. *Relationship Quality in Services Selling: An Interpersonal Influence Perspective*. *Journal of Marketing*. 1990, 54 (3): 68-81.
- [4] Hennig- Thurau, Thorsten, Klee, Alexander. *The Impact of Customer Satisfaction and Relationship Quality on Customer Retention: A Critical Reassessment and Model Development*. *Psychology& Marketing*. 1997, 14 (8): 737-765.
- [5] Roberts, Keith, Varki, Sajeev, and Brodie, Rod. *Measuring the Quality of Relationships in Consumer Services: An Empirical Study*. *European Journal of Marketing*. 2003, 37 (1/2): 169-196.
- [6] Tsai W, Ghoshd S. *Social capital and value creation: an empirical study of intrafirm networks*. *Academy of Management Journal*, 1998, 41 (4): 464-476.
- [7] Bock G M, Zmud R W, Kim Y G, et al. *Intention formation in knowledge sharing: examining the roles of extrinsic motivators, social-psychological forces, and organizational climate*. *MIS Quarterly*, 2005, 29(1):87-111.
- [8] Song Zhihong et al., *Empirical Study on the Relationship between Knowledge Features/Knowledge Share and Corporation Innovation Ability*, *Science REearch*, 2010, 28(4): 597-604;
- [9] Xie Hongming, Wang Xianbiao and Wu Shuo, *Influences of Incentives on Knowledge Management and Management Innovation*, *Science Research*, 2009, 27(1): 147-153.
- [10] William R. King & Peter V. Marks Jr. *Motivating Knowledge Sharing Through a Knowledge Management System*. *Omega*, 2008, 36(1):131-146.