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# Influence of institutional and moral orientations on relational risk management in supply chains

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## ABSTRACT

Inter-organizational relationships in supply chains are built, maintained, and enhanced to achieve corporate goals. However, relational risk will weaken the success of supply chains. Manufacturers must build forms of relational governance to safeguard against the relational risk of partners. For managing relational risk, this research investigates the contribution of institutional and moral orientations to relational risk management. The results of the study of 260 major manufacturing firms in Taiwan suggest that three types of relational risk—opportunistic behavior, loss of competences, and incomprehension—are significantly affected by institutional and/or moral orientations. The findings provide useful insights into how supply chain members should reinforce their institutional and moral views of relational governance and manage relational risks faced by the supply chain as a whole.

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## 1. Introduction

Relational risk has increasingly become an issue of strategic importance in supply chain management (Das and Teng, 2001; Delerue, 2005; Jia and Rutherford, 2010; Nooteboom et al., 1997). It is defined as both the probability and the outcome of suboptimal cooperation (Das and Teng, 2001; Delerue, 2005). Relational risk derives from the failure to address power asymmetries between partners (Ratnasingam, 2007). To improve supply chain performance and product quality, firms often demand that their supply chain partners, including subcontractors or suppliers, implement common processes, which usually requires the management of relational risk. Standardizing firms' operations usually requires relational risk management. Specifically, to be successful in a supply chain, collaborative behavior and activities need to be promoted to manage relational risk among members (Nyaga et al., 2013).

To take full advantage of a supply chain, manufacturers must understand those factors that affect the partners' relational risk. Improving the collaboration between supply chain partners reduces uncertainty and risk (Bode et al., 2011). To reduce supplier risks that raise high management cost because of multiple suppliers, some manufacturing firms (e.g., Intercon Japan) provide

their suppliers with economic incentives (Tang, 1999, 2006). In supply chains, collaborative relationships can help promote superior value and provide good interaction (Dyer, 1996; Wagner et al., 2010). Previous research has focused on modeling relational risk precursors or independent variables from the perspective of transaction costs or resource-based economics. Nooteboom et al. (1997) examined trust between supply chain partners and the results suggest that trust-related variables have significant effects on relational risk. Delerue and Simon (2009) investigated national cultural value among supply chain partners and the findings demonstrate that cultural values significantly affect manager perception of risks. Jia and Rutherford (2010) proposed cultural adaptation as the solution to mitigate the relational risk. However, little research has been conducted on the effects of the institutional and moral orientations of relational governance on inter-organizational risk management and relationships, despite the acknowledged importance of relational governance to inter-organizational behavior (Schoenherr et al., 2012). Good relationships that have the potential to ensure the success of supply chains will be highly valued (Carter and Jennings, 2002; Van de Vijver et al., 2011). Therefore, supply chain partners should aim to develop and maintain close and cooperative inter-organizational relationships, which will in turn help them to manage relational risk.

Relational governance and risk management are important strategies for preserving good relationships between supply chain partners and reducing the likelihood of relational risk (Cousins et al., 2006; Kale et al., 2000; Liu et al., 2009). Relational

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governance affects both the structure and the operation of inter-organizational relationships (Zaheer and Venkataraman, 1995). It is conducted in line with the agreed-upon values and activities associated with social relationships, especially inter-organizational exchange (Poppo and Zenger, 2002). Relational governance can promote collaboration and mitigate exchange hazards (Poppo and Zenger, 2002; Zaheer and Venkataraman, 1995). Supply chain relationships that increase the effectiveness of governance and improve the management of relational risk are fundamental to firms' long-term survival and success. The nature of an inter-organizational relationship depends on the type of collaboration involved: from simple buy-and-sell interaction to close collaborative product development (Dwyer et al., 1987; Wagner and Johnson, 2004). Therefore, firms encounter various relational risks when developing inter-organizational relationships (Delerue, 2005; Ratnasingam, 2007). Effective relational governance reduces relational risk which are intrinsically social (Poppo and Zenger, 2002). Institutional theory offers a convincing explanation of the effects of social environment on the behavior of firms in inter-organizational relationships. The behavior of organizational partners is shown to be influenced by either formal rules or laws or informal agreements (Howell and Annansingh, 2013). The behavior of supply chain partners is also influenced by the moral attitudes of their agents, which are determined by internal normative guidelines. Therefore, establishing value-based relationships that involve risk evaluation is an important component of relational governance. Our main research question is as follows. "How do institutional and moral views of relational governance help firms to manage relational risk?"

To address the important issue of relational risk mitigation in supply chains, this study investigates the influence of the inter-organizational institutional and moral orientations of supply chain partners on relational risks such as opportunistic behavior, loss of competences, and incomprehension.

The remainder of this paper is organized as follows. Section 2 provides a brief overview of relational governance and risk management in supply chains. Section 3 presents the theoretical framework and hypothesis development, and the data-collection method and research design are described in Section 4. The study's findings are presented in Section 5. The results are discussed in Section 6, and Section 7 concludes the paper and offers directions for future research.

## 2. Relational governance and risk management in supply chains

Inter-organizational relationships can be enhanced to reduce relational risks in supply chains. Relational risks comprise both risks associated with cooperation and risks associated with partners' behavior (Delerue, 2005). Opportunistic behavior, loss of competences, and incomprehension are useful measures of relational risk (Cheng, 2011; Delerue, 2005). Opportunism describes a wide range of possible behavior (Wathne and Heide, 2000). Within the transaction cost framework, opportunistic behavior is defined as the pursuit of self-interest by guile, leading to the deceit-oriented violation of implicit or explicit promises (Morgan and Hunt, 1994; Williamson, 1975). Loss of competences and incomprehension are measures of the risk of uncontrolled disclosure in relationships and the risk of a lack of understanding between partners, respectively. Manufacturing firms may be reluctant to share valuable capabilities or resources with their supply chain partners, especially if they regard their partners as potential competitors and/or a threat to their core capabilities or resources due to relational risk. It is essential for all parties involved to evaluate their relationships and implement appropriate strategies to control the

likelihood of relational risk.

