

2007

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Recommended Citation

Liu, Hefu; Ke, Weiling; Wei, Kwok Kee; Gu, Jibao; and Chen, Huaping, "The Impact of Power on Firm's IT Infrastructures Integration Intention for SCM" (2007). *PACIS 2007 Proceedings*. 110.

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119. The Impact of Power on Firm's IT Infrastructures Integration Intention for SCM

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Abstract

While IT infrastructures integration (ITII) along supply chains helps enhance chains' efficiency and effectiveness, the lack of ITII is still one of the critical failure factors for supply chain management. As such, it is imperative to understand the drivers for ITII adoption. Based on the perspective of social network, we derive a model to examine the effects of dominant firms' mediated and non-mediated power on partner firms' intention to integrate IT infrastructures across the supply chain. In particular, we examine the mediating effect of target firms' trust and perceived institutional pressures on the relationship between dominant firms' power (i.e., mediated and non-mediated power) and target firms' ITII adoption intention. Results from a survey show that the target firms' trust toward their partners and their perceived institutional pressures mediate non-mediated power's influence, while trust mediates the effect of mediated power on ITII adoption intention. Contributions and implications of this study are discussed.

Introduction

IT infrastructures integration (ITII) for SCM enables firms to enhance their efficiency of interacting and coordinating supply chain activities with partners with the objective of improving firm performance (Chung et al. 2005; Rai et al. 2006). The integration involves "the transformation of fragmented, functional, silo-oriented supply chain processes to integrated, cross-functional inter-firm supply chain processes." (Rai et al. 2006, P238) This transformation allows firms to derive benefits from their IT usage, such as real-time information flow and improved activity coordination, which cannot be gained from fragmented IT infrastructures (Malhotra et al. 2005; Rai et al. 2006).

However, although ITII for SCM can offer great potential benefits and enhance operation efficiency (Chung et al. 2005; Rai et al. 2006), the lack of ITII is still one of the critical failure factors for supply chain management (Sahin et al. 2002). This seems to be inconsistent with the profit-maximization principle of organizations. To unlock the mystery, we need to look beyond the perspective of economics, such as Transaction Cost Economics (Williamson 1985). Indeed, from the social network perspective, an inter-organizational relationship does not depend solely on its cost-efficiency (Hart et al. 1997; Pfeffer 1981). It can be defined and shaped by a social network within which firms are embedded (Gulati 1998). Hence, we use the social network perspective as a lens to study the factors affecting a firm's predisposition to integrate their IT

infrastructures for SCM.

According to the social network perspective, an organization's beliefs, feelings, and behaviors can be affected by the social structure of relationships around it (Scott 2000). Hence, more and more researchers have incorporated power within social networks in their research models when studying the adoption of innovation in general and information systems in particular (Jaspersen et al. 2002). Many of them have identified the significant role of power in firms' IS related decision making (e.g., Allen et al. 2000; Chwelos et al. 2001; Hart et al. 1997; Iacovou et al. 1995; Premkumar 2003; Premkumar et al. 1995; Saunders et al. 1992). However, in the IS discipline, most research treats power as a simple construct and do not differentiate its different forms (e.g., Chwelos et al. 2001; Grover 1993; Iacovou et al. 1995; Premkumar et al. 1995). This limits our understanding of the role of power in firms' IS related decision making. The different types of power can lead to different, even opposite results: some incur conflicts and damage firms' cooperation, while others increase partners' satisfactions and willingness to cooperate (Hart et al. 1997). In addition to power, researchers have identified institutional pressures and trust as two other significant social network factors influencing firms' ITII adoption (e.g., Chwelos et al. 2001; Hart et al. 1997; Hart et al. 1998; Khalifa et al. 2006; Lai et al. 2006; Teo et al. 2003). According to these studies, submitting to institutional pressures may improve firms' legitimacy and then enhance their capabilities to gain resources and social support, and establishing high level inter-organizational trust can enhance firms' tolerance to risk and promote inter-organizational cooperation.

Based on the social network perspective, we propose a theoretical framework on how a dominant firm's (DF) power (mediated and non-mediated power) impacts a target firm's (TF) ITII intention. As markets become more competitive, a simple, direct and heavy-handed use of power is no longer suitable for managing inter-organizational relationships (Brown et al. 1995). Especially, firms' interpretation and reaction to partners' power are affected by other social network factors. Thus, in the current study, we contend that a TF's perceived institutional (i.e., coercive, normative) pressure and trust mediate the relationship between a DF's power and the TF's ITII. The research model is tested and supported by data collected with executives in China. This paper is organized as follows. In Section 2, we review relevant extant literature. In Section 3, we derive our research model and propose research hypotheses. In Section 4, we describe research methodology and present our data analysis results. The final section is our discussion and conclusion of the current study.

Literature Review

IT Infrastructures Integration for SCM

An IT infrastructure refers to "the base foundation of the IT portfolio (including both technical and human assets), shared through the firm in the form of reliable services." (Broadbent et al. 1999, P163) According to this definition, IT infrastructures integration for SCM then is identified as "the degree to which a focal firm has established IT capabilities for the consistent and high-velocity transfer of supply chain-related information within and across its boundaries." (Rai et al. 2006, P231) Much more than individual physical components, an integrated IT infrastructure can efficiently support firms achieve operational efficiency via the real-time information sharing and consistent coordinate activities (Rai et al. 2006). It also can help firms cope with uncertain and complex environments with the electronic interdependence and mutual adjustment (Bensaou et al. 1995).

The great potential benefits of ITII for SCM are attractive to firms and motivate them to adopt such integration. Yet, such integration is not all successful. Thus, highlighting benefits is not sufficient to promote firms adopt ITII for SCM. Under this condition, understanding what and

how factors affect firms' intention to adopt ITII is important. The extant literature suggests that we can study the firm's ITII from the perspective of social network, which suggests that power, trust and institutional pressures are the major factors affecting the collaboration between organizations.

