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Examining the relationships between relationship quality, supplier dependence, supply risk, and supply chain performance: The case of Iranian manufacturing firms

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Abstract

In today turbulent environment controlling the suppliers' risk could have a key role in escalating the firms' performance. The present study extends the supply chain literature by introducing supplier dependence as a moderator of the relationship between relationship quality and supply risk reduction. Also, the supply risk reduction is also introduced as a mediator between the relationship quality and supply chain performance association. Data from a survey of 143 Iranian manufacturing firms are used to test the research hypotheses using structural equation modelling. As a result, trust and commitment as two dimensions of relationship quality are found to have a significant and positive effect on supply risk reduction. Furthermore, supply risk reduction also has a positive impact on supply chain performance. Consequently, the results indicate that while supplier dependence positively moderates the contingent relationship between trust and supply risk reduction, it has no significant impact on the link between commitment and supply risk reduction.

Keywords
Relationship Quality, Supplier Dependence, Supply Risk Reduction, Supply Chain Performance

1. Introduction

Due to the high cost of losing a customer (Athanasopoulou, 2009) and the current competitive environment, firms take steps to promote the performance of themselves as well as their supply chain members by establishing a strong relationship with their trading partners and reducing uncertainty. A review of the pertinent literature reveals relationship quality (RQ) as a key antecedent and driver of firm's competitive advantages and performance such as the organization's flexibility, speed in responding to customer needs and timely delivery (e.g. Han et al., 1993; Fynes et al., 2004; Ramaseshan et al. 2006). A good quality of existing relationships among firms and their business partners (e.g. supplier) enhances the exchange of relevant information, knowledge, and technology (Roberts et al., 2003) which in turn can lead to superior performance in innovation processes, and hence resulting in a better response to the market needs and environment changes (Pe´rez-Bustamante, 1999). In fact, an appropriate level of buyer-supplier relationship quality can result in a sustainable relationship that assuring the efficiency, effectiveness, and productivity improvement for both supplier and buyer firms (Morgan and Hunt, 1994; Liao et al., 2010). While different factors (i.e. trust, commitment, satisfaction, communication, and cooperation) are discussed in the literature as the main dimensions of the relationship quality, trust (T) and commitment (C) are the most frequently cited factors among them. Previous studies highlighted these two dimensions as the key factors in making firms' activities more efficient (Skarmeas et al., 2008) and argued that good levels of trust and commitment enable buyers and suppliers to continuously improve their efficiency (Athanasopoulou, 2009). In line with the pertinent literature, the present study considers trust and commitment as the factors reflecting the level of relationship quality.

While the importance of the "relationship quality" was highlighted in the earlier studies in the supply chain area (i.e. Fynes et al., 2004), the review of the literature shows that, to date, only one study has empirically investigated the potential impact of the relationship quality on firms' supply chain performance (SCP). Thus, this research aims to revisit the association between the supply chain performance and relationship quality in B2B environment by considering new perspectives which can shed more light on this research subject. Since the relationship based on trust and commitment among supply chain members can mitigate the supply disruption risks (Wuttke et al., 2013) and consequently improve the supply chain outcomes (Chen et al., 2013), we argue that the supply risk reduction (SRR) mediates the link between relationship quality and supply chain performance. Furthermore, supplier dependence (SD), as the amount of alternative resources availability in supplier, is argued to be a key factor in supply risk (Hallikas et

al., 2005). In this scenario increasing the level of supplier dependence decrease an opportunistic behavior risk which in turn can result in diminishing risks associated with supply side (Speckman & Davis, 2004). Thus, by employing the contingency perspective we argue that supplier dependence moderates the relationship between relationship quality and supply risk reduction. Built on these premises, this work is set to apply a new perspective in the examination of the relationship between relationship quality and supply chain performance. The new approach, which distinguishes this study from others, is illustrated in following aspects. First, no study, to date, has involved the role of supply risk in the relationship between relationship quality and supply chain performance empirically. Also, the moderating role of supplier dependence on the relationship between relationship quality dimensions and supply risk has not been extensively studied yet. Moreover, the role of supply risk reduction on supply chain performance is noticeable (Chen et al., 2013). Therefore this study contributes to extending the limited literature on the relationships between relationship quality, supplier dependence, supply risk, and supply chain performance .
The remainder of the paper is structured as follows: Section 2 sets the theoretical background, and then the paper develops the hypotheses. Section 3 explains the research method and data analysis, and findings are derived in Section 4. Finally, we conclude with a discussion of key findings and directions for further research in Section 5.