Relational governance, which involves the maintenance of inter-organizational relationships in supply chains, strives to solve exchange problems and enhance performance (Heide and John, 1988; Wang and Wei, 2007). Cooperative relationships are particularly valuable when exchange opportunities between partners exist (Poppo and Zenger, 2002). It is the most important strategy used by supply chain partners to manage relational risks (Lee and Johnson, 2010; Szczepański and Światowicz-Szczepańska, 2012; Wallenburg and Schäffler, 2014). Relational risk is often governed by formal contracts. However, no contract has complete coverage (Wang and Wei, 2007). Moral consciousness is also required to flexibly manage inter-organizational relational risk (Sim and Brinkmann, 2003). Inter-organizational relationships in a supply chain that are subject to appropriate forms of relational governance enhance the competitive advantages of the supply chain as a whole (Holland, 1995).

Several prevailing theories have shown that relational governance is an effective means of managing relational risk in supply chains (Delerue and Simon, 2009; Jia and Rutherford, 2010; Nooteboom et al., 1997). Institutional theory is a non-economic motivation theory according to which the desire for legitimacy and recognition drives partners to form inter-organizational relationships in supply chains (Liu et al., 2010; McFarland et al., 2008). Researchers have contended that integrating institutional and moral frameworks of relational governance can improve understanding of inter-organizational relational exchange (Li et al., 2010). Institutional norms alone cannot fully elucidate all of the forms and processes of inter-organizational governance. According to the moral perspective, moral orientation may lead partners to maintain proper standards of behavior (Ferrell and Gresham, 1985), which in turn mitigate inter-organizational relational risks. The institutional and moral perspectives both emphasize specific relationships in the social environment, which are measured by the value they add to organizations. Consequently, the institutional theory of relational governance, supplemented by the moral theory, is used in this study to examine the ways in which value-based relationships manage relational risks in supply chains.

Institutional theory describes the pressure placed on organizations by environmental factors; organizations are assumed to enter into inter-organizational relationships governed by unwritten rules of proper social conduct to gain legitimacy or recognition within society (Liu et al., 2010; McFarland et al., 2008; Zhu and Sarkis, 2007). According to institutional theory, the behavior of institutionally oriented firms is driven by strong social influences or aims, and firms in an institutionally oriented supply chain gradually become homogeneous via institutional isomorphism (DiMaggio and Powell, 1983; Ketchen and Hult, 2007; North, 1990). Contravening formal and/or informal guidelines for intra-organizational conduct in a supply chain may cast doubt on a firm's legitimacy and thus reduce its access to resources and social support. Therefore, firms with a strong institutional orientation behave in accordance with norms and seek to reduce inter-organizational relational risks. In a supply chain with a strong institutional orientation, firms work to sustain productive relationships with their partners.

In addition to institutional orientation, moral orientation plays an important role in shaping the commercial activities of supply chain partners. The concept of moral orientation is a science in practice; it is concerned with identifying and establishing rules for right and wrong actions (Small, 2002; Winquist and Taylor, 2001). Moral orientation describes individual behavior as determined by principles of right and wrong, and generally leads individuals to follow a morally correct course of action (Small, 2002; Winquist and Taylor, 2001). Partners with similar moral standards are able to collaborate harmoniously, which eliminates tension and

strengthens operational efficiency (Carroll, 1989; Clarence, 1977; Weaver and Treviño, 1994). In supply chains, a shared awareness of moral principles can reduce relational risks. The establishment of close inter-organizational relationships through relational governance by supply chain members enhances the competitive advantages of the supply chain as a whole.

In this study, a novel research model of relational governance and risk management in supply chains is developed to investigate the factors that influence inter-organizational relational risk and the implementation of relational governance. The model is based on the premise that supply chain members value their relationships with other members and manage relational risk to avoid jeopardizing these relationships. The constructs of the research model and the research hypotheses are discussed in the following section.

### 3. Theoretical framework and hypothesis development

Fig. 1 depicts the conceptual model of the factors involved in managing relational risk. The model was used to test six hypotheses. In Fig. 1, each hypothesis is identified by the letter H and a number. The arrows indicate hypothesized relationships, and the minus signs indicate negative relationships.

#### 3.1. Institutional orientation

According to institutional theory, the behavior of institutionally oriented firms is shaped by powerful social influences or aims, and their interaction is structured by human-devised constraints (Cai and Yang, 2014; North, 1990). Such firms seek to gain legitimacy by fulfilling expectations of appropriate organizational structures, behavior, and practices (Scott, 1987). In their competition for resources, customers, and political power, organizations usually conform to the “rules of the game” to avoid opportunistic behavior (Cheng, 2011; Liang et al., 2007; North, 1990). Violating these rules may cast doubt on a firm’s legitimacy and thus reduce its access to protected resources and social support (DiMaggio and Powell, 1983; Teo et al., 2003). Collaboration between partners decreases the probability of opportunistic behavior. This leads to the following hypothesis.