The Use of Power

Power is defined as a firm's capabilities to influence another firm which depends on its resources to act as it desired (Hart et al. 1998). French and Raven (1959) and Raven and Kruglanski (1970) have identified six types of power sources: coercion, reward, legitimate, expert, reference, and information. Brown et al (1995) classify these sources into mediated power and non-mediated power, they consider such classification offers a more desirable method for examining power than other classification approaches (e.g., Gaski 1986; Hart et al. 1997).

Mediated power refers to the power sources whose reinforcements guiding the TF's behaviors are external to the TF and the reinforcements are controlled by the DF (Brown et al. 1995). It includes coercion, reward and legitimate power sources. Coercion is defined as the TF's perception that a DF can mediate punishments for it. Reward refers to the TF's perception that a DF can mediate rewards for it if it complies. Legitimate implies that a DF is perceived to have a legitimate right to wield influence on the TF (Brown et al. 1983). Mediated power can be transferred to great extrinsic motivations for the TF. However, frequent use of it can damage firms' long-term inter-organizational relationships, because such use only focuses the TF's short-term compliances (Boyle et al. 1992; Brown et al. 1995; Frazier et al. 1986).

Non-mediated power refers to the power sources whose enforcements guiding the TF's behaviors are mediated by the TF itself and the success or failure of the TF's behaviors is attributed to itself too (Brown et al. 1995). It includes the sources of expert, reference and information. Expert refers to the TF's perception that a DF holds expertise or knowledge that is valued by it, while reference is based on the TF's identification with a DF or its hope to be associated with the DF closely. Information refers to a DF's ability to influence the TF by providing information that can facilitate the TF's compliance (Brown et al. 1983). Compared with mediated power, the use of non-mediated power more focuses on the intrinsic motivation, namely common norms, values and inter-organizational relationship (Boyle et al. 1992; Brown et al. 1995). Thus, it produces fewer conflicts in the inter-organizational network.

In addition to power, researchers have identified other two important social network factors: institutional pressures and trust. These two social network factors all can significantly impact firms' IS related actions (e.g., Chwelos et al. 2001; Hart et al. 1997; Hart et al. 1998; Khalifa et al. 2006; Lai et al. 2006; Teo et al. 2003). Especially, they can affect firm's interpretation and reaction to their partners' power.

Institutional Pressures

Institutional pressures refer to the pressures that emanate from the institutional environment and can push firms to adopt shared norms and routines (DiMaggio et al. 1983). As prevailing conventions, institutional pressures' significant effects on firms' ITII have been widely recognized by researchers (e.g., Chwelos et al. 2001; Khalifa et al. 2006; Lai et al. 2006; Teo et al. 2003). Violating institutional pressures may make firms' legitimacy be questioned and their resources acquisitions and social supports be jeopardized (DiMaggio et al. 1983; Teo et al. 2003). Institutional pressures normally are classified into three kinds: normative, mimetic, and coercive pressures (DiMaggio et al. 1983). Given mimetic pressures stem from firms' perceived

success of competitors' actions and act through structural equivalence (Teo et al. 2003), we skip it and just study coercive and normative pressures.

Coercive pressures stem from political influences and legitimacy (Lai et al. 2006). They normally operate through inter-organizational connectedness relations. Coercive pressures can be formally exerted on organizations by powerful organizations in the shape of rules or laws, or informally through certain cultural expectations (DiMaggio et al. 1983; Teo et al. 2003). The control of scarce and important resources is firms' coercive strategies' base (Dabholkar et al. 1998).

Normative pressures result from expectations regarding how work should be conducted professionally (DiMaggio et al. 1983). Through inter-organizational channels, these expectations are transferred and gradually become shared norms. In particular, norms are created and strengthened by the prevalence/extent of some new practices in the market, and then great normative pressures are posed to impact managers' choices (Teo et al. 2003). To appear legitimate and progressive, firms often submit to normative pressures to adopt new practices which are consistent with dominant firms' norms and values (DiMaggio et al. 1983; Teo et al. 2003).

Inter-organizational Trust

Inter-organizational trust refers to one party's own intention or willingness to depend on another party based on the anticipated beneficial behavior of that party (Cummings et al. 1996). According to social network perspective, inter-organizational trust can determine the nature of inter-organizational businesses and social order (Gefen et al. 2003). Thus, as firms' own beliefs and values (Mayer et al. 1995), inter-organizational trust can promote firms' ITII significantly (Hart et al. 1997; Hart et al. 1998). Lewis and Weigert (1985) have identified two types of trust: affective trust and cognitive trust. Affective trust is based on organizations' sensibility judgments and is established through inter-firms' emotions and feelings. Cognitive trust is based on organizations' rational judgments and is developed through the focal firms' understanding and conviction towards partner's competences (Cummings et al. 1996; Lewis et al. 1985; McAllister 1995). However, researchers cannot study trust just from one type (Lewis et al. 1985). Missing cognitive trust could incur blind faith or fixed hope, and removing affective trust could induce cold blooded prediction or rationally calculated risk. In our research, we integrate these two types of trust into the concept of inter-organizational trust.

Research Model and Hypotheses

Figure 1 represents the research model. This model describes the influence process of power from a DF's mediated power and non-mediated power to the TF's perceived coercive, normative pressures and its inter-organizational trust to the TF's ITII intention for SCM. This model focuses on the intention of ITII, rather than actual adoption, because "the role of intention as a strong predictor of behavior has been well-established in IS and reference disciplines." (Komiak et al. 2006)

Power and Institutional Pressures

According to Ang and Cummings (1997), in a hypercompetitive condition, a DF would attempt to use its power to reshape institutional rules and models in the institutional environment to serve its own interests. From this view, we propose that the TF's perceived coercive and normative pressures can be affected by a DF's different types of power significantly.

