Impact of Intellectual Capital on Firm Performance: the Influence of Innovation Capability and Environmental Dynamism

Full Paper

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Abstract

The business values of intellectual capital (IntC) and innovation capability (InnoC) are enduring research questions, especially for high-tech firms. Although each one has been recognized as a critical factor for firm's competitiveness, few studies discussed the influence of IntC and InnoC on firm performance in one integrated framework. Moreover, the moderating effects of environmental dynamism on IntC or InnoC to firm performance were often neglected. This paper developed a research model to explain IntC's impact on firm performance, with InnoC as a mediating variable and environmental dynamism as a moderating variable. Using a survey study conducted in high-tech firms in China, we tested the research model and found that InnoC partly mediate the effect of IntC on firm performance. Environmental dynamism moderates the relationship between structural capital, relational capital, InnoC, and operational performance, as well as between structural capital and financial performance.

Keywords (Required)

Intellectual capital, firm performance, innovation capability, environmental dynamism.

Introduction

According to the knowledge-based view (KBV), a firm's knowledge-related resources are more likely to contribute to the firm's attaining and sustaining superior performance (Bogner and Bansal 2007). This view is especially important for today's high-tech firms such as those in the information technology industry. As the necessary intangible asset that bases largely on knowledge, intellectual capital (IntC) should be elaborately managed in any firms. Although literatures on IntC have built on the assertion that IntC is the main source of competitive advantage or performance at firm level, less is known about how the process should be concerning the specific effect of IntC on firm performance (Sharabati et al. 2010; Shih et al. 2007; Shih et al. 2010).

Beyond researches which alleged IntC would play a central theoretical role in explaining performance variances (Namvar et al. 2010; Phusavat et al. 2011; Shih et al. 2010), a few studies believed that certain factors would mediate the relationship between IntC and firm performance (Hsu and Sabherwal 2011; Hsu and Wang 2012). For example innovation capability (InnoC) has been found to be closely tied to and enhanced by IntC (Subramaniam and Youndt 2005a; Subramaniam and Youndt 2005b). On the other hand, InnoC's contribution to organizational competitiveness or performance has been accepted by innovation theorists (Börjesson and Löfsten 2012; Han et al. 1998). Therefore, InnoC could possibly intermediate the effect of IntC on firm performance. However, extant research has not shed much light on the mediating role of InnoC in the relationship between IntC and firm performance. Furthermore, few studies have discussed how to anticipate and respond to environmental changes for ensuring the contribution of IntC and InnoC to firm's competitiveness and survival. The rate and unpredictability of

such change in a firm's external environment are referred to as environmental dynamism (Heavey et al. 2009; Jansen et al. 2009b).

To fill these research gaps, we develop a research model to explain how IntC influences a firm's performance through InnoC, incorporating the moderating effect of environmental dynamism. We then examine the research model and hypotheses based on data collected from high-tech firms in China. A brief overview of the research model and the study has been presented in (Wang et al., 2013) and this paper describes the study in more details. The remainder of this paper is organized as follows. Section 2 puts forward the theoretical development and hypotheses of our study. Section 3 provides research methodology including data collection and the measurements. Data analysis and the findings are reported in Section 4. Implications concluding remarks are discussed in Section 5.

Theoretical development and hypotheses

Intellectual Capital

Following relevant research, we define IntC as the sum of all knowledge within an organization, not only held by individuals, but also embed in organizational databases, business processes, systems, and relationships (Youndt et al. 2004; Zharinova 2011). Previous studies have proposed different frameworks that help to better conceptualize IntC. Synthesizing the existing discussions, we find that the widely accepted framework of IntC should have three major components: human capital, structural capital, and relational capital (Chen 2008; Chu et al. 2006; Hsu and Fang 2009; Namvar et al. 2010; Sharabati et al. 2010; Shih et al. 2010).