**Hypothesis 1.** Institutional orientation is negatively related to opportunistic behavior.

The term “institutional orientation” describes an emphasis on legitimacy that leads to isomorphism in the institutional environment (Standing et al., 2009; Wong et al., 2009; Zsidisin et al., 2005). According to institutional theory, there are three main types of environmental alignment or isomorphism: normative, coercive, and mimetic (DiMaggio and Powell, 1983). Coercive

isomorphism involves formal and/or external pressure exerted by cultural expectations or organizations upon which firms are dependent (DiMaggio and Powell, 1983). Regulatory institutions use coercive power when they perceive that the activities of supply chain members conflict with larger inter-organizational aims (Grewal and Dharwadkar, 2002). Coercively re-aligning the behavior of these firms with institutional expectations reduces the risks of uncontrolled disclosure of strategic information and loss of competences. A dominant partner that controls scarce and important resources may coerce partners dependent on these resources to share knowledge or technology that benefit the dominant firm (Pfeffer and Salancik, 1978; Teo et al., 2003). Therefore, it is reasonable to propose that the greater the institutional orientation of supply chain partners, the smaller the risk of loss of competences. This leads to the following hypothesis.

**Hypothesis 2.** Institutional orientation is negatively related to the risk of loss of competences.

Normative mechanisms associated with the professionalization of fields and disciplines include the collective struggle of members of a given field to define the conditions and methods of their work, to control the production of future professionals in the same field, and to legitimize and establish a cognitive base for their occupational autonomy (DiMaggio and Powell, 1983). Researchers have argued that formal education and professional networks create pools of almost interchangeable employees in their respective industries (Liang et al., 2007). Accordingly, supply chain members can use normative mechanisms to reduce the risk of a lack of understanding between partners. As normative mechanisms are associated with institutional isomorphism, an institutional orientation can help enterprises to reduce the risk of incomprehension between partners. This leads to the following hypothesis.

**Hypothesis 3.** Institutional orientation is negatively related to incomprehension risk.

#### 3.2. Moral orientation

Morally oriented attitudes and behavior are based on human values and how humans relate to each other (Small, 2002). Supply chain partners face considerable relational risks during their interaction, and their moral choices have important implications, potentially leading to huge gains or losses (Motwani et al., 1998; Sim and Brinkmann, 2003; Siponen et al., 2012). As partners with different sets of goals are more likely to engage in opportunistic behavior, the risk of opportunism is reduced when all supply chain members seek to interact with each other in line with proper standards of behavior. Therefore, it is reasonable to propose that the stronger the moral orientation of supply chain partners, the smaller the risk of opportunistic behavior. This leads to the

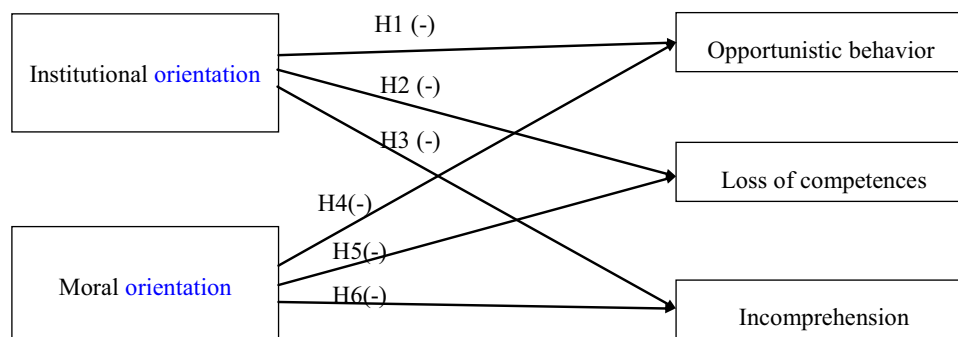


Fig. 1. The research model.

following hypothesis.

**Hypothesis 4.** Moral orientation is negatively related to opportunistic behavior.

Moral orientation reflects conceptions of certain actions and behavior as right or wrong. In a supply chain with a strong collective moral orientation, these conceptions are protected and respected by the member organizations. It is widely acknowledged that firms must conform to moral standards to maintain cooperative relationships (Carroll, 1989; Clarence, 1977; Weaver and Treviño, 1994). Therefore, a strong moral orientation helps to maintain effective inter-organizational operation even if the risk of loss of competences arises (Delerue, 2004). In other words, morally oriented supply chain members that regard cooperative relationships as a source of competitive advantages are less likely to be adversely affected by loss of competences. This leads to the following hypothesis.

**Hypothesis 5.** Moral orientation is negatively related to the risk of loss of competences.

A strong moral orientation is not only a prerequisite for members of an inter-organizational relationship to get along, but an important determinant of inter-organizational commercial activities. O'Malley (2000) and Delerue (2004) indicate that moral orientation has a critical role in maximizing the benefits of inter-organizational collaboration by discouraging supply chain members from risking incomprehension. Establishing a moral orientation in a supply chain increases collaboration efforts, thereby decreasing the risk of incomprehension. Accordingly, this study proposes the following hypothesis.

**Hypothesis 6.** Moral orientation is negatively related to incomprehension risk.

#### 4. Research method

To develop the survey instrument, a pool of items measuring the constructs of the research model was first identified from the literature. Next, a survey was used to collect data from a sample to assess the instrument's validity and reliability and test the relationships hypothesized in the research model.

##### 4.1. Content validity

All of the measures used in the survey instrument were developed from the literature. Where appropriate, the expression of the items was tailored to the supply chain context, as shown in Table 1. The items were measured on a 7-point Likert scale with responses ranging from "strongly disagree" (1) to "strongly agree" (7).

##### 4.2. Pre-test and pilot-test

Three specialist academics and four Ph.D. students were asked to pre-test a 14-item questionnaire and provide feedback on the content and appearance of the survey instrument. Several large manufacturing firms were contacted to help conduct a pilot test of the instrument, with the aim of selecting participants with ample knowledge of the operation and management of the inter-organizational relationships between manufacturing firms and their suppliers or subcontractors. This study sought to choose respondents who were expected to have the best knowledge about the operation and management of the inter-organizational relationships between their manufacturing firm and its suppliers or subcontractors. As recommended by scholars and practitioners, the respondents were function managers in senior-management teams who were responsible for maintaining and developing inter-organizational relationships with suppliers or subcontractors. Each function manager received a survey package containing a cover letter explaining the research objectives, a copy of the questionnaire, and a stamped, return-addressed envelope. The pilot-test respondents were asked to complete the questionnaire and provide feedback on the wording, comprehensibility, and clarity of the items, and the overall appearance and content of the instrument.