A DF's mediated power may increase the TF's perceived coercive pressures. Coercive pressures can exert on the TF in the shape of rules or laws formally (DiMaggio et al. 1983; Teo

et al. 2003). Normally, to promote ITII, a DF must standardize the integration of data, application, and process in the channel relationships (Hart et al. 1998; Rai et al. 2006). Such standardizations then act as the rules or laws, such as ANSI X.12 standards or inter-firm contracts to ensure the success of ITII. Thus, when the DF highlights the rules and laws by offering rewards and punishments or legal actions, the TF's perceived coercive pressures are increased by these extrinsic motivations.

However, a DF use mediated power normally want to achieve the TF's short-term compliances (Hart et al. 1998). To achieve its own internal goals, the DF even may use mediated power at the expense of the TF (Gaski 1984). Such use will influence the relational norms negatively and damage the TF's normative commitments (Brown et al. 1995), and then the influences of the intrinsic motivations, such as common norms and values in the channel relationships are limited (Brown et al. 1983). To keep survival chance, the TF are more likely to turn to the DF's individual interest, rather than the norms, standards, and solutions that have been institutionalized in the institutional environment (DiMaggio et al. 1983).

H1a: Higher use of mediated power by a DF will increase the TF's perceived coercive pressures

H1b: Higher use of mediated power by a DF will decrease the TF's perceived normative pressures

Non-mediated power can enhance the TF's perceived coercive pressures too. Coercive pressures not only exert on firms in the shape of rules or laws formally, but also exert through certain cultural expectations informally (DiMaggio et al. 1983). According to Hofstede (1998), firms' certain cultural expectations mainly rely on the common norms and values in the environment. For non-mediated power, its bases are long-term orientation (Boyle et al. 1992; Brown et al. 1995; Skinner et al. 1992). The more a DF uses non-mediated power, the more it focuses on common norms and values (Brown et al. 1995). Therefore, a DF's non-mediated power can increase the TF's perceived coercive pressures through influencing the TF's certain cultural expectations informally. Meanwhile, firms' perceived normative pressures are determined by the common norms and values in the channel relationships. Thus, the TF's normative pressures will be elevated by the use of non-mediated power too (Brown et al. 1995; Falbe et al. 1992).

H2a: Higher use of non-mediated power by a DF will increase the TF's perceived coercive pressures

H2b: Higher use of non-mediated power by a DF will increase the TF's perceived normative pressures

Power and Inter-organizational Trust

Inter-organizational trust has two dimensions: one is established through inter-firms' emotions and feelings and the other is developed based on partner's competences (McAllister 1995). Normally, a TF's trust toward a DF can be affected by the DF's power when the TF is making IS related decisions (Allen et al. 2000; Hart et al. 1997). Specifically, using mediated power make firms force one-sided advantages upon others (Bachmann 2001) and less willing to accommodate partners' needs and wants (Frazier et al. 1986). Such using damages inter-organizational cooperation and accommodations (Brown et al. 1995), and then damages firms' mutual emotions and feeling in the channel relationships. Meanwhile, mediated power more focus on "offering rewards and threatening punishment or legal actions" (Brown et al. 1995), rather than demonstrating competence (Hart et al. 1997; Hart et al. 1998). Thus, once a DF uses the mediated power, the TF's trust towards it will be depressed.

In contrast, firms' non-mediated power enhances trust in the channel relationships (Hart et al. 1997). The use of non-mediated power can positively impact firms' attitudes toward their relationships (Frazier et al. 1986), and heighten the degree of relationalism between channel partners (Boyle et al. 1992). Meanwhile, the power of information, expert, and reference endow a DF with the special competences to interpret information in the business process of its partners. Thus, when a DF uses non-mediated power, the TF's trust towards it will be increased.

H3a: Higher use of mediated power by a DF will decrease the TF's inter-organizational trust

H3b: Higher use of non-mediated power by a DF will increase the TF's inter-organizational trust

Coercive Pressures and ITII intention for SCM

Coercive pressures normally stem from dominant partners (Teo et al. 2003). Previous research has supported the notion that coercive pressures have positive impacts on firms' adoption of IOS (e.g., Chwelos et al. 2001; Khalifa et al. 2006; Lai et al. 2006; Teo et al. 2003). They propose when a DF realizes the benefits of inter-organizational linkages, it would promote partners to adopt the same linkages to serve its own interest (Dabholkar et al. 1998). Correspondingly, to secure its access to scarce resources, TF, who is a resource-dependent trading partner would comply with such demands under great coercive pressures (Hart et al. 1997; Teo et al. 2003).

H4: The greater firms' perceived coercive pressures, the greater the likelihood that firms will integrate their IT infrastructures with their partners for SCM.

Normative Pressures and ITII intention for SCM

Generally, normative pressures can be strengthened by the prevalence/extent of innovations among partners in a network (Powell et al. 1991; Teo et al. 2003). Due to ITII's abilities to develop a higher-order process capability and enhance firm performance (Rai et al. 2006), researchers and practicing managers are increasingly encouraged to focus attentions to ITII (Chung et al. 2005; Rai et al. 2006). Such tendencies promote the prevalence of ITII in a network, and in turn increase the normative pressures that perceived by the TF. To maintain the existing relationships with partners or not be locked out of a future cooperation relationship, the TF would be likely to conform to such pressures and adopt ITII (Burt 1982).

H5: The greater firms' perceived normative pressures, the greater the likelihood that firms will integrate their IT infrastructure with their partners for SCM.

