The Impacts of Network Competence, Knowledge Sharing on Service Innovation Performance: Moderating Role of Relationship Quality

Zhaoquan Jian and Chen Wang

Abstract This research contributes to existing literature by examining how network competence (NC), knowledge sharing (KS) and relationship quality (RQ) affect service innovation performance (SIP). The sample used in this empirical research is drawn from the Pearl River Delta of China. The results show that: (1) Enterprise's network competence has a distinct positive impact on SIP; (2) Knowledge sharing partially mediates the effect of network competence on SIP. (3) Relationship quality positively moderates the effect of network competence on knowledge sharing, and the effect of knowledge sharing on SIP. (4) Relationship quality does not positively moderate the effect of network competence on SIP. These results enrich current understanding of the relationships among network competence, knowledge sharing, relationship quality and service innovation performance.

Keywords Service Innovation (SI) • Service Innovation Performance (SIP) • Network Competence (NC) • Relationship Quality (RQ) • Knowledge Sharing (KS).

1 Introduction

In the twenty-first century, the era of innovation-based "knowledge economy" has set in; the creation, spread and application of knowledge has become the main driving force to promote the progress of the times; the scale, complexity and interdependence of today's service systems have been driven to an unprecedented level. The rising significance of service and the accelerated rate of change mean that service innovation (SI) is now a major challenge to practitioners in business and

Z. Jian (✉) • C. Wang
School of Business Administration, South China University of Technology, Guangdong 510640, P.R. China
e-mail: jianzq@163.com; lynn_gofighting@qq.com

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government as well as to academics in education and research. A better understanding of service systems is required.

Most previous studies focus on manufactory industry, with little attention paid to A service industry. Empirical findings in the innovation literature are limited and inconclusive regarding SI antecedents [1]. Based on existing literatures, this paper aims to explore in depth the interacting influence of network competence, relationship quality, and knowledge sharing on SIP, which contributes to the theory of service science and RBV and provides some managerial implication for company to achieve high SIP.

2 Theory Foundation and Research Hypotheses

2.1 Influence of Network Competence on Service Innovation Performance

The initial view of service innovation (SI) is attributed to Schumpeter [2]. Later, the notion came to be regarded as the set of innovations in service processes for an organization's existing service products. Build on the existing literature, we summarize SI as enterprises' intangible activities formed in the process of service, using a variety of innovative ways to meet customer needs and maintain competitive advantage. Topics such as the performance measurement of SI projects remain under-researched. Fizgerald et al. found that SIP is multi-dimensional, not only can reflect the effectiveness of the company's operations, but also reflect a project plan, or the level of the overall development process [3].

The concept of network competencies (NC) and capabilities is derived from the Resource Based View of the firm. We argue that the ability of a firm to develop and manage relations with key suppliers, customers and other organizations and to deal effectively with the interactions among these relations is a core competence of a firm. Previous research had made some achievements on the relationship between NC and SIP. Möller, Kristian and Aino Halinen proposed a network management framework and showed that unique and dynamic networks can improve SIP [4]. Through an empirical research, Ritter and Gemünden found that NC has a strong positive impact on technological collaborations and firm's innovation success [5]. Based on previous studies, we propose:

Hypothesis 1: Network competence is positively related to SIP.

2.2 Mediating Effects of Knowledge Sharing

Contingency theory has been used in many contexts, particularly in the field of strategic actions and organizational structure. It examines the effects of related variables (e.g., strategy and business model) on firm performance [6]. We delineate

two fundamental strands of contingency theory: the "fit-as-mediation" view and the "fit-as-moderation" view [7]. According to the fit-as-mediation view, when faced with keen competition, organization's predominant response is to aggressively pursue innovation through collaboration. However, we focus in this study on the aspects of a firm's knowledge sharing that account for the effect of network competence on SIP.

Recent research attempts to understand alliance activities from a knowledge-based perspective and posits that the sharing of knowledge becomes central to develop new processes, products, or services in alliance [8, 9]. The argument that inter-firm collaboration enhances innovation practices has gained wide acceptance. Thus, we propose that well-developed mechanism of knowledge sharing can enhance innovation practices and act as a mediator between network competence and service innovation performance. Following contingency theory, we suggest the following hypothesis:

Hypothesis 2: Knowledge sharing mediates the impact of network competence on SIP.

2.3 Moderating Effects of Relationship Quality

Structural contingency theory emphasizes both external and internal fit. Thus, the second strand of contingency theory is the fit-as-moderation view [6]. This view proposes that a firm's performance is attributable to a match between its strategic behaviors and environment conditions. In this view, firm performance is the dependent variable, network competence and knowledge sharing the predictor variables, and relationship quality the contextual variables.