Embedded in employees, human capital means the summation of employees' competence, knowledge, skills, innovativeness, attitude, commitment, wisdom, and experience which represent the individual knowledge stock of an organization to reach certain target (Bontis et al. 2007; Cabello-Medina et al. 2011). Structural capital is the valuable intangible assets that employees cannot take away when off work or leaving the organization (Edvinsson and Malone 1997). Embedded in organizations, structural capital might be best described as the valuable strategic assets of organizational capabilities, organizational culture, routines, procedures, information systems, hardware, software, databases, company images, patents, copyrights, trademarks, and so on (Aramburu and Saenz 2011; Karagiannis et al. 2008; Zangoueinezhad and Moshabaki 2009b). Relational capital means the knowledge and learning capabilities that exist in relationships between an organization and its stakeholders (Bontis 1998; Cegarra-Navarro and Sanchez-Polo 2008a; Cegarra-Navarro and Sanchez-Polo 2008b; Dewhurst and Navarro 2004; Kale et al. 2000). It is critical for organizations because it helps to create organizational value through interaction and exchange of internal knowledge and external intellectual resources (Carmeli and Azeroual 2009; Collins and Hitt 2006; Kong and Farrell 2010).

Innovation Capability

Innovation capability (InnoC) implies the accumulation, appearance or potential of a firm's innovation relating to conceiving and implementing something new (Aramburu and Saenz 2011). As certain intangible infrastructure, InnoC can be further regarded as the ability to mobilize the knowledge, possessed by its employees, and combine it to create new knowledge, facilitating various innovations including new product or service, new material or program, new production process technology, new structure, new administrative system, and new organizational forms (Calantone et al. 2002). Based on existing literature (Çakar and Ertürk 2010; Damanpour 1991; Davenport 1993; Liao et al. 2007; Liao et al. 2010; Lin 2007), we conceptualize InnoC as the potential of knowledge creation and accumulation to institutionalize something new in an organization, and valuate it from the aspects of product, process and management. Product innovation means providing differentiated or new products/services in the market and obtaining satisfaction from customers. Process innovation concerns providing new manufacture or service operation other than current ones in order to achieve better performance. Management innovation is a capability that improves a firm's performance by implementing new managerial regulations, systems, and methods, etc.

Research Hypotheses

In this paper we propose a research model to explain the impact of IntC on firm performance, with InnoC as a mediating variable and environmental dynamism as a moderating variable. The proposed model is demonstrated in Figure 1.

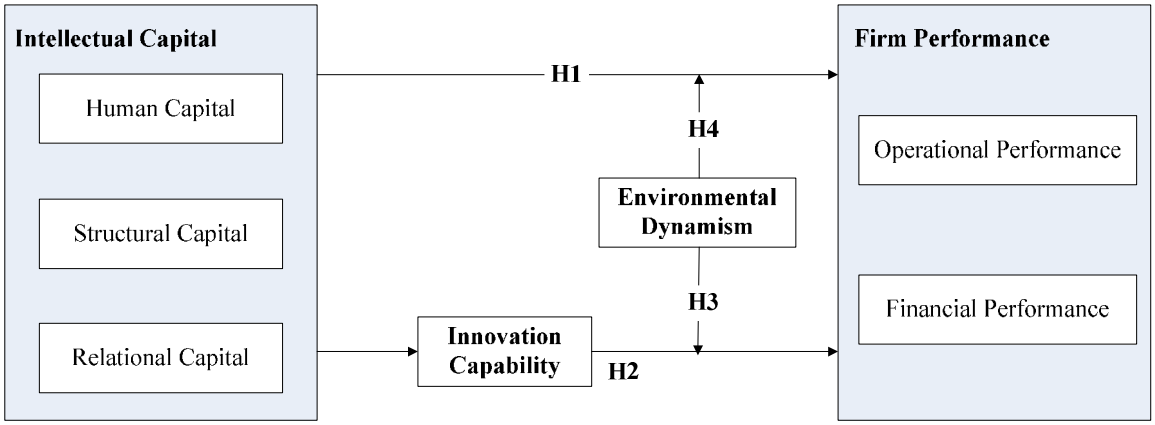

Figure 1 Research model

IntC and Firm Performance

As discussed earlier, IntC has been widely viewed as the sum of knowledge resources of an organization. IntC and its components were demonstrated to contribute to a firm's competitiveness, innovativeness, financial, and non-financial performance (Carlucci et al. 2004; Hsu and Fang 2009; Kang and Snell 2009; Kitts et al. 2001; Kong and Thomson 2009; Longo et al. 2009; Phusavat et al. 2011; Sharabati et al. 2010; Shih et al. 2007; Shih et al. 2010; Yang and Lin 2009; Youndt et al. 2004).