Inter-Organizational Trust and ITII intention for SCM

Trust is a central mechanism for governing inter-organizational coordination expectations and interactions (Bachmann 2001). With high level trust, the TF tends to believe a DF' business sense and judgement and is willing to make joint decisions based on ITII (Karmer et al. 1996). Finally, the TF's psychological barriers which imposed by high risk involved in the integration will be overcome, and the uncertainties that incurred by firms' cooperation are reduced (Bachmann 2001; Hart et al. 1998; Luhmann 1979).

H6: The greater inter-organizational trust, the greater the likelihood that firms will integrate their IT infrastructures with their partners for SCM.

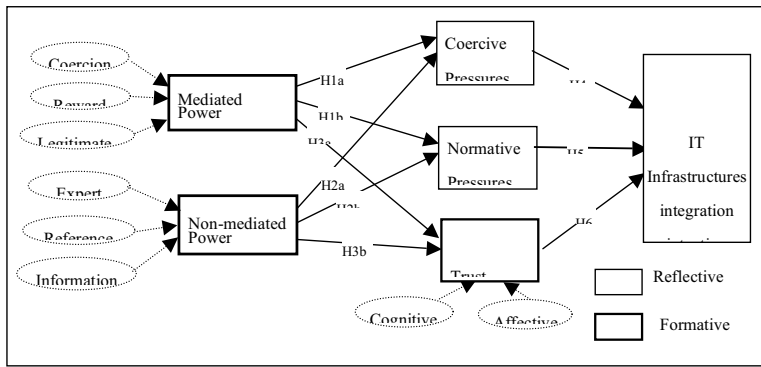


Figure 1. Research Model

Research Method

Measures

An English questionnaire was developed based on previously validated measures. All items were measured with 7-point Likert scales, ranging from “strongly agree” to “strongly disagree”. We used firms’ eSCM adoption intention represent their ITII intention and adapted the items from Ajzen and Fishbein (1980). Electronic supply chain management (eSCM) refers to orchestrating the operation of firms value chains by integrating information systems across organizational boundaries (Chwelos et al. 2001). These IOS are most essential for firms’ ITII (Kumar et al. 1996).

The items measuring the six power sources were adapted from Brown et al’s (1995) work, and the items for measuring inter-organizational trust were adapted from Cummings and Bromiley’s (1996) paper. We used the scales from Teo et al (2003) and Khalifa and Davison (2006) to test institutional pressures. Normative pressures were measured on the extent of eSCM adoption in the TF’s industry; coercive pressures were measured on the TF’s perceived dominances of supplier adopters and customer adopters. Given the survey was executed in China, we translated the questionnaire into Chinese firstly and then back-translated to English so as to ensure equivalence of meaning between the English and Chinese versions.

Data Collection

We sent questionnaires to 202 executives based on the name list provided by an institute which was famous for its executives training programs. We received 134 useful returned questionnaires, achieving a response rate of approximately 66%. According to Armstrong and Overton’s (1977) method, we tested the non-response bias. The chi-squares of the responses from the first 25% of the respondents to that of the final 25% were compared. No significant differences between these two groups on key measures were indicated by our results. In Table 1, we showed the demography of these samples.

Data Analysis and Results

According to Chin (1998), if a latent variable is assumed to be caused by its items, it is a formative construct. Thus, in our study, three constructs were identified as the formative constructors, i.e., mediated power, non-mediated power and trust. Since our model contains those formative constructs, and the research is predictive, partial least square (PLS) was chosen to analyze the data.

Table 1. Sample Demography

Organization Demographic	Category	Frequency (n=134)	Percent
Industry	Manufacturing	62	46.27%
	Finance	37	27.62%
	Services	35	26.11%
Number of Employees	<100	35	26.10%
	100-500	33	24.60%
	500-1000	19	14.20%
	>1000	47	35.10%
Number of IT Employees	<5	54	40.30%
	6-10	25	18.70%
	11-15	13	9.70%
	>16	42	31.30%

Measurement Model

To test our model, we firstly assessed the measurement model’s convergent validity and discriminant validity. For convergent validity, we assessed by the reliability of items, composite reliability of constructs, average variance extracted (AVE). As Table 2 shown, the loading of all items are up 0.60. In table 3, the values of composite reliability ranged from .820 to .928 and above the .70 recommended level (Fornell et al. 1981), and AVE scores for every construct ranged from .603 to .811 and above the .50 recommended level. According Fornell and Larcker’s (1981) recommendation, the relationship between correlations among constructs and the square root of AVEs can be used to assess items’ discriminant validity. As Table 3 shown, the square root of AVEs for each construct was greater than the correlations between constructs.

Table 2. Loadings of the Measures

Coercion Power (CoPo)		Reward Power (RePo)	
CoPo1	0.872	RePo1	0.760
CoPo2	0.903	RePo2	0.869
CoPo4	0.796	RePo3	0.851
Legitimate Power (LePo)		Information Power (InPo)	
LePo1	0.845	InPo1	0.725
LePo2	0.685	InPo2	0.815
LePo3	0.870	InPo3	0.787
Expert Power (ExPo)		Reference Power (RePo)	
ExPo1	0.846	RfPo1	0.881
ExPo2	0.813	RfPo2	0.881
ExPo3	0.778	Affective Trust (AfTr)	
Cognitive Trust (CoTr)		AfTr1	0.861
Cotr1	0.747	AfTr2	0.878
Cotr2	0.850	AfTr3	0.807
Cotr3	0.844	Normative Pressures (NoPr)	
Coercive Pressures (CoPr)		NoPr1	0.839
CoPr1	0.824	NoPr2	0.837
CoPr2	0.738	NoPr3	0.712
CoPr3	0.739	Integration Intention (InIn)	
CoPr4	0.808	InIn1	0.891
CoPr5	0.804	InIn2	0.921
CoPr6	0.799	InIn3	0.890