Only minor changes were suggested; none of the statements were removed. After these changes had been made, and the adjusted questionnaire had been reviewed again by another two specialists, the instrument was ready to be sent to a large sample of respondents to collect the data required to analyze our research model. Table 1 shows the 14 items and their corresponding measurement constructs.

**Table 1**  
Constructs and measures of the research items.

Construct	Source
<i>Institutional orientation</i>	
IO1 You and your partner have a comprehensive set of norms of action has been well developed in the cooperation	Li et al. (2010)
IO2 You and your partner have a binding set of rules for both firms have been created.	
IO3 You and your partner have both firms have a mutual understanding of each other's organizational culture, values, and operations.	
<i>Moral orientation</i>	
MO1 You apply consistent policies and decision making procedures across all your partners.	Griffith et al. (2006), Hu and Korneliusen (1997)
MO2 You do not discriminate but rather treat all your partners similarly.	
MO3 You generally treat all your partners fairly.	
MO4 You and your partner work actively on developing a collective image within the fields of cooperation.	
<i>Opportunistic behavior</i>	
OB1 To accomplish their objectives for the supply chains one of the partners will sometimes promise to do things without actually doing them later	Morgan and Hunt (1994), Simonin, (1999), Norman (2002)
OB2 To accomplish their objectives for the supply chains one of the partners will sometimes engage in opportunistic behavior at the other partner's expense	
<i>Loss of competences</i>	
LC1 Core technical information flows quite freely restricts from our firm to your partner.	Kale et al. (2000), Delerue (2005)
LC2 Marketing plans and information flow quite freely restricts from our firm to your partner.	
LC3 Strategic information flows quite freely restricts from our firm to your partner.	
<i>Incomprehension</i>	
IN1 Your partner does not anticipate and interpret the events related to cooperation in the same way as you do.	Nooteboom et al. (1997), Delerue (2005)
IN2 Your partner does not anticipate and interpret the events related to expression in the same way as you do.	

### 4.3. Data collection

The data were obtained from a questionnaire survey distributed to the function managers of 1000 manufacturing firms in Taiwan. These firms were selected because they comprised the top 1000 Taiwanese manufacturing firms of 2011 as listed in Business Weekly (Taiwan's leading business magazine). A modified version of Dillman's (2007) total-design method was used to maximize the response rate. Each of the managers at the manufacturing firms received a survey package containing a cover letter explaining the research objectives, a copy of the questionnaire, and a stamped, return-addressed envelope. To make the submission process as convenient as possible, the participants were offered two options for returning the questionnaire (by mail or fax). Two weeks after the distribution of the survey, personalized reminder e-mails were sent to all of the potential participants. Those who did not respond within 3–4 weeks of the survey distribution received a reminder telephone call. Two hundred and sixty usable responses were obtained, with a total response rate of 26%.

Additionally, the 260 respondents were function managers or top managers such as general manager, vice president, or CEO. To check for the potential bias of a single informant, the consistency between the data collected from function managers and top managers was verified. Consistent with past research (Weil, 1992), interrater reliabilities (IRR) (James et al., 1984) were calculated to show the agreement level between function managers and top managers. The average estimates of IRR were 0.861 for institutional orientation, 0.831 for moral orientation, 0.901 for opportunistic behavior, 0.812 for loss of competences, and 0.875 for incomprehension risk, respectively. All estimates exceeded the recommended cut-off value of 0.7 (Eby and Dobbins, 1997), indicating the response consistency between the two groups.

The results of a chi-square analysis indicated that there were no differences in the industry distribution of the firms involved in the survey. Next, the managers to whom the survey had been sent were divided into two groups: respondents and non-respondents. No significant differences in industry type, total sales revenue, and year of establishment were found between the two groups. This suggested that the returned questionnaires were not affected by non-response bias. Table 2 shows the demographic and other characteristics of the manufacturing firms in the sample.

## 5. Results

Software AMOS 17.02 was used to conduct structural-equation modeling (SEM) to test and analyze the relationships hypothesized in the research model. The aim of SEM is to examine the relationships between a set of posited constructs simultaneously; each construct is measured by one or more observed items (measures). SEM is used to analyze two models: a measurement model (confirmatory factor analysis, CFA) and a structural model (Anderson and Gerbing, 1988). The measurement model specifies the relationships between the observed measures and their underlying constructs, which are allowed to inter-correlate, and the structural model specifies the posited causal relationships between the constructs.

### 5.1. Assessment of the measurement model

Prior to the main analysis, exploratory factor analysis was performed using principal-axis factoring to ascertain whether our items loaded onto a common latent factor. The specified measurement model (see Table 1 for the measures and their underlying constructs) was found to be capable of ascertaining the extent to which the surveyed items actually measured their