"Relationship quality" was firstly proposed and defined by Crosby, who defined relationship quality as the overall evaluation of the strength of buyer-seller relationship [10]. Based on the previous study, it's an integrated and realistic way to understand the relationship of the intangible resources with SIP [11]. Ritter and Gemünden suggested that with the development of the network, only when managing network relationships, can the company promote information sharing between partners, learn from each other better and have complementary advantages to improve effectiveness and efficiency [5]. The following hypotheses are offered for testing:

Hypothesis 3: Relationship quality positively moderates the influence of knowledge sharing on SIP.

Hypothesis 4: Relationship quality positively moderates the influence of network competence on knowledge sharing.

Hypothesis 5: Relationship quality positively moderates the influence of network competence on SIP.

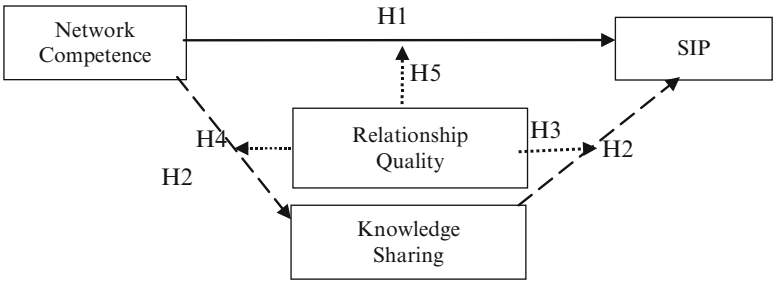

Fig. 1 The research model

3 Method

3.1 Research Framework

Based on previous research findings, interviews and group discussions, the research framework model shown in Fig. 1 is developed.

3.2 Variable Definitions and Measurement

In order to ensure the validity and reliability of measurement tools, we adopt the used scale in published literatures as much as possible, and do some proper modification according to this research's purpose. Before the final questionnaire and investigation, we do some pilot study to evaluate the questionnaire design and accuracy of the word expression, and then make corresponding modifications.

The scale measuring network competence is based on questionnaire of Ritter and Gemünden [5], including task implementation and qualification. The measurement scale of relationship quality is mainly according to Roberts et al. [12], Garbarino and Johnson [13]. Knowledge sharing is in the light of studies of Davenport and Prusak [14], Gupta and Govindarajan [15]. SIP makes reference to the studies of Bock et al. [16], Storey and Kelly [17].

3.3 Research Samples

This study analyzes data at the firm level. Both the sample and the variables used in this analysis come from the Pearl River Delta of China firms' survey. The sample includes six high-tech industries. From July, 2010 to January, 2011, we had sent out 485 questionnaires by mail or door to door interview, with the response rate of 60.2%, and the effective response rate of 50.1%. Structure of the sample firms is sufficiently diverse and heterogeneous.

3.4 Reliability and Validity of the Samples

The scale was developed from prior research and interviews with practitioners. All constructs were measured using a five-point Likert scale to assess the degree to which the respondent agreed or disagreed with each items. Factor loadings, Composite reliability (CR), and Cronbach's alpha are indicative level of measurement reliability. CR value above 0.5 indicates adequate reliability; the least value of CR in the survey exceeds 0.83, which suggests an acceptable level. In this study, the Cronbach's alpha values of each constructs exceed the suggested level of 0.7, showing internal consistency of each construct.

On the validity, the items in the questionnaires of this research are all from the published literatures, and we also did some modification according to some experts and pre-test. We assessed the factorial validity through CFA. A construct with either loadings of indicators above 0.5, or a significant t-value above 2.0, or both, is considered to have convergent validity. We assessed convergent validity using the average variance extracted (AVE), which for the constructs all exceeded 0.50, confirming satisfactory convergent validity. The values of the square root of the AVE for the measures in the diagonal were all greater than the correlations among the measures off the diagonal. Hence, discriminant validity was satisfactory.

4 Results

4.1 Results for the Direct Effects

A bootstrapping technique was used to determine the significance of the structural paths. The path coefficients for the research constructs are expressed in a standardized form. The predictive power of the research model was assessed by examining the explained variance (R2) for the endogenous constructs. For most firms, the positive relationship between network competency and SIP was significant ($b = 0.54$, $t = 10.07$, $p < 0.001$). Thus, Hypotheses 1 was supported. Therefore, the significant hypotheses explained a substantial amount of the variance in the endogenous constructs.

4.2 Results for Mediating Effects

To assess the extent of mediation in the model, we followed Andrews et al. [18], who indicated that four specific criteria must be met. In this study, the independent variable was NC, KS being the proposed mediating variables, and SIP being the dependent variable. As shown in Table 1, Model 1 did not include the mediator of KS. Model 2 results showed that entering the mediator of KS indeed decreased the

Table 1 Regression results

Model	Independent variables	Beta	t	R2	F	ΔR2
1	Constant		0.06	0.30	101.41***	
	NC[1]	0.54	10.07***			
2	Constant		0.07	0.42	87.62***	0.126
	NC	0.40	7.43***			
	KS	0.38	7.23***			
3	Constant		−0.20	0.45	38.32***	0.025
	NC	0.35	6.44***			
	KS	0.36	6.56***			
	RQ	0.11	2.07*			
	RQ*NC	−0.09	−1.52			
	RQ*KS	0.14	2.41*			
4	Constant		0.00	0.15	42.3***	0.149
	NC[2]	0.39	6.50***			
5	Constant		−0.62	0.20	20.05***	0.052
	NC	0.35	5.65***			
	RQ	0.19	3.16**			
	RQ*NC	0.13	2.24*			