Table 3. Assessment of Convergent and Discriminant Validity

	Mean	Composite Reliability	AVE	CoPo	RePo	LePo	InPo	ExPo	RfPo	CoTr	AfTr	NoPr	CoPr	InIn
CoPo	3.833	0.893	0.736	0.858										
RePo	3.729	0.867	0.685	0.454	0.828									
LePo	4.022	0.845	0.647	0.530	0.583	0.804								
InPo	3.346	0.820	0.603	0.285	0.345	0.341	0.777							
ExPo	3.639	0.853	0.660	0.350	0.320	0.443	0.525	0.812						
RfPo	3.313	0.874	0.777	0.101	0.213	0.280	0.509	0.435	0.881					
CoTr	3.438	0.855	0.664	-0.124	0.037	-0.039	0.259	0.284	0.260	0.815				
AfTr	3.341	0.886	0.721	-0.087	0.061	0.088	0.411	0.258	0.366	0.631	0.849			
NoPr	3.714	0.906	0.618	0.141	0.140	0.127	0.231	0.255	0.056	0.088	0.075	0.798		
CoPr	3.560	0.840	0.637	0.138	0.217	0.153	0.305	0.308	0.217	0.127	0.125	0.675	0.785	
InIn	3.562	0.928	0.811	-0.081	-0.064	-0.076	0.088	0.108	0.129	0.264	0.220	0.496	0.514	0.901

Note: The colored diagonal elements are the square root of the AVE.

Structural Model

In Figure 2, we presented the results of the structural model. In this study, three indicators for the formative constructs, namely coercion, legitimate, and reference did not present significant formative weights. In addition, the model explained 6.9 to 35.1 percent of the variances. Our results showed that only H1a and H1b were not supported. A DF's mediated power only can negatively impact the TF's trust partially ($\beta=-0.204$, $p<0.1$), and cannot significantly influence the TF's perceived coercive ($\beta=0.073$) and normative pressures ($\beta=0.065$). However, a DF's non-mediated power positively impact the TF's trust ($\beta=0.508$, $p<0.01$), perceived coercive ($\beta=0.324$, $p<0.01$) and normative pressures ($\beta=0.226$, $p<0.05$). Specifically, the TF's trust ($\beta=0.192$, $p<0.05$), perceived coercive ($\beta=0.316$, $p<0.01$) and normative pressures ($\beta=0.272$, $p<0.01$) increase the TF's ITI intention for SCM.

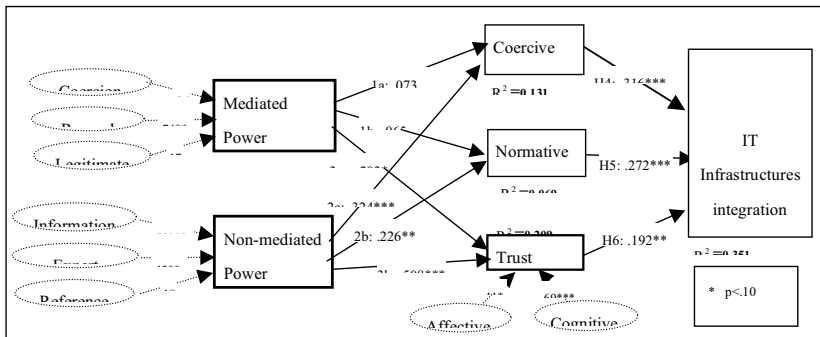


Figure 2. PLS Analysis of Direct Effect

Mediating Effect Testing

To test the mediating effect of the TF's trust, perceived coercive and normative pressures, we adopted Baron and Kenny's (1986) three-step method. To improve mediations, the results ought to be able to, first, show that the independent variable (IV) can directly predict the dependent variable (DV); second, show that IV should significantly predict the mediator (M); last, assess the significance of the path coefficients between IV and DV when controlling for M. If M is significant but IV is not, M's mediating effect will be full. If both M and IV are significant, M's mediating effect will be partial. As Table 4 shown, the mediating effect of the TF's trust is full, but the TF's perceived coercive and normative pressures have no mediating effect. However,

for a DF, the TF's trust, perceived coercive and normative pressures all have full mediating effect on the relationship between its non-mediated power and the TF's ITII intention. In Figure 3, the model with mediating effect was shown. Through allowing significant and direct effect between

IV and DV, this model altered the hypothesized model (Figure 2). The direct effect of mediated power and firms' ITII intention shown the "not" mediating effect indicated in Table 4.

Table 4. Results of Mediating Effect Tests

IV	M	DV	Coefficient in Regressions				Mediating
			IV->DV	IV->M	IV+M->DV	M	
MePo	Trust	InIn	-0.166**	-0.198*	-0.076	0.270***	Full
MePo	CoPr	InIn	-0.166**	0.081	-0.189**	0.561***	Not
MePo	NoPr	InIn	-0.166**	0.065	-0.179**	0.528***	Not
NMePo	Trust	InIn	0.215***	0.513***	0.051	0.256***	Full
NMePo	CoPr	InIn	0.215***	0.323***	-0.025	0.536***	Full
NMePo	NoPr	InIn	0.215***	0.225**	0.064	0.468***	Full