**Table 2**  
Profile of firms in the sample.

Demographic profile	Number of firms	Percentage
<i>Industry type</i>		
Food/beverage	8	3.1
Textiles/fiber	8	3.1
Printing and related support activities	7	2.7
Chemical/plastics	32	12.3
Non-metallic mineral products	5	1.9
Basic metal industries	34	13.1
Electrical machinery/machinery and equipment	21	8.1
Electronics/communication	87	33.5
Transport equipment	17	6.5
Electronic parts and components	23	8.8
Others	18	6.9
<i>Annual sales revenue (New Taiwan \$)</i>		
Below \$1 billion	61	23.5
\$1.1 billion to below \$2 billion	50	19.2
\$2.1 billion to below \$3 billion	31	11.9
\$3.1 billion to below \$4 billion	16	6.1
\$4.1 billion to below \$5 billion	15	5.8
\$5.1 billion to below \$10 billion	22	8.5
\$10.1 billion to below \$20 billion	20	7.7
\$20.1 billion to below \$50 billion	22	8.5
\$50.1 billion and above	23	8.8
<i>Years of establishment</i>		
Less than 5 years	7	2.7
6–10 years	31	11.9
11–15 years	43	16.6
16–20 years	26	10.0
21–25 years	34	13.1
26–30 years	30	11.5
Over 31 years	89	34.2
<i>Position of respondent</i>		
Top managers	25	9.6
Function managers	235	90.4

respective constructs. First, the 14 items in the survey instrument were analyzed to assess their dimensionality and measurement properties. Analysis of their eigenvalues suggested a five-factor solution, with factors comprising institutional orientation, moral orientation, risk of opportunistic behavior, risk of loss of competences, and risk of incomprehension. In addition, all of the items loaded significantly and substantially onto their underlying constructs, providing evidence of convergent validity. As the CFA results indicated that all of the items performed well, they were retained in the research model.

The chi-square value ( $\chi^2$ ) obtained for the measurement model was significant ( $\chi^2=79.402$ ,  $df=51$ ,  $p < 0.01$ ), with a  $\chi^2/df$  value smaller than 2, indicating an ideal fit (Bentler, 1990). The large  $\chi^2$  value was not surprising, as the chi-square statistic has been shown to relate directly to sample size (Joreskog and Sorbom, 1993). To assess the overall model fit without considering sample size, alternative stand-alone fit indices less sensitive to sample size were used. These indices comprised the goodness of fit index (GFI), the adjusted goodness of fit index (AGFI), the comparative fit index (CFI), the root mean square residual (RMSR), and the root mean square error of approximation (RMSEA) (Joreskog and Sorbom, 1993). For a good model fit, the GFI should be close to 0.90, the AGFI greater than 0.80, the CFI greater than 0.90, the RMSR smaller than 0.05, and the RMSEA smaller than 0.10 (Joreskog and Sorbom, 1993). The values obtained for the measurement model suggested an acceptable model fit (GFI=0.959; AGFI=0.915; CFI=0.991; NFI=0.974; RMSEA=0.046).

To assess the reliability of the constructs, composite reliability was calculated. All of the composite-reliability values, which ranged from 0.723 to 0.971, exceeded the recommended cut-off value

**Table 3**  
Assessment results of the measurement model.

Construct	Items	Standardised loading	Standardised error	t-value	SMC	CR	AVE
Institutional orientation	IO1	0.794	0.035	7.850***	0.630	0.828	0.617
	IO2	0.866	0.044	5.144***	0.750		
	IO3	0.708	0.045	9.338***	0.501		
Moral orientation	MO1	0.712	0.058	10.074***	0.507	0.875	0.638
	MO2	0.826	0.061	8.074***	0.682		
	MO3	0.872	0.041	7.227***	0.760		
	MO4	0.775	0.044	9.423***	0.601		
Opportunistic behavior	OB1	0.760	0.084	6.837***	0.578	0.723	0.566
	OB2	0.745	0.086	7.66***	0.555		
Loss of competences	LC1	0.822	0.042	11.022***	0.676	0.954	0.873
	LC2	0.987	0.012	2.753**	0.974		
	LC3	0.985	0.012	3.166**	0.970		
Incomprehension	IN1	0.977	0.016	1.886*	0.955	0.971	0.943
	IN2	0.965	0.016	2.83**	0.931		

\* Denotes significance at  $\alpha=0.05$ .

\*\* Denotes significance at  $\alpha=0.01$ .

\*\*\* Denotes significance at  $\alpha=0.001$ .

of 0.70 (Joreskog and Sorbom, 1993). The squared multiple correlation of a variable denotes the proportion of the variable's variance accounted for by its predictors. The average variance extracted was greater than 0.5 in all cases, indicating that each of the constructs accounted for more of the variance than that caused by measurement error (Joreskog and Sorbom, 1993). Analysis of the discriminant validity between the constructs also indicated an acceptable model fit. Table 3 summarizes the results of the assessment of the measurement model.

## 5.2. Assessment of structural model

Table 4 displays the inter-correlations between the three constructs of the structural model, which are consistent with the hypothesized negative relationships shown in Fig. 1. The overall fit of the structural model was acceptable, as suitable values were obtained for all of the fit indices ( $\chi^2=76.971$ ,  $df=51$ ,  $p < 0.01$ ;  $GFI=0.959$ ;  $AGFI=0.916$ ;  $CFI=0.991$ ;  $NFI=0.975$ ;  $RMSEA=0.044$ ).

## 5.3. Common method bias

Multiple approaches were used to evaluate the threat of common-method bias. First, as recommended by Podsakoff and Organ (1986), Harman's one-factor test was run to ensure that our findings were not determined by common-method variance. Unrotated principal components analysis revealed three factors with eigenvalues greater than 1, which together accounted for 61.1% of the total variance. The first factor did not account for the majority of the variance (21.7%). As no single factor emerged that could account for most of the variance, common-method bias was assumed not to be a problem. Second, the data were examined for empirical evidence of common-method bias by conducting CFA

**Table 4**  
Correlation matrix of constructs.

	(A)	(B)	(C)	(D)	(E)
(A) Institutional orientation (IO)	1.000				
(B) Moral orientation (MO)	0.130	1.000			
(C) Opportunistic behavior (OB)	-0.209***	-0.490***	1.000		
(D) Loss of competences (LC)	-0.259***	-0.234***	0.136	1.000	
(E) Incomprehension (IN)	-0.278***	-0.125***	0.137	0.104	1.000

\*\*\* Denotes significance at  $\alpha=0.001$ .

with a construct representing an unmeasured method factor. If a one-factor model fits the data poorly, common-method variance is assumed not to be a serious threat. To develop the one-factor model, all of the measurement items were loaded onto a single factor. The results of CFA indicated that the one-factor model did not fit the data ( $\chi^2=759.071$ ,  $df=76$ ;  $GFI=0.634$ ;  $AGFI=0.495$ ;  $CFI=0.642$ ;  $NFI=0.620$ ;  $RMSEA=0.229$ ). Therefore, common-method bias was concluded not to be a problem in the study.

