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# PROMOTION OF NETWORK COMPETENCE: A STUDY OF INTER-EXPLANATORY EFFECT BASED ON LEADER-MEMBER EXCHANGE AND ORGANIZATIONAL IDENTIFICATION

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Abstract. *Taking manufacturing enterprises as the research object, the paper mainly discusses the influence of leader-member exchange on network competence and innovation performance, and analyzes the role of organizational identification in this process. The results of ISEM test show that leader-member exchange, organizational identification and their mutual explanatory effects can significantly improve network competence and innovation performance. This also shows that although network competence is achieved by leader-member exchange, organizational identification is also an indispensable impetus to the improvement of network competence.*
**Keywords:** Leader-member exchange, Network competence, Organizational identification, Innovation performance

1. **Introduction.** Innovative enterprises are the main carriers of China's in-depth implementation of innovation-driven development strategy. With the promotion of innovation resource integration and innovation subject collaboration, the technological innovation of enterprises has gradually become systematized and networked [1]. Therefore, it is more and more important for enterprises to identify the strategic opportunities of innovation network, deal with innovation network relations and manage innovation network location to acquire scarce innovative resources. Enterprises and academia define this ability as network competence, which is valuable, scarce, irreplaceable and difficult to imitate, and increasingly becomes an important core organizational capability. At the same time, in the era of collaborative innovation, the industrial environment changes rapidly, and organizations need to seek transformation to enhance their competitive advantages. As Prahalad and Hamel pointed out in their research, "Excellent leaders can stimulate the potential of subordinates, and eventually accumulate the core capabilities of organizations to improve their competitive advantages" [2]. Blader et al. pointed out that employees of high organization identification tied themselves to the interests and fate of the company. Therefore, in the work, they would think about things from the perspective of the company, be proactive, and strive to contribute to the company [3].

Existing researches have discussed the relationship between organization identification and innovation, leader-member exchange and innovation. Compared with employees of low organization identification, employees of high organization identification take the initiative to do organizational citizenship behavior [4], employees of high organization identification are willing to do loyalty behavior to maintain organizational reputation and interests [5], and employees of high organization identification share knowledge with colleagues, perform well in roles, and innovate in work [6]. Leader-member exchange

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relation has a significant positive impact on employee innovation behavior [7]. High-quality leader-member exchange has positive effect on employee performance [8]. Based on the above inferences, there is no detailed research which is done in the view of network to study the impact of micro-behavior on organizational capability and innovation. The paper examines the effect of leader-member exchange and organizational identification as well as the mediating effect of network competence on employee innovation performance through interference structural equation model (ISEM), which tries to fill the gap in the past research.

## 2. Literature Review and Research Hypothesis.

### 2.1. Network competence and its formation.

Some scholars advocate that enterprises can completely control themselves and even related enterprises. This control school defines "core enterprise" and enterprise network which includes strategic alliance. Other scholars insist that firms cannot control their resources completely because others influence or restrict their actions. There is no "invisible hand" to create an efficient and healthy enterprise network environment. On the contrary, the "visible hand" tries to create a favorable network environment for the enterprise itself.

According to social relations theory, enterprises cannot engage in production and operation activities separately from industrial clusters, and must be deeply integrated with their industrial environment. Only in this way can they promote their own business and enhance their R&D capabilities [9]. As a result, businesses need to manage their business relationships and networks.

Håkansson first proposed the concept of networking ability, which was defined as the ability of an enterprise to improve its network comprehensive status and handle individual network relationships [10]. Parida et al. defined it as an organization capability which was owned by core organization to develop and use practical and potential inter-firm relational network's resources and information, and the core organization could actively and consciously coordinate network resources by integrating various departments of the organization, and collaboratively integrate partner's knowledge to create value to innovate [11]. From the above, we know that network competence is not born, and it is learned day by day.

### 2.2. The relationship between leader-member exchange and network competence.

Based on resource conservation theory and leader-member exchange theory (LM X) theory, leader-member exchange refers to the dual exchange relationship between leaders and subordinates based on role-taking and social exchange [12]. Exchange relationship is the exchange of tangible and intangible work resources between leaders and subordinates in nature. The quality of this dual exchange relationship can be divided into high and low levels. The low level of exchange relationship is based on employment, while the high level of exchange relationship is based on trust [13]. Due to limited resources and energy, leaders are more inclined to establish different exchange relationships with different subordinates in different ways of management [14]. Then it shows different types of differentiation (economic exchange and social exchange) and different degrees of differentiation (high and low exchange level) [15].