Including employees' knowledge, experience, capabilities and wisdom, human capital is deemed as the source and momentum of revolution and innovation (Bontis et al. 2007). Firms which invest in human capital and attach importance to employees tend to enjoy better business returns or competitive advantages (Cabello-Medina et al. 2011; Ling and Jaw 2006; Wang et al. 2008). Seleim et al. (Seleim et al. 2007) argued that human capital is the most important aspect of IntC, and the most important factor affecting organizational performance. Thus, superior human capital might serve to provide better performance of firms (Bontis et al. 2007; Hitt et al. 2001; Hsu 2008; Seleim et al. 2007).

Structural capital, sometimes used interchangeably with organizational capital in existing literature, includes all non-human reserves of knowledge in a firm for better innovativeness and performance (Bontis 1998; Youndt et al. 2004). Structure capital enables efficient processes of communication and operation, which facilitate knowledge related activities and eventually contribute to values and profits (Karagiannis et al. 2008). Consequently, firms incorporating structural capital in their competitive intelligence and overall business strategies will not only creatively transform the way they gather, produce and transmit knowledge, but also gain better position to generate higher quality, lower costs, and deeper insight leading to firm performance (Aramburu and Saenz 2011; Zangoueinezhad and Moshabaki 2009b).

Regarded as the building block of relation, as well as knowledge exchange and combination in work settings through networks, relational capital is essential to improve knowledge combination capability in an organization for developing innovative technological products (Capello and Faggian 2005; Kale et al. 2000; Kong and Farrell 2010). Through the internal and external connections, firms have access to specialized important information which facilitates them to assess current knowledge and identify types of knowledge for development (Carmeli and Azeroual 2009).

Based on the above discussion, we hypothesize that

Hypothesis 1: *IntC positively relates to firm performance.*

The Mediating Effect of Innovation Capability between IntC and Firm Performance

Some IntC researchers argued that performance might be improved through intermediate outcomes induced by IntC, and InnoC was the potential one (Hsu and Sabherwal 2011; Hsu and Fang 2009; Menor et al. 2007; Namvar et al. 2010; Wu et al. 2007). A growing body of organizational innovation literature demonstrates that InnoC can foster innovativeness, upgrade efficiency, and create value, which lead to better performance or superior profitability (Calantone et al. 2002; Hitt et al. 1997; Hsueh and Tu 2004; Parasuraman 2010; Yang 2012). Therefore, InnoC significantly relates to various firm performances.

Because InnoC is firm-specific and path-dependent, it depends heavily on knowledge, skill, and experience inside an organization. Accumulation and exploitation of IntC determines the level of a firm's innovativeness, such as the development of new product and new problem-solving methods (Leitner 2011; Subramaniam and Youndt 2005b).

Though many organizational factors including technologies, managerial support, and specific firm design may facilitate InnoC, the role of human capital or individual knowledge in an organization has been emphasized as the primary resource (Liao et al. 2007; Liao et al. 2010; Lin 2007; Su-Chao and Ming-Shing 2008). As important features of human capital, creativity, teamwork capacity, flexibility, motivation, learning capacity, and education contribute positively to InnoC (Cabello-Medina et al. 2011).

Structural capital, which an organization uses to preserve and reuse its knowledge, facilitates the ongoing pursuit and harnessing of innovations (Zangoueinezhad and Moshabaki 2009a). With the establishment of structures, processes, and routines that are perceived to be more reliable and robust than other knowledge, organizations can develop InnoC successfully when faced with new and unstable circumstance (de Pablos 2004).

Relational capital contains a firm's interaction with its stakeholders which often provides the organization with important external resources (Capello and Faggian 2005; Dewhurst and Navarro 2004). With a diversity of perspectives, competencies, and experiences that relational capital provides, firms' strategic communities, including customers, suppliers, and other partners are able to achieve the desired InnoC (Bonner and Walker Jr 2004; Chen et al. 2009b; Kodama 2005).

Based on the above discussion of IntC's contributions to InnoC and InnoC's contribution to firm performance, we hypothesize that

Hypothesis 2*: InnoC mediates the relationship between IntC and firm performance.*

The Moderating Role of the Environmental Dynamism

Environmental dynamism refers to the rate and unpredictability of change in a firm's external environment (Heavey et al. 2009; Jansen et al. 2009b). It may be characterized by the rapid and discontinuous change in demand, competitors, technology, and/or regulation with inaccurate, unavailable, or obsolete information (Bourgeois III and Eisenhardt 1988; Wang and Li 2008). In the absence of environmental demand for change, organizational performance is often simply a reflection of how firms take the best advantage of their existing assets, routines, and capabilities.