## 5.4. Hypotheses testing

The relationships between the independent and dependent variables were assessed simultaneously by covariance-based SEM. Maximum-likelihood (ML) estimation was used to estimate the model's parameters, with the covariance matrix as the data input. ML estimation has been found to be well suited to theory testing and development (Anderson and Gerbing, 1988; Hair et al., 1998; Joreskog and Sorbom, 1993).

Fig. 2 shows the structural model with the coefficients obtained for each path (hypothesized relationship). Institutional orientation was not found to be significantly associated with opportunistic behavior (H1:  $\gamma = -0.068$ ,  $t = -0.866$ ,  $p > 0.05$ ). Institutional orientation had a negative effect on the risk of loss of competences (H2:  $\gamma = -0.207$ ,  $t = -2.999$ ,  $p < 0.01$ ) and a negative effect on incomprehension risk (H3:  $\gamma = -0.264$ ,  $t = -3.718$ ,  $p < 0.001$ ). Moral orientation had a negative effect on opportunistic behavior (H4:  $\gamma = -0.470$ ,  $t = -5.875$ ,  $p < 0.001$ ) and a negative effect on the risk of loss of competences (H5:  $\gamma = -0.172$ ,  $t = -2.595$ ,  $p < 0.01$ ). Moral orientation was not significantly associated with incomprehension risk (H6:  $\gamma = -0.046$ ,  $t = -0.675$ ,  $p > 0.05$ ).

## 5.5. Multi-group analysis

Multi-group analysis was used to assess the structural model to gain initial insights into the influence of institutional orientation and moral orientation on three inter-organizational relational risks (opportunistic behavior, loss of competences and incomprehension). The 260 usable responses were divided into two groups based on the median score (Germain et al., 2008) for firm size, which was measured by annual sales revenue (Harris and Katz, 1991; King and Teo, 2000). Group 1 comprised smaller sized firms and Group 2 comprised larger sized firms. To examine the differences between the parameters of the two groups, the groups were

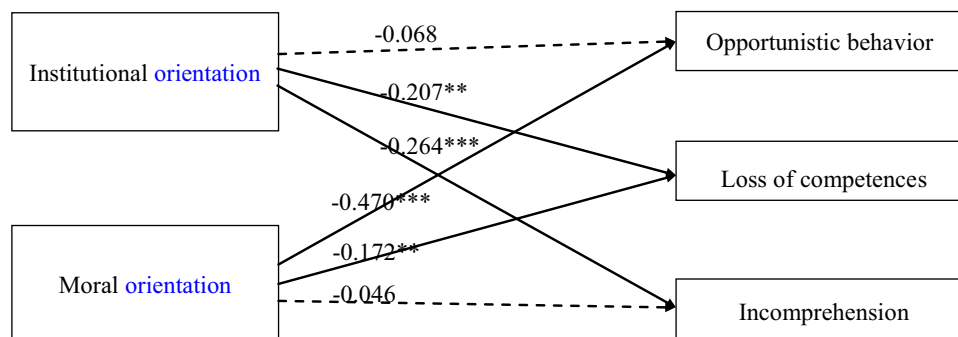


Fig. 2. The structural model \*\* and \*\*\* denote significance at  $p < 0.01$  and  $p < 0.001$  respectively.

statistically compared using the multi-group procedure suggested by Joreskog and Sorbom (1993). The paths were individually compared between the groups, and a chi-square test was used to determine whether the estimated coefficients for each group were equal. The path coefficients of the two groups were analyzed separately using multi-group analysis to ensure that the model had a similar goodness of fit for both groups. The fit indices for Group 1 were acceptable ( $\chi^2/df=1.332$ ,  $GFI=0.947$ ;  $AGFI=0.893$ ;  $CFI=0.991$ ;  $NFI=0.965$ ;  $RMSEA=0.044$ ). The fit indices for Group 2 were also acceptable ( $\chi^2/df=1.150$ ,  $GFI=0.923$ ;  $AGFI=0.834$ ;  $CFI=0.994$ ;  $NFI=0.956$ ;  $RMSEA=0.042$ ). The estimation results showed that the differences between the parameters of the two groups were significant. Overall, the analysis revealed that institutional orientation was less significantly associated with loss of competences in Group 1 ( $\gamma = -0.096$ ,  $t = -1.095$ ,  $p > 0.05$ ) than in Group 2 ( $\gamma = -0.412$ ,  $t = -3.698$ ,  $p < 0.001$ ). Moral orientation was also less significantly associated with loss of competences in Group 1 ( $\gamma = -0.136$ ,  $t = -1.553$ ,  $p > 0.05$ ) than in Group 2 ( $\gamma = -0.249$ ,  $t = -2.484$ ,  $p < 0.05$ ). Institutional orientation was significantly associated with incomprehension risk in both Group 1 ( $\gamma = -0.267$ ,  $t = -2.938$ ,  $p < 0.01$ ) and Group 2 ( $\gamma = -0.234$ ,  $t = -2.021$ ,  $p < 0.05$ ), but less significantly associated with opportunistic behavior in the two groups (Group 1:  $\gamma = -0.022$ ,  $t = -0.226$ ,  $p > 0.05$ ; Group 2:  $\gamma = -0.215$ ,  $t = -1.689$ ,  $p > 0.05$ ). Moral orientation was significantly associated with opportunistic behavior in Group 1 ( $\gamma = -0.494$ ,  $t = -4.847$ ,  $p < 0.001$ ) and Group 2 ( $\gamma = -0.399$ ,  $t = -3.212$ ,  $p < 0.01$ ), but less significantly associated with incomprehension risk in the two groups (Group 1:  $\gamma = -0.046$ ,  $t = -0.529$ ,  $p > 0.05$ ; Group 2:  $\gamma = -0.160$ ,  $t = -1.474$ ,  $p > 0.05$ ). Table 5 shows the structural model with the coefficients obtained for each path (hypothesized relationship) for Group 1 and Group 2, respectively.