The cultivation of network competence is not only the thinking of top managers, but also the ability that organizations need to build from bottom to top. The closer the first-line employees are to the organizational boundaries, the more sensitive they are. They can get the change of environments, customer's needs and adjustment of competitor's strategic behaviors at the first time. Therefore, whether they are able to recognize the dynamics of innovation networks acutely will determine the overall action of the organization. In Chinese management context, leader-member relationship shows a more orderly pattern, which psychologically classifies team members into "inside" and "outside" circles, so that

members will respond differently to leaders [16]. High-quality leadership-membership relationship helps members to gain more support, opportunities and resources from leaders. Employees will trust leaders more, increase loyalty to organizations, and actively implement actions to enhance network competence. Therefore, it helps employees to enhance network capabilities. Based on interaction, the relationship between employees and leaders will be more harmonious, and further enhance the respect and trust of leaders. According to Gerstner's and Day's research, this interaction has a strong correlation between leader-member interaction and organizational member competence [17].

Hypothesis 1: The higher the level of leader-member exchange is, the better the network competence is.

2.3. **The interpretation effect of leader-member exchange and organizational identification.** Ashforth and Mael defined organizational identification as "personal perception of oneself and the organization as a whole, empathy with the success and failure of the organization" [18]. Many scholars have confirmed that employees with high organizational identification are closely related to the company's interests and destiny, so they would think about things from the company's point of view, and take the initiative and strive to contribute to the company. Organizational identification influences employees' attitudes and behaviors toward the organization by satisfying their positive emotions and reciprocity principles. In terms of mutual release effect, the more attention leaders attach to the importance of organizational identification, the more employees respond positively to the construction of network competence and then feedback the organization.

Hypothesis 2: Organizational identification interferes with the relationship between leader-member exchange and network capability.

2.4. **The mediating effect of network competence on leader-member exchange and innovation performance.** The exchange process between leader and his or her subordinates affects employee innovation performance. Leader-member exchange can help team cross-border collaboration, customer service, internal and external knowledge sharing, maintain close working relationship with partners, exchange ideas with partners regularly, maximize the interests of both sides, and then improve enterprise innovation performance. In order to successfully play the role of manager, leaders must have relevant management capabilities in order to achieve outstanding performance.

Hypothesis 3: The better the leader-member exchange is, the better the innovation performance is.

Hypothesis 4: The stronger the employee's network competence is, the better the innovation performance is.

Hypothesis 5: Leader-member exchange has a positive impact on employee innovation performance through the improvement of network competence.

## 3. Research Method.

3.1. **Samples and data collection.** Due to the difficulty of enterprise survey, in order to ensure the smooth progress of the survey and improve the questionnaire returns-ratio, this study chooses the survey area with certain social relations, and asks the personnel in this area to assist in the survey and callback of the questionnaire. The paper chooses the manufacturing enterprises as research sample due to the importance of manufacturing innovation. The final survey areas are Liaoning, Shandong and Beijing. A total of 401 questionnaires were sent out by mail, interview and E-mail, and 368 questionnaires were recovered with a recovery rate of 91.7%. The effective sample size meets the requirement that the sample size should be at least 5 times of the measurement items.

Table 1. Descriptive data of manufacturing organizations participating in the survey ($N = 368$)

| | Type | % | | Type | % |
|---|---|---|---|---|---|
| Nature of enterprise | State enterprise | 34.5 | Enterprise size | Less than 300 people | 14.3 |
| | Three-invested enterprise | 36.7 | | 301-500 people | 39.6 |
| | Private enterprise | 28.8 | | 501-1000 people | 33.9 |
| | | | | More than 1001 people | 12.2 |
| Industry | Machinery manufacturing industry | 35.1 | Enterprise age | Less than 3 years | 10.7 |
| | New material industry | 9.0 | | 4-5 years | 24.6 |
| | Chemical and textile industry | 13.6 | | 6-10 years | 25.8 |
| | Electronic communication equipment industry | 30.2 | | 11-20 years | 26.4 |
| | Other industry | 12.1 | | More than 21 years | 12.5 |