As a knowledge-based resource, IntC has more flexibility than commodity-like resource and should be dynamically managed to acquire and sustain competitive advantage (Harashchuk 2011). In stable environments where firms' external conditions remain largely unchanged over time, it is unnecessary for firms to cope with changes. When commodity-like resource suffice to achieve business process efficiency without much reconfiguration, customization, and updating, IntC have few opportunities to exhibit their effects in terms of acquiring and sustaining competitive advantage. In contrast, as the environment gets more dynamic, commodity-like resource can quickly become obsolete or incompatible with new business requirements and no longer create and sustain competitive advantage. IntC should then reconfigure existing configurations and acquire new ones, so that the focal firm is agile enough to survive external

changes. Hence, IntC has more probability to acquire and sustain competitive advantage in dynamic environments than in stable environments.

InnoC helps firm to deal with the turbulence of external environment and, therefore, is one of the key drivers of long term performance, particularly in dynamic markets (Baker and Sinkula 2002; Lyon and Ferrier 2002). It is time sensitive for firms to improve their performance in dynamic environments, because the opportunities for identification and utilization of external chances are easy to fleet (Shepherd et al. 2007). In dynamic environments, the higher innovation capabilities a firm possess, the better performance it can earn by heightening the alignment between inner capabilities and outer requirements. In stable environments, a firm is faced with fewer obliged changes of its product, process and management capabilities. It becomes easier for conceptualizing and predicting the current and preferred future states. So the contribution of InnoC to firm performance may drop down when the level of environmental dynamism is relatively low. Previous literatures also demonstrated that environmental dynamism moderated the impact of innovation on performance (Levinthal and March 1993; Lewin and Volberda 1999).

Hypothesis 3*: Environmental Dynamism positively moderates the relationship between IntC and firm performance.*

Hypothesis 4*: Environmental Dynamism positively moderates the relationship between InnoC and firm performance.*

Research methodology

Data Collection

We conducted a survey with a sample of 691 high-technology firms in China to empirically validate the theoretical model. Following the key informant approach, which states that top managers represent the best source of information for this type of study, we directed our questionnaires (each company received one questionnaire) to the CEO/general manager or senior manager. From these, 263 surveys were collected; among which 252 are valid for analysis (valid return rate was 36.5 percent).

Measurements

In order to ensure the reliability and validity of our study, measurement items were reused or adapted from existing scales in the literature. Human capital measurement was mainly derived and adapted from (Bontis 1998; Chen et al. 2009a; Hsu and Fang 2009; Youndt et al. 2004). Structural capital measurement was adapted from (Bontis 1998; Hsu and Fang 2009; Wu et al. 2008). Relational capital measurement was derived from (Bontis 1998; Hsu and Fang 2009; Longo and Mura 2011). Innovation capability measurement was adapted from (Liao et al. 2007; Lin 2007). Operational performance measurement was mainly derived and adapted from (Bowersox et al. 2000; Wang and Wang 2012). Financial performance measurement was adapted from (Bowersox et al. 2000; Inman et al. 2011; Vaccaro et al. 2010; Wang and Wang 2012). Environmental dynamism measurement was derived from (Heavey et al. 2009; Jansen et al. 2009a).

Because the questionnaire was initially written in English, we applied back translation to translate the original instrument into the Chinese. Some modifications were made to align the scales with the Chinese context. An expert panel of two professors, six CEOs and senior business managers examined the face validity of the measurement items. After pretest and several revisions, the final questionnaire was developed for data collection. A seven-point Likert-type scale ranging from "1" (totally disagree) to "7" (totally agree) was used throughout the questionnaire.

Control Variable

To account for differences among firms, control variables are included in our research model: firm age and size. They are selected for reflecting past success and the potential to impact current and future performance (Ravichandran and Lertwongsatien 2005). They may imply the power of pricing and

bargaining, and the pervasiveness of operation and management routines, all of which can influence firm performance. Firm age is measured from the date the firm was founded to the date the survey was administered. Firm size is measured by the natural log of assets and number of employees in our study.