Note: In Model 1, 2, 3 knowledge sharing as mediator, relationship quality as moderator, SIP as dependent variable; in Model 4, 5 relationship quality as moderator, knowledge sharing as dependent variable

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

impact of NC from b = 0.54 to 0.40. In particular, the impact of NC on SIP was diminished, indicating partial mediation. Correspondingly, KS partially mediated the relationship between NC and SIP; thus, Hypothesis 2 was supported.

4.3 Results for Moderating Effects

The moderating effects models (see Table 1) tested the extent to which relationship quality moderated the main effect hypothesized in Hypothesis 1 and 2. We mean-centered NC, KS, SIP and RQ. Then we added the interaction terms from Model 2 to Model 3. As shown in Table 1, Model 3 indicated that the interaction term of RQ × KS had a significant positive moderating effect on the association between KS and SIP; Model indicated that the interaction term of RQ × NC had a significant positive moderating effect on the association between NC and KS. Thus, Hypothesis 3 (b = 0.14, p < 0.05) and Hypothesis 4 (b = 0.13, p < 0.05) were supported, which confirms the moderating role of relationship quality. However, Hypothesis 5 was not supported. It comes out a surprise the RQ's moderating effect is negative. When the RQ is higher, NC will not influence SIP so much, it imply that relationship and competence are alternative in China, although the moderating effect doesn't have a statistical significance (b = −0.09, P > 0.10) (see Figs. 2 and 3).

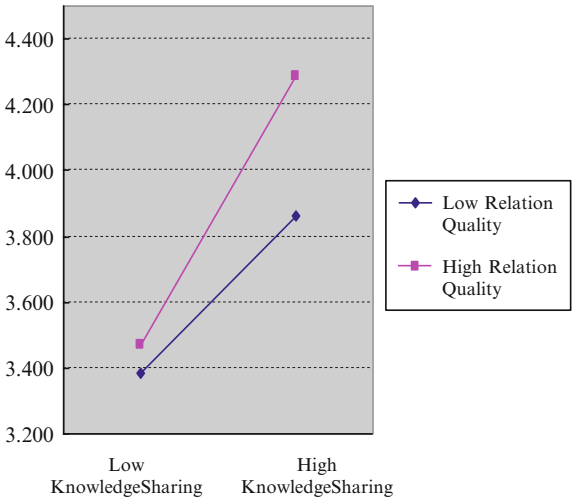

Fig. 2 Moderating effect of RQ on the relation of KS and SIP

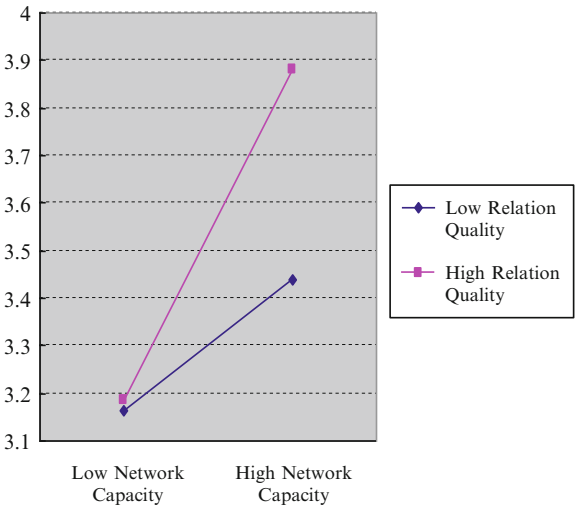

Fig. 3 Moderating effect of RQ on the relation of NC and KS

5 Conclusion

With the literature review and case interview, this paper constructs a theoretical model and studies the relationships among NC, KS, SIP and RQ, selecting 102 high-tech firms in Pearl River Delta as the empirical research sample. Statistical analyses present some interesting findings as follows: (1) Enterprise's NC has a distinct positive impact on SIP, and KS partially mediates the effect of NC on SIP. (2) RQ has a positive moderating effect on the relations between NC and KS, and between KS and SIP. (3) The hypothesis that RQ positively moderates the relation between NC and SIP is rejected. These results enrich current understanding of the relationships among NC, KS, RQ and SIP. The research has some new findings as

well as some questions that need further discussion. (1) This study is based on the six high-tech industries. In the future, it is better to make empirical analysis to some other industries and compare the differences. (2) The samples are all from Pearl River Delta of China, thus, the successive study could do a more extensive investigation in other areas, such as the Yangtze River Delta of China, Bohai Economic Rim, etc. New findings may appear in the further empirical research.

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