### 3.2. **Variable.**

3.2.1. *Leader-member exchange.* The leader-member exchange scale is based on Liden's research. It contains three dimensions: loyalty, contribution and professional respect. There are 12 items in it. "Loyalty" is measured by questions such as "even if the team leader does not fully understand things, he/she will defend my work in front of superiors", and "contribution" is measured by questions such as "I am willing to pay excessive efforts for the team leader's benefit". "Professional respect" was measured by items such as "the knowledge of the team leader on the job is evident". Confirmatory factor analysis (CFA) results showed that the model fitness was $\chi^2/df = 2.35$, less than 3; GFI = 0.96, AGFI = 0.95, both greater than 0.9; NNFI = 0.93, CFI = 0.98, all above 0.9; RMSEA = 0.061, SRMR = 0.037, less than the minimum standard of 0.08, indicating that the fitting effect of this model is very good.

3.2.2. *Network competence.* The network competence scale comes from the classic network competence model of Möller and Halinen (1999). Combined with the results of existing empirical research on network competence, it develops three dimensions including network strategic competence, network operation competence and network relationship competence, with a total of 20 items. CFA analysis results showed that the model fitness was $\chi^2/df = 1.95$, less than 3. GFI = 0.98, AGFI = 0.96, both greater than 0.9; NNFI = 0.96, CFI = 0.97, all above 0.9; RMSEA = 0.072, SRMR = 0.052, less than the minimum standard of 0.08, indicating that the fitting effect of this model is very good.

3.2.3. *Organizational identification.* The organizational identification scale was arranged by Eisenberger and Lynch (1998). The higher the score is, the higher the level of organizational identification is. CFA analysis results showed that the model fitness was $\chi^2/df = 2.03$, less than 3; GFI = 0.94, AGFI = 0.93, both greater than 0.9; NNFI = 0.95, CFI = 0.98, all above 0.9; RMSEA = 0.057, SRMR = 0.044, less than the minimum standard of 0.08, indicating that the fitting effect of this model is very good.

3.2.4. *Innovation performance.* The employee innovation performance measurement scale is developed by Zhou and George (2001), which covers 13 topics. CFA analysis results showed that the model fitness was $\chi^2/df = 1.59$, less than 3. GFI = 0.96, AGFI = 0.94, both greater than 0.9; NNFI = 0.93, CFI = 0.94, all above 0.9; RMSEA = 0.068, SRMR = 0.061, less than the minimum standard of 0.08, indicating that the fitting effect of this model is very good.

3.2.5. *Control variable.* When testing the hypothesis in this paper, education level (1 = high school or below; 2 = college; 3 = undergraduate course; 4 = graduate students), years of service (years of working in the present position) are selected as the control variables.

## 4. Research Results.

4.1. **Measurement model analysis.** The confirmatory factor analysis (CFA) is used to test the whole model with four potential variables and two control variables. The test results in Table 2 show that the measurement model has a good model matching ($\chi^2/df$ = 1.69, less than 3; GFI = 0.92, greater than 0.9; NNFI = 0.94, CFI = 0.91, greater than 0.9; SRMR = 0.04, RMSEA = 0.07, less than 0.08). The observational indexes of all research variables are significantly lower than those of $p < 0.001$. The standard factor loads are between 0.56 and 0.90, and the average variance of each variable is 0.63 and 0.58. The maximum and minimum reliabilities are 0.85 and 0.73 respectively, more than recommended value 0.50. Above on, the study variables have good reliability, aggregation validity and region discrimination validity. As shown in Table 2, there is a positive correlation between leader-member exchange and organizational identification and network competence. There is also a positive correlation between network competence and innovation performance, which preliminarily supports Hypothesis 1, Hypothesis 3 and Hypothesis 4.