Results

Reliability and Validity

We performed a confirmatory factor analysis (CFA) to evaluate measurement model consisting of seven latent constructs. Table 1 shows the means, SD, factor loading, AVE, CR and C-α of every constructs. We evaluated the internal reliability by using Cronbach's alpha (C-α); this statistic ranges from 0.90 to 0.95, which are all higher than 0.7 (Nunnly & Bernstein, 1994), showing acceptable reliability. Convergent validity is the degree to which factors that are supposed to measure a single construct, agree with each other. We tested convergent validity by assessing factor loadings which should be significant and exceed 0.5, composite reliabilities which should exceed 0.6, and the average variance extracted (AVE) that should be more than 0.5 for all constructs (Fornell & Larcker, 1981). In our model, all the indicators fall in the acceptable ranges. Factor loadings range from 0.70 to 0.91. Composite reliabilities (CR) range from 0.90 to 0.95. AVE ranges from 0.65 to 0.78. The results show that our model meets the convergent validity criteria.

Constructs	Mean	SD	Items	Loading	AVE	CR	C-α
Human capital (HC)	4.08	0.68	hc1	0.83	0.65	0.90	0.90
			hc2	0.75			
			hc3	0.89			
			hc4	0.86			
			hc5	0.70			
Structural capital (SC)	3.92	0.74	sc1	0.82	0.67	0.93	0.93
			sc2	0.79			
			sc3	0.88			
			sc4	0.86			
			sc5	0.80			
			sc6	0.74			
			sc7	0.82			
Relational capital (RC)	3.94	0.76	rc1	0.85	0.70	0.92	0.92
			rc2	0.88			
			rc3	0.84			
			rc4	0.79			
			rc5	0.82			
Innovation capability (InnoC)	4.02	0.83	ic1	0.91	0.76	0.95	0.95
			ic2	0.87			
			ic3	0.82			
			ic4	0.90			
			ic5	0.87			

			ic6	0.85			
Operational performance (OP)	3.97	0.77	op1	0.89	0.76	0.95	0.95
			op2	0.90			
			op3	0.87			
			op4	0.87			
			op5	0.82			
			op6	0.88			
Financial performance (FP)	3.95	0.80	fp1	0.87	0.75	0.94	0.94
			fp2	0.80			
			fp3	0.89			
			fp4	0.86			
			fp5	0.91			
Environmental dynamism (ED)	3.90	0.78	ed1	0.90	0.78	0.94	0.93
			ed2	0.88			
			ed3	0.86			
			ed4	0.90			

Table 1 Results of CFA and Internal Reliability Testing

We used Fornell and Larcker's approach (Fornell and Larcker 1981) to assess discriminant validity. In this approach, the AVE for each construct should be higher than the squared correlation between the construct and any of the other constructs. Table 2 indicates that the measurement model has satisfactory discriminant validity. In Table 2, diagonal elements in italics are the AVE and off-diagonal elements are the squared correlations between constructs. It is obvious that each diagonal element is higher than respective off-diagonal elements, suggesting adequate discriminant validity.

Construct	HS	SC	RC	InnoC	OP	FP	ED
HS	0.65						
SC	0.08	0.67					
RC	0.12	0.08	0.70				
InnoC	0.19	0.19	0.09	0.76			
OP	0.10	0.12	0.11	0.15	0.76		
FP	0.16	0.22	0.12	0.16	0.11	0.75	
ED	0.05	0.20	0.12	0.13	0.14	0.12	0.74

Table 2 Discriminant Validity Analysis

Hypotheses Testing

Table 3 presents the results of regression analysis regarding the effects of IntC and InnoC on firm performance. The values of the VIF associated with the predictors show a range from 1.00 to 1.47, which fall within acceptable limits (Hair et al. 1998), suggesting no need for concern with respect to

multicollinearity. Models 1a and 1b in Table 3 are the base models that include the control variables. Models 2a and 2b capture the direct effects of IntC on the operational and financial performance respectively. They are both significant at the $p < 0.05$ level ($R^2 = 0.22$ and 0.31) and explain additional 21% and 30% of variance over what the control variables alone explain.