Table 5

Comparison of the structural model in multi-group analysis.

Attribute	Group 1	Group 2
Standardized path estimates		
IO → OB	-0.022	-0.215
IO → LC	-0.096	-0.412***
IO → IN	-0.267**	-0.234**
MO → OB	-0.494**	-0.399**
MO → LC	-0.136	-0.249*
MO → IN	-0.046	-0.160
Model fit indices		
GFI	0.947	0.923
AGFI	0.893	0.834
CFI	0.991	0.994
NFI	0.965	0.956
RMSEA	0.044	0.042

\* Denotes significance at  $\alpha=0.05$ .

\*\* Denotes significance at  $\alpha=0.01$ .

\*\*\* Denotes significance at  $\alpha=0.001$ .

## 6. Discussion

Consistent with our hypotheses, the results of the analyses suggest that institutional and moral orientations are both negatively related to the risk of loss of competences. This finding is in line with the results of previous research on this subject. Institutionally and morally oriented forms of inter-organizational interaction and cooperation in a supply chain help members to understand inter-organizational activities and processes. The finding may suggest that in Taiwan's supply chains, organizations are sufficiently institutionally and morally oriented to reduce the risk of loss of competences. Organizations in a supply chain are likely to band together if their cooperation is perceived to benefit and thus add value to their inter-organizational relationships. Therefore, partners in a cooperative inter-organizational relationship can mutually enhance each other's ability to process information rationally and reduce the risk of loss of competences. As a result, effective relational risk management during the formation of inter-organizational relationships in supply chains is likely to reinforce members' institutional and moral orientations and thus reduce the likelihood of loss of competences.

The findings of the study also indicate that moral orientation is the major determinant of opportunistic behavior, as institutional orientation was found to have no significant effect on organizations' opportunism. In supply chains, moral orientation is chiefly responsible for controlling opportunistic behavior. This finding is in line with the results of previous research on this subject. A strong moral orientation shared by supply chain members may be essential first to reduce the risk of inter-organizational opportunistic behavior, and second to minimize the risks stemming from exposure to partners' opportunistic behavior. In contrast, institutional orientation was found to have no significant effect on opportunistic behavior. Together, these findings suggest that when forming inter-organizational relationships in supply chains, it is beneficial to reinforce members' moral orientation, as this reduces the likelihood of opportunistic behavior.

The results also suggest that institutional orientation is the major determinant of incomprehension risk, as moral orientation was found to have no significant effect on the likelihood of incomprehension. In Taiwan's supply chains, the institutional orientation of supply chain partners is critical to the inter-organizational management of incomprehension risk. This finding is consistent with the results of studies conducted in numerous other organizational settings (e.g., Bello et al., 2004; DiMaggio and Powell, 1983; Wang et al., 2011). A strong institutional orientation is associated with formal or informal norms that regulate the inter-organizational behavior of supply chain members. These norms aid inter-organizational communication, comprehension, cooperation, and other aspects of relationships within supply chains. Therefore, a strong institutional orientation is essential to enable firms to control incomprehension risk. Moral orientation reflects moral attitudes and

consciousness, which have a less significant role in managing incomprehension risk. These findings suggest that a strong institutional orientation shared by supply chain members can reduce incomprehension risk and thereby increase the advantages gained from inter-organizational collaboration.

### 6.1. Theoretical implications

The theoretical contributions of the research model and findings presented in this paper are as follows. First, the results of the study provide insights into the management of inter-organizational relational risks in supply chains. Specifically, although the importance of relational governance has been widely recognized, there are several gaps in the literature concerning its role in managing relational risks, such as opportunistic behavior, loss of competences and incomprehension (Delerue and Simon, 2009; Jia and Rutherford, 2010; Nooteboom et al., 1997). In this study, an attempt was made to fill these gaps by identifying the relationships between relational governance and relational risks and investigating strategies for managing various types of relational risk. Therefore, this study contributes to theoretical understanding of the use of institutional and moral orientations to manage various relational risks, such as opportunistic behavior, loss of competences and incomprehension, at the level of the supply chain. The theoretical framework established in this study can also be used to examine other types of inter-organizational relationship.

Second, the results of the multi-group analysis directly support the findings reported in the literature on relational governance and risk management. Our findings suggest that institutional and moral orientations are significantly associated with loss of competences in larger sized firms (Group 2), but that these relationships are less significant in smaller sized firms (Group 1). In both larger and smaller sized firms, moral orientation is found to be the major factor influencing opportunistic behavior, while institutional orientation is the major determinant of incomprehension risk. These multi-group findings are noteworthy. The changes experienced by larger sized firms are likely to be more predictable, creating environments conducive to the implementation of institutional and moral approaches to relational governance. According to institutional theory, the risks of loss of competences and incomprehension in institutional environments can be managed either formally, through rules or laws, or informally, through cultural expectations. Supply chain partners choose to conform to rules and laws to prevent loss of competences and reduce the risk of incomprehension. From the moral perspective, supply chain members are subject to rules indicating right or wrong behavior. Violating these rules may injure inter-organizational collaboration and jeopardize members' access to each other's valuable resources. This may explain the emphasis placed by supply chain partners on moral orientation, which reduces the risks of loss of competences and opportunistic behavior. Therefore, the institutional and moral orientations of cooperative activities should be well defined when establishing partnerships, to ensure that relational risks (such as opportunistic behavior, loss of competences, and incomprehension) do not damage inter-organizational supply chain relationships.