*p<0.1; **p<0.05; ***p<0.01

MePo: Mediated Power; NMePo: Non-mediated Power

IV: Independent Variable; M: Mediator; DV: Dependent Variable

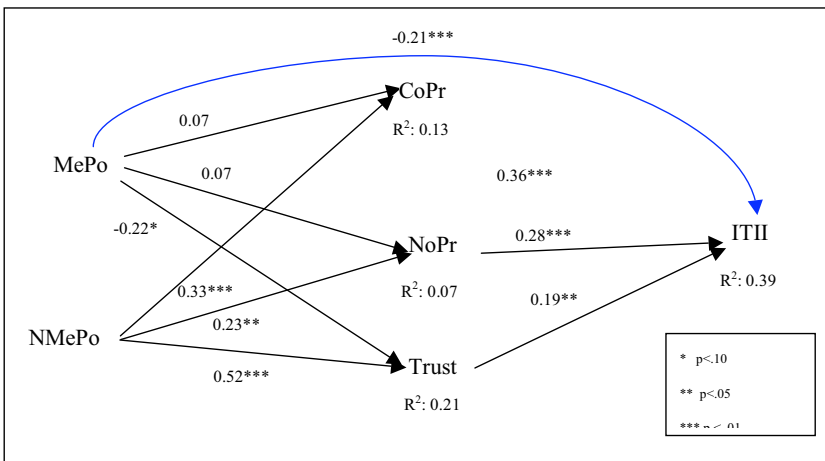


Figure 3. Results of PLS Analysis (Including Mediating Effect)

Discussion, Contribution and Limitations

Discussion of Findings

This study firstly tests the effects of non-mediated and mediated power on trust and institutional factors. Consistent with the finding of Hart and Saunders (1997), the result indicates that a DF's mediated power can negatively impact the TF's trust, and the DF's non-mediated power can affect the trust positively. This suggests that a DF's power can act as a central precondition of

the TF's trust (Bachmann 2001), and the TF's trust can be quite clearly impacted by the DF's power (Allen et al. 2000; Hart et al. 1997). Also, the result shows that a DF's non-mediated power can positively influence the TF's perceived institutional pressures. This finding supports the argument that a DF can use its power to reshape institutional rules and models in the institutional environment (Ang et al. 1997). However, this support is partial. The result shows that a DF's mediated power does not have a significant effect on the TF's perceived institutional pressures. A plausible explanation is that: Firms are increasingly noticing the importance of relationship norms in governing their strong ties with partners in a hypercompetitive environment (Buchanan 1992; Dwyer et al. 1987; Patnayakuni et al. 2006). Meanwhile, they realize that the use of mediated power will damage such relational norms (Hart et al. 1998). To protect its long-term inter-firm relationship, a DF will be more inclined to use non-mediated power rather than mediated power. Thus, the effects of mediate power will be limited in the institutional environment.

According to the result, firms' trust and perceived coercive and normative pressures increase their ITII intention. These findings are consistent with previous research that focus on trust and institutional theories (e.g., Hart et al. 1998; Lai et al. 2006; Teo et al. 2003). Meanwhile, the result of our additional, in-depth analysis indicates that a DF's mediated power can affect the TF's ITII intention significantly ($\beta = -0.116, p < 0.05$), but the DF's non-mediated power cannot. The finding of mediated power's negative effects is consistent with Brown et al's (1995) argument. When a DF uses mediated power, the TF may take such use as less willing to accommodate its needs and wants. Meanwhile, the short-term orientation of mediated power would further prevent the promotion of ITII which is focus on long-term inter-organizational cooperation.

Finally, our result confirms the mediating effect of trust in the relationship between power and firms' ITII intention. Meanwhile, the result presents the differences of the TF's perceived institutional pressures' mediating effect in the influence process of a DF's non-mediated and mediated power. This finding indicates that a TF is easier to internalize a DF's mediated power's impacts directly compared to internalizing the DF's non-mediated power's effects. Indeed, the benefits or costs of a DF's mediated power are more direct to the TF than the DF's non-mediated power, thus, the TF will be less dependent on mediators to internalize a DF's mediated power.

Implications for Practice

This study has three important managerial implications. First, it indicates that non-mediated power is effective in influencing the TF's ITII intention. As such, firms should convince their partner to adopt ITII by sharing information and knowledge about ITII, i.e., exercising non-mediated power, rather than turning to coercion and other forms of mediated power. Especially, the use of non-mediated power helps to nurture a relationship to firms' mutual-benefit, in addition to leading the TF to adopt ITII. In contrast, the DF should try to avoid the use of mediated power, which damages the relationship with the TF and is not really effective in getting the TF adopt ITII. Second, the current study shows that trust mediates the relationship between power and the TF's ITII adoption intention. Nurturing a trusting relationship with trading partners is critical for the firm to gain the support from the partners. Especially, trust allows the DF to lead partners to formulate strategies that enhance the efficiency and effectiveness of supply chains. Third, firms should leverage institutional pressures in influencing partners' ITII adoption. Exerting institutional pressures on partners will greatly facilitate firms to use their non-mediated power to obtain partners' compliance. Especially, these institutional pressures can help firms highlight the legitimization of ITII adoption, and then promote such adoption.

Implications for Theory

Firstly, our study extends the applicability of social network perspective to firms' IS related cooperation. Although, many research have identified the role of power, institutional pressures and trust in firms IS related cooperation. No research combines these factors together from the social network perspective. Our research offers researchers such holistic view. This can deepen researchers' understanding of the role of social network factors in firms' decision making.

Second, unlike previous research which has identified different types of power in IS discipline (e.g., Allen et al. 2000; Hart et al. 1998), our research clearly differentiate the sources of power in a more fine-grained manner. In the IS discipline, our differentiation extends our understanding of power, and provides explanation for the mixed and even controversial findings of prior studies on power's effect.

Another important contribution of this study is unveiling the mechanisms underlying the influence process of different types of power. Although prior studies have alluded to the influences of power on trust and institutional pressures in firms' decision making (e.g., Allen et al. 2000; Ang et al. 1997; Bachmann 2001; Clegg 1989; Hart et al. 1997), there is no study examining the mediating effect of trust and pressures on power in an integrated model and how such mediating effect varies across different types of power. In that sense, the current research enriches our understanding of the interaction between social network factors and shed new light on how these factors affect firms' making decisions on inter-organizational cooperation issues in general and ITII adoption in particular.