The effects of human capital, structural capital and relational capital on operational performance have values of 0.20, 0.23, and 0.20, which are all positive and significant ($p < 0.05$). Similarly, human capital, structural capital and relational capital have effects on financial performance with the values of 0.25, 0.35 and 0.16, which are all significant ($p < 0.05$ for the first two and $p < 0.10$ for the remains) . These findings indicate that firms would achieve higher level of firm performance if they have well-developed IntC. Accordingly, the results strongly support hypothesis 1, which indicates that IntC relates positively to firm performance.

Variable	Operational performance				Financial performance			
	Model 1a	Model 2a	Model 3a	Model 4a	Model 1b	Model 2b	Model 3b	Model 4b
Firm age	-0.04	-0.06	-0.05	-0.07	-0.03	-0.05	-0.05	-0.06
Ln(asset)	-0.08	-0.03	-0.08	-0.05	0.01	0.07	0.01	0.06
Ln(number)	-0.07	-0.09	-0.07	-0.08	0.07	0.05	0.08	0.06
Human capital		0.20**		0.13**		0.25**		0.21**
Structural capital		0.23**		0.16**		0.35**		0.31**
Relational capital		0.20**		0.18**		0.16*		0.15**
Innovation capability			0.39**	0.21**			0.41**	0.14**
R^2	0.01	0.22	0.16	0.25	0.01	0.33	0.17	0.34
F	1.09	11.52**	12.09**	11.61**	0.54	20.10**	12.83**	18.17**

Note: * Significant at the 0.10 level (2-tailed).

** Significant at the 0.05 level (2-tailed).

Table 3 The Effects of IntC and Innovation Capability on Firm Performance

Table 4 shows the results of regression analyses of the effects of IntC on InnoC. The values of the VIF associated with the predictors show a range from 1.00 to 1.23, suggesting little multicollinearity problem. Model 5 show the base results that include the control variables only. Model 6 capture the effects which human capital, structural capital and relational capital have on InnoC. This model is significant at the $p < 0.05$ level ($R^2 = 0.32$) and explain an additional 25% of variance over what the control variables alone explain.

Coefficients of human capital, structural capital on InnoC are 0.34 and 0.32, which are significant at the $p < 0.05$ level. However, relational capital is not significantly associated with InnoC ($p > 0.10$). These findings indicate that firms would achieve a higher level of InnoC if they have better human capital and structural capital. But the relational capital contributes little to InnoC.

Variable	Innovation capability	
	Model 5	Model 6
Firm age	0.03	0.01
Ln(asset)	0.01	0.08

Ln(number)	-0.01	-0.04
Human capital		0.33**
Structural capital		0.32**
Relational capital		0.09
R2	0.00	0.31
F	0.08	18.45**

Note: * Significant at the 0.10 level (2-tailed).

** Significant at the 0.05 level (2-tailed).

Table 4 The Effects of IntC on Innovation Capability

The study follows Baron and Kenny's (Baron and Kenny 1986) procedure to analyze the mediating effect of InnoC between IntC and firm performance. The first step is to examine the relationship between independent variable and the dependent variable. As models 2a and 2b in Table 3 show, three IntC factors relate significantly to firm performance. The second step is to examine the effect of the mediator, InnoC, on the independent variable, IntC. The results of model 6 of Table 4 indicate that human capital and structural capital have positive and significant effects on InnoC whereas relational capital has not. The third step is to examine the relationship between mediator and the dependent variable. Models 3a and 3b of Table 3 show that InnoC has significant and positive effects on firm performance with the value of 0.39 ($p < 0.05$) and 0.41 ($p < 0.05$) respectively. The fourth step is to include the mediator, InnoC, in the models to examine whether it reduces the effects of the antecedent. As models 4a and 4b in Table 3 show, the coefficients for InnoC factors is positive and significant, indicating the direct effect of InnoC on firm performance. Further, InnoC significantly reduces the effects of IntC factors on the dependent variable. The findings indicate that the inclusion of the InnoC attenuates the relationships between IntC and firm performance. Thus, except relational capital, InnoC plays a mediating role between IntC and firm performance, partly supporting hypothesis 2.