Table 2. Variable average, standard deviation and Pearson correlation coefficient

| | Average | Standard deviation | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| 1. Organizational identification | 3.24 | 0.51 | 0.79 (0.57) | | | | | |
| 2. Leader-member exchange | 3.76 | 0.33 | 0.04 | 0.78 (0.59) | | | | |
| 3. Network competence | 3.89 | 0.34 | 0.42** | 0.54** | 0.76 (0.51) | | | |
| 4. Innovation performance | 3.56 | 0.38 | 0.27** | 0.44** | 0.66** | 0.76 (0.55) | | |
| 5. Years of service | 2.67 | 1.36 | −0.04 | 0.03 | 0.14 | 0.17* | – | |
| 6. Education level | 2.32 | 0.55 | 0.08 | 0.19** | 0.20** | 0.14* | 0.06 | – |

Note: $N = 368$; *$p < 0.05$; **$p < 0.01$; the diagonal value is the confidence of the construct, and the average variation is the amount of extraction in the brackets.

4.2. **Structural model analysis.** A total of five nesting patterns were compared in the paper: virtual structure model, measurement model, assumption model, complete mediation effect competition model and no interference effect competition model. The comparison between the models is limited to 0 by a specific parameter or the free estimate is used to compare the chi-square differences. The nested comparative analysis results are listed in Table 3.

Table 3 shows that the measurement model is significantly better than the virtual structure model; assumption model is well matched and significantly better than measurement model. This shows that assumption model is more substantial than virtual structure model and measurement model. Comparing the assumption model with complete mediation effect competition model, we find that the assumption model is significantly better than the complete mediation effect competition model ($\chi^2 = 167.89$, $df = 78$, $p < 0.10$). It shows that the effect of mutual interpretation between leader-member exchange and organizational identification has substantial statistical significance.

Table 3. Nested model comparison analysis table

| Model | $\chi^2$ | *df* | CFI | GFI | NNFI | SRMR | RMSEA |
|---|---|---|---|---|---|---|---|
| 1. Virtual structure model | 398.14** | 69 | 0.76 | 0.74 | 0.79 | 0.24 | 0.17 |
| 2. Measurement model | 98.25 | 58 | 0.91 | 0.92 | 0.94 | 0.05 | 0.07 |
| 3. Assumption model | 122.41 | 81 | 0.95 | 0.93 | 0.96 | 0.04 | 0.06 |
| 4. Complete mediation effect competition model[a] | 167.89 | 78 | 0.89 | 0.80 | 0.93 | 0.07 | 0.07 |
| 5. No interference effect competition model[b] | 155.66 | 77 | 0.94 | 0.89 | 0.87 | 0.08 | 0.06 |

Note: $N = 368$; $p < 0.10$; $*p < 0.05$; $**p < 0.01$; $***p < 0.001$; *a*: Reduce the "Leader-member exchange – Innovation performance" path in assumption model; *b*: Reduce the "$A \times B$ interpretation effect – Network competence" path in the above model.