Limitations and Future Research

It is important to evaluate the study's results and contributions in light of its limitations. First, the demography of our research sample might limit the generalizability of our findings. To reduce random errors caused by the differences of industries, we purposefully chose to study firms in only three industries. Although the industries chosen were representative industries, the generalizability of our research would be compromised to a certain extent. Indeed, managers in different industries may have different understandings of the potential benefits and costs of ITII for SCM. We hope future research should be conducted with samples from many different industries. Second, the data about the use of power and other factors is based on the individual manager's perception. While the respondents were executives and made important decisions for their firms, their perception may be somehow different from that of the whole management teams. Unfortunately, it is difficult, if not impossible, to survey all members of the top management teams. We suggest that future research should be conducted to test and extend the model proposed in this paper.

References:

- Allen, D.K., Colligan, D., Finnie, A., and Kern, T. "Trust, Power, and Interorganizational Information Systems: The Case of the Electronic Trading Community Translease," *Information Systems Journal* (10) 2000, pp 21-40.
- Ang, S., and Cummings, L.L. "Strategic Response to Institutional Influences on Information Systems Outsourcing," *Organization Science* (8:3) 1997, pp 235-256.
- Armstrong, J.S., and Overton, T.S. "Estimating Nonresponse Bias in Mail Surveys," *Journal of Marketing Research* (14:3) 1977, pp 396-402.
- Azjen, I., and Fishbein, M. *Understanding Attitudes and Predicting Behavior* Prentice-Hall, Inc., Englewood Cliffs, NJ, 1980.
- Bachmann, R. "Trust, Power and Control in Trans-Organizational Relations," *Organization*

- Studies* (22:2) 2001, pp 337-365.
- Baron, N.S., and Kenney, D.A. "The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations," *Journal of Personality and Social Psychology* (51) 1986, pp 1173-1182.
- Bensaou, M., and Venkataraman, N. "Configurations of Interorganizational Relationships: A Comparison between U.S. and Japanese Automakers," *Management Science* (41:9) 1995, pp 1471-1492.
- Boyle, B., Dwyer, F.R., A.Robicheaux, R., and Simpson, J.T. "Influence Strategies in Marketing Chnnels: Measures and Use in Different Relationship Structures," *Journal of Marketing Research* (29) 1992, pp 461-473.
- Broadbent, M., Weill, P., and St. Clair, D. "The Implications of Information Technology Infrastructure for Business Process Redesign," *MIS Quarterly* (23:2) 1999, pp 159-182.
- Brown, J.R., and F.Lusch, R. "Conflict and Power-Dependence Relations in Retailer-Supplier Channels," *Journal of Retailing* (59:4) 1983, pp 53-80.
- Brown, J.R., Lusch, R.F., and Nicholson, C.Y. "Power and Relationship Commitment: Their Impact on Marketing Channel Member Performance," *Journal of Retailing* (71:4) 1995, pp 363-392.
- Buchanan, L. "Vertical Trade Relationships: The Role of Dependence and Symmetry in Attaining Organizational Goals " *Journal of Marketing Research* (29:1) 1992, pp 65-75.
- Burt, R.S. *Toward a Structural Theory of Action: Network Models of Social Structure, Perception, and Action* Academic Press, New York, 1982.
- Chin, W.W. "Issues and Opinion on Structure Equation Modeling," *MIS Quarterly* (22:1) 1998, pp vii-xvi.
- Chung, S.H., Byrd, T.A., R.Lewis, B., and Ford, F.N. "An Empirical Study of the Relationships between IT Infrastructure Flexibility, Mass Customization, and Business Performance," *The Database for Advances in Information Systems* (36:3), Summer 2005, pp 26-44.
- Chwelos, P., Benbasat, I., and Dexter, A.S. "Research Report: Empirical Test of an EDI Adoption Model," *Information Systems Research* (12:3) 2001, pp 304-321.
- Clegg, S.R. *Frameworks of Power* Sage Publications, London, 1989.
- Cummings, L.L., and Bromiley, P. *The Organizational Trust Inventory: Development and Validation* Sage, Thousand Oaks, CA., 1996.
- Dabholkar, P.A., and Neeley, S.M. "Managing Interdependency: A Taxonomy for Business-to-Business Relationships," *The Journal of Business & Industrial Marketing* (13:6) 1998, p 439.
- DiMaggio, P., and Powell, W.W. "The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields," *American Sociological Review* (48:2) 1983, pp 147-160.
- Dwyer, F.R., and Oh, S. "Output Sector Munificence Effects on the Internal Political Economy of Marketing Channels," *Journal of Marketing Research* (24) 1987, pp 347-358.
- Falbe, C.M., and Yukl, G. "Consequences for Managers of Using Single Influences Tactics and Combinations of Tactics," *Academy of Management Journal* (35) 1992, pp 638-652.
- Fornell, C., and Larcker, D.F. "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error," *Journal of Marketing Research* (18:1) 1981, pp 39-50.
- Frazier, G.L., and Summers, J.O. "Perceptions of Interfirm Power and Its Use Within a Franchise Channel," *Journal of Marketing Research* (23) 1986, pp 169-176.
- French, J.R.P., and Raven, B. *The Bases of Social Power* University of Michigan, Ann Arbor, MI: Institute for Social Research, 1959, pp. 150-167.
- Gaski, J.F. "The Theory of Power and Conflict in Channels of Distribution," *Journal of Marketing* (48) 1984, pp 9-29.
- Gaski, J.F. "Interrelations among a Channel Entity's Power Sources: Impact on the Exercise of Reward and Coercion on Expert, Referent, and Legitimate Power Sources," *Journal of*