Table 5 presents the results of the hierarchical moderated regression using the centered data. The result of Model 9a and 9b suggest that environmental dynamism has negative moderating effect of on the relationship between structural capital and firm performance with the value of -0.14($p < 0.05$) and -0.13 ($p < 0.05$), respectively. On the contrary, relational capital is positively moderated by environmental dynamism when it contributes to operational performance with the value of 0.18 ($p < 0.05$). Therefore hypothesis 3 is partly supported. As for hypothesis 4, the results of Model 9a show that environmental dynamism positively moderate the relationship between InnoC and operational performance with the value of 0.12 ($p < 0.1$). However, Model 9b indicates InnoC is not significantly moderated by environmental dynamism when contributing to financial performance. Thus hypothesis 4 is also partly supported.

Variable	Operational performance		Financial performance	
	Model 8a	Model9a	Model 8b	Model 9b
Controls				
Firm age	-0.06	-0.06	-0.05	-0.05
Ln(asset)	-0.04	-0.06	0.07	0.05

Ln(number)	-0.07	-0.06	0.06	0.06
Direct effects				
Human capital	0.13**	0.12*	0.21**	0.20**
Structural capital	0.11*	0.11*	0.28**	0.27**
Relational capital	0.14**	0.11*	0.13**	0.12**
Innovation capability	0.18**	0.20**	0.12*	0.13**
Environmental dynamism	-0.17**	-0.20**	-0.09	-0.08
Moderation effects				
Human capital * Environmental dynamism		-0.04		0.00
Structural capital * Environmental dynamism		-0.14**		-0.13**
Relational capital * Environmental dynamism		0.18**		0.04
Innovation capability * Environmental dynamism		0.12*		0.03
R^2	0.27	0.31	0.35	0.36
F	11.25**	8.81**	16.24**	11.22**

Note: * Significant at the 0.10 level (2-tailed).

** Significant at the 0.05 level (2-tailed).

Table 5 Results of environmental dynamism' moderation effects

Discussion

Our study represents a significant step in explaining firm performance through IntC which incorporates InnoC as a mediating variable and environmental dynamism as a moderating variable. It has produced empirical evidence to substantiate the hypothesized associations that three types of IntC contribute to firm operational and financial performance directly and InnoC plays a partial mediating role except for relational capital. Environmental dynamism negatively moderates the structural capital - firm performances link, and positively moderates the relational capital - operational performance link and the innovation capability - operational performance link. These findings have several implications for theory and practice.

Theoretical Implications

Firstly, our study uncovers that IntC contributes to firm performance through the partial mediating role of InnoC, which provides new theoretical insights to the content of KBV processes. To date, several studies have verified the effect of InnoC on firm performance (Calantone et al. 2002; De Clercq et al. 2011; Hitt et al. 1997). In the meanwhile, the influences of IntC on firm performance have been widely accepted (Carlucci et al. 2004; Hsu and Sabherwal 2011; Longo et al. 2009; Phusavat et al. 2011; Sharabati et al. 2010; Shih et al. 2007; Shih et al. 2010). However, few studies have examined the integrated mechanisms that underlie the relationship among IntC, InnoC and firm performance in details. Our proposed model fills this gap by confirming the partial mediating role of InnoC, and showing that human and structural capital will not only increase operational and financial performance directly, but also contributes to firm performance through the InnoC indirectly.

Secondly, we theoretically hypothesize and empirically demonstrate that environmental dynamism works as an important moderator in the relationship among IntC, InnoC and firm performance, which will extend our understanding of IntC and innovation theories under different contextual conditions.

Practical Implications

This study also contributes to practice. The relationships among IntC, InnoC and firm performance may provide a guide as to how companies could achieve better performance by improving IntC and InnoC. Scales put forward in this study (available upon request) offer a checklist for companies to evaluate themselves in certain domain. Companies should think over the important antecedents that lead to types of IntC in improving InnoC and firm performance. In addition, the findings suggest the level of environmental dynamism plays a significant moderating role in the relationship among IntC, InnoC, and firm performance. Therefore, strategies for the development of IntC or InnoC for firm performances should be designed based on various environment dynamism.

Limitations and Opportunities

This study has limitations which suggest the need for further research. First, because the data were gathered from high-tech enterprises in China, it will limit the generalization of our results. Second, the data did not allow a longitudinal investigation of the conceptual framework examined in this paper. As a suggestion for further improvement, we need to note the importance of the sustainability of the operational and financial performance generated in knowledge based activities for a wider range of firms. A longitudinal sample collected over multiple points of time is also recommended for future research.

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