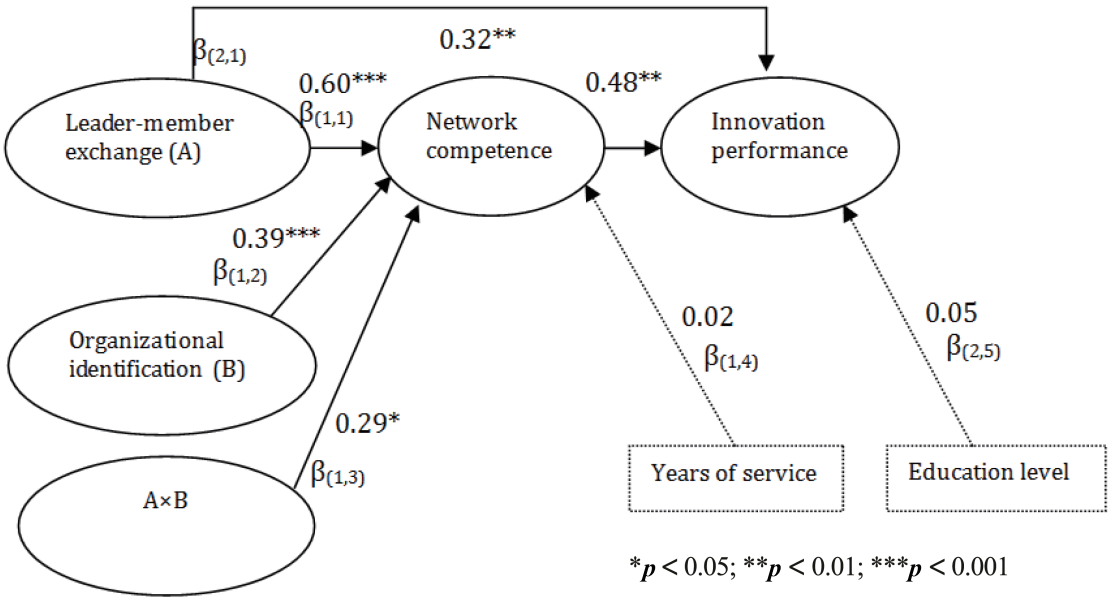


Figure 1. Estimation parameters of the final model

From Figure 1, leader-member exchange has a significant positive correlation with network competence ($\beta = 0.60$, $t = 7.72$, $p < 0.001$). Leader-member exchange has a significant positive correlation with innovation performance ($\beta = 0.32$, $t = 5.26$, $p < 0.01$). There is also a clear positive correlation effect, so Hypothesis 1, Hypothesis 3 and Hypothesis 4 are supported, and the intermediary relationship of network competence is initially established. Sobel's "Iceberg Model" is further used to test the significance of the mediating effect of network competence, which is also well validated ($z = 1.98$, $p < 0.001$), so Hypothesis 5 holds. Hypothesis 2 tests the interference effect of organizational identification on the relationship between leader-member exchange and network competence. The results show that organizational identification has a direct effect on network competence ($\beta = 0.39$, $t = 5.02$, $p < 0.001$) and has a significant reciprocal effect with innovation-oriented learning ($\beta = 0.29$, $t = 4.26$, $p < 0.05$), so Hypothesis 2 holds.

## 5. Discussion and Conclusion.

5.1. **Discussion.** All the hypotheses in this paper are supported, and the results show that the higher the degree of organizational identification, the stronger the positive impact of leader-member exchange on network competence, and the better the innovation performance of employees. The theoretical contribution of the research conclusion lies in:

in the aspect of network competence, instead of the previous study which focuses on the connotation and evaluation of network competence, it discusses the prediction of leader-member exchange on network competence, and verifies the mediating effect of network competence between leader-member exchange and innovation performance. It finds that in addition to the leader-member exchange, organization support is also needed. More importantly, organizational identification plays a role of continuous strengthening. The higher the degree of organizational identification, the more its strengthening effect on the leadership-members exchange and management competence.

5.2. **Conclusion.** Considering the management implications, first the company can make good use of the initiative, responsibility and self-realization of leaders, actively promote the quality of leader-member interaction, improve its innovation performance, and help companies create the maximum profit. Furthermore, the study found that while organizations promote leader-member exchange, they need to be supported by organizational identity, which extends two practical suggestions. First, strengthen the quality of leader-member exchange, increase the exchange of trust, loyalty and knowledge sharing, rather than simply exchange of material aspects. At the same time, the key employees in building network competence should be included in the leader's "circle". Second, in terms of organizational culture, managers need to strengthen the construction of organizational culture, enhance employees' strong sense of belonging and mission, actively advocate corporate values and corporate culture, and strengthen employees' identification with organizational culture. Furthermore, enterprises should strengthen the network competence building, promote the improvement of network competence from the aspects of leader-member exchange and organizational identification, and strengthen the network competence.

There are still some limitations in the paper. Firstly, considering the possibility of data collection, the research samples are mainly concentrated in Liaoning, Shandong and Beijing. The manufacturing enterprises are selected as the research objects. Although the total number of samples meets the requirements of statistical analysis, and the research model and hypothesis have been well verified, it cannot cover other types of enterprises. Whether the research conclusion has universal applicability remains to be further tested. Secondly, due to the limitations of time and conditions, this study adopts horizontal research, and more rigorous causal relationship is analyzed through a vertical study. If we can do a longitudinal study on the network competence cultivation, inter-organization learning and network power of enterprises in different periods of network development, it will be helpful to better sort out the mechanism of action between them. Finally, the measurement of some research variables in the model is generated by the author according to the results of interviews and relevant literature. Although it has been tested to be reliable and effective, it still needs to be verified by multi-party authentication.

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