- Marketing Research* (23) 1986, pp 62-77.
- Gefen, D., Karahanna, E., and Straub, D.W. "Trust and TAM in Online Shopping: An Integrated Model," *MIS Quarterly* (27:1) 2003, pp 51-90.
- Grover, V. "An Emperically Derived Model for the Adoption of Customer-based Interorganizational Systems," *Decision Sciences* (24:3) 1993, pp 603-640.
- Gulati, R. "Alliances and Networks," *Strategic Management Journal* (19:4) 1998, pp 293-317.
- Hart, P.J., and Saunders, C. "Power and Trust: Critical Factors in the Adoption and Use of Electronic Data Interchange," *Organization Science* (8:1), January-February 1997, pp 23-42.
- Hart, P.J., and Saunders, C.S. "Emerging Electronic Partnerships: Antecedents and Dimensions of EDI Use from the Supplier's Perspective," *Journal of Management Information Systems* (14:4) 1998, pp 87-111.
- Hofstede, G. "Attitudes, Values and Organizational Cultures: Disentangling the Concepts," *Organization Studies* (19:3) 1998, pp 477-492.
- Iacovou, C.L., Benbasat, I., and Dexter, A.S. "Electronic Data Interchange and Small Organizations: Adoption and Impact of Technology," *MIS Quarterly* (19:4) 1995, pp 465-485.
- Jasper, J.S., Carte, T.A., Saunders, C.S., Butler, B.S., Croes, H.J.P., and Zheng, W. "Review: Power and Information Technology Research: A Metatriangulation Review," *MIS Quarterly* (26:4) 2002, pp 397-459.
- Karmer, R.M., and Tyler, T.R. *Trust in Organizations: Frontier of Theory and Research* Sage, Thousand Oaks, CA, 1996.
- Khalifa, M., and Davison, R.M. "SME Adoption of IT: The Case of Electronic Trading Systems," *IEEE Transactions on Engineering Management* (53:2) 2006, pp 1-10.
- Komiak, S.Y.X., and Benbasat, I. "The Effects of Personalization and Familiarity on Trust and Adoption of Recommendation Agents," *MIS Quarterly* (30:4) 2006, pp 941-960.
- Kumar, K., and van Dissel, H.G. "Sustainable Collaboration: Managing Conflict and Cooperation in Interorganizational Systems," *MIS Quarterly* (20:3) 1996, pp 279-300.
- Lai, K.-h., Wong, C.W.Y., and Cheng, T.C.E. "Institutional Isomorphism and the Adoption of Information Technology for Supply Chain Management," *Computers in Industry* (57) 2006, pp 93-98.
- Lewis, J.G., and Weigert, A. "Trust as a Social Reality," *Social Forces* (63) 1985, pp 967-985.
- Luhmann, N. *Trust and Power* Wiley, New York, 1979.
- Malhotra, A., Gosain, S., and Sawy, O.A.E. "Absorptive Capacity Configurations in Supply Chains: Gearing for Partner-enabled Market Knowledge Creation," *MIS Quarterly* (29:1) 2005, pp 145-187.
- Mayer, R.C., Davis, J.H., and Schoorman, F.D. "An Integrative Model of Organizational Trust," *Academy of Management Review* (20:3) 1995, pp 709-734.
- McAllister, D.J. "Affect- and Cognition-based Trust as Foundations for Interpersonal Cooperation in Organizations," *Academy of Management Journal* (38:1) 1995, pp 24-59.
- Patnayakuni, R., Rai, A., and Seth, N. "Relational Antecedents of Information Flow Integration for Supply Chain Coordination," *Journal of Management Information Systems* (23:1) 2006, pp 13-49.
- Pfeffer, J. *Power in Organizations* Pitman Publishing Company, Marshfield, MA, 1981.
- Powell, W.W., and DiMaggio, P. *The New Institutionalism in Organizational Analysis* University of Chicago Press, Chicago, 1991.
- Premkumar, G. "A Meta-Analysis of Research on Information Technology Implementation in Small Business," *Journal of Organizational Computing and Electronic Commerce* (13:2) 2003, pp 91-121.
- Premkumar, G.P., and Ramamurthy, K. "The Role of Interorganizational and Organizational Factors on the Decision Mode for Adoption of Interorganizational Systems," *Decision*

- Sciences* (26:3) 1995, pp 303-336.
- Rai, A., Patnayakuni, R., and Seth, N. "Firm Performance Impacts of Digitally Enabled Supply Chain Integration Capabilities," *MIS Quarterly* (30:2), June 2006, pp 225-246.
- Raven, B.H., and Kruglanski, A.W. *Conflict and Power* Academic Press, New York, 1970, pp. 69-109.
- Sahin, F., and Powell, R.E. "Flow Coordination and Information Sharing in Supply Chains: Review, Implications and Directions for Future Research," *Decision Sciences* (33:4) 2002, pp 505-536.
- Saunders, C., and Clark, S. "EDI Adoption and Implementation," *Information Resources Management Journal* (5) 1992, pp 9-19.
- Scott, J. *Network Analysis: A handbook* Sage, London, 2000.
- Skinner, S.J., B.Gassenhermer, J., and Scott, W.K. "Cooperation in Supplier-Dealer Relations," *Journal of Retailing* (68) 1992, pp 174-193.
- Teo, H.H., Wei, K.K., and Benbasat, I. "Predicting Intention to Adopt Interorganizational Linkages: An Institutional Perspective," *MIS Quarterly* (27:1), March 2003, pp 19-49.
- Williamson, O.E. *The economic Institutions of Capitalism* Free Press, New York, 1985.

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