The findings of the multi-group analysis may also be explained by the presence of stronger and more stable social networks in larger firms. Institutionally and morally oriented approaches are related to the cognitive dimensions of firms' social capital, and can thus be implemented more effectively in tightly bound social networks. Relational risk (such as opportunistic behavior) is fostered by the removal of barriers and the provision of rewards (Ferrell and Gresham, 1985). Rewards that signify social approval and respect and increase the status of supply chain members are important preconditions for relational governance and risk management. Supply chain partners expect to receive rewards from

others, which in turn enhance their exchange relationships. Firms should carefully assess their relational risk in institutional and moral environments, and reinforce the institutional and moral orientations of their cooperative activities to effectively manage their relational risk activities.

Institutional and moral orientations are less significant with loss of competences in smaller sized firms (Group 1). When loss of competences is in smaller sized firms, one possible explanation is that members such as larger sized firms may force its partner into an unreliable manner. When the balance of power between two parties is asymmetric, institutional and moral orientations may not be useful. In an inter-organizational relationship, power is the ability of a company to enforce compliance. In a supply chain, power refers to the control of a company over the resources that its suppliers or buyers need (Wagner and Eggert, 2016). Thus, institutional and moral orientations are not expected to reduce loss of competences in relation to uncontrolled relationships in the smaller sized firms.

We found that institutional orientation more effectively mitigated incomprehension risk and moral orientation more effectively mitigated opportunistic behavior for the supply chain members in both groups. According to Chua et al. (2012), the social or personal ties associated with structural bonds make it difficult for collaborating supply chain members to terminate their relationships. Therefore, structural bonds help the parties to resolve relational risk even if little has been done to address these risks *ex ante*.

### 6.2. Managerial and practical implications

This study provides numerous useful insights for managers and practitioners seeking to manage relational risks. First, strategies for managing relational risks (such as opportunistic behavior, loss of competences, and incomprehension) are increasingly popular among managers, as relational risk management enhances inter-organizational relationships, helping firms to achieve business goals and thereby increase their competitive advantages. The findings of this study are not only consistent with the results of prior research on the effects of institutional and moral orientations on relational risk, but reveal the specific mechanisms by which various relational risks are managed by institutional and moral orientations. The most important finding for managers and practitioners concerns the importance of developing strong institutional and moral orientations to decrease relational risks (such as opportunistic behavior, loss of competences, and incomprehension) in supply chains. Supply chain members should be bound by common regulations that maximize their competitive advantages and moral inter-organizational attitudes and behavior should be promoted among all of the partners in a supply chain. Therein, relevant parties can enhance the relational and institutional views of relational governance and manage the relational risk can then be achieved, efficiently and effectively, leading to the sustainability and productivity of supply chain relationships.

Second, the results of our multi-group analysis of the dynamic interactions between relational governance and relational risk cast light on inter-organizational governance. Specifically, managers' use of institutional and moral orientations (i.e., institutional and moral views of relational governance) enables larger sized firms to mitigate the negative influence of relational risk. When a significant power gap exists between two parties, managers should consider institutional and moral orientations may not be useful, especially in smaller sized firms. According to Szczepański and Światowicz-Szczepańska (2012), an integrative approach should be taken to inter-organizational governance by examining the dynamic interactions between relational governance and relational risk. Therefore, the findings of the current study will help



managers to develop more effective configurations of institutional and moral orientations as safeguards to efficiently and effectively manage relational risk.

## 7. Conclusions and future research

It is strategically important for firms to understand the factors that shape relational risk within the inter-organizational setting of a supply chain. In this study of supply chains in Taiwan, a new model of the factors that influence inter-organizational relational risks is developed. The findings indicate that both morally and institutionally oriented forms of relational governance encourage supply chain members to control relational risks such as opportunism, loss of competences, and incomprehension. The findings also offer practical insights into strategies for enhancing institutional and moral approaches to relational governance to mitigate inter-organizational relational risk and thereby maximize the competitive advantages of the whole supply chain.

Despite these contributions, the study exhibits methodological limitations typical of most empirical surveys. The data for the study consisted of responses from single respondents in an organization, which may have led to response bias. This limitation should be taken into account when interpreting the results. The use of single respondents may also generate measurement inaccuracy (Siemsen et al., 2010). In addition, although non-response bias was found not to be a serious concern in this study, future researchers should aim to reach out to non-respondents and collect data on at least some of their characteristics to enable comparison with “true” non-respondents (Wagner and Kemmerling, 2010). As the study investigated only supply chains in Taiwan, its findings cannot be generalized to all types of supply chain. To address these inherent limitations, it would be fruitful to conduct cross-industrial studies comparing various supply chain types to determine whether differences between supply chains moderate the effects of inter-organizational relationships on relational risk. Future researchers could theoretically and empirically explore the potential effects of alternative constructs on the inter-organizational relationships between institutional and moral orientations.

In this novel study of the use of relational governance by supply chain members to improve relational risk management, institutional and moral approaches to relational governance are shown to affect inter-organizational relational risk, such as opportunism and behavior leading to loss of competences and/or incomprehension. The theoretical framework on which the research model is based provides a starting point for future theoretical and empirical research using alternative constructs and measures to describe and model value-based relationships from the perspectives of relational and institutional governance.

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