2. Theoretical background and research hypotheses

The ***relationship quality*** presents the appropriateness of the relationship to meet the customers' needs (Roberts et al., 2003). Morgan and Hunt (1994) have suggested trust and commitment as key factors to evaluate successful relationship and discussed that appropriate levels of these factors can result in good performance, effectiveness, and productivity, and consequently leads the company to make a relationship based on cooperation and success. Walter et al. (2003) highlighted customer satisfaction, trust, and commitment as the basis of relationship quality in B2B relationships. Also, Van Bruggen et al. (2005) have known relationship quality as a multi- dimensional variable and investigated different dimensions including customer satisfaction, customer trust, customer commitment, and relationship conflicts in measuring this factor. Rauyruen & Miller (2007) have enumerated making a strong relationship with customers and converting them to loyal customers as the ultimate goal of relationship quality. In 1987 the first study in the field of relationship quality was conducted by Dwyer and Oh, and then the basis of this concept established by Crosby et al. (1990). Since 1995, many researchers began to examine concepts of relationship quality (Athanasopoulou, 2009) in which many factors and concepts are employed to assess relationship quality (Skarmeas et al., 2008; Athanasopoulou, 2009). For instance, some scholars (i.e. Morgan and Hunt, 1994; Bowen and Shoemaker, 1998; Hewett et al., 2002; Friman et al., 2002; Farrelly and Quester, 2005; and Huntley, 2006) considered trust and commitment as the main dimensions of relationship quality. Furthermore some other researchers such as Smith (1998،) ؛Baker et al. (1999)؛ Roberts et al. (2003)؛ Van Bruggen et al. (2005)؛ Ulaga and Eggert (2006)؛ Leonidou et al. (2006)؛ Rauyruen & Miller (2007)؛ and Skarmeas et al. (2008) studied trust, commitment and satisfaction as the relationship quality main dimensions. In addition, factors including opportunism, customer orientation and ethical profile, perception of cooperative norms with reseller by Baker et al. (1999), affective conflict by Roberts et al. (2003), relationship conflicts by Van Bruggen et al. (2005), adaptation, communication, cooperation and understanding by Leonidou et al. (2006), and perceived service quality by Rauyruen & Miller (2007) are also suggested as dimensions for the relationship quality. Similarly, factors such as conflict, cooperation, opportunism, and power have been also suggested to operationalize the relationship quality concept in limited number of studies (e.g. Dwyer and Oh, 1987; Kumar et al., 1995; Naude and Buttle, 2000). In general, the review of the pertinent literature shows trust and commitment as the most frequently cited dimensions of buyer-supplier relationship quality.
Trust has been used in wide range of studies to evaluate the relationship quality and is mainly considered as the company's willingness to rely on its business partners (Skarmeas et al., 2008). This dimension is derived from the relationship marketing literature that represents believes and attitudes, and expects honest behavior in the business partner. Three main aspects are discussed in the literature to shed more light on the trust definition: 1) believing that business partner shows benevolence in its activities. 2) Honesty and making assurance for the company by relying on the business partner. 3) Believing that a business partner has the competence to act in the interests of the parties' relationship (Walter et al., 2003). Roberts et al. (2003) have introduced trust as the level of assurance to the business partner that leads to efficiency and effectiveness improvement, and risk reduction simultaneously. Also, Van Bruggen et al. (2005) define trust as the perceived reliability and benevolence in the business partner. Similarly, Rauyruen & Mille (2007) suggest trust as a key antecedent to create the sense of safety and loyalty in the relationship for supplier and customer respectively. Eventually, trust can be defined as the level of each parties' honesty and reliability in fulfilling their obligations without being opportunist.
Commitment concept derives from the relationship marketing literature is focused on the establishing and maintaining a long-term and beneficial relationship. Walter et al. (2003) considered emotional commitment, dedication, and

instrumental commitment as the three dimensions of commitment. Bruggen et al. (2005) argue commitment as the tendency of companies to develop and maintain a stable relationship. In the definition of commitment in the buyer-supplier relationship, the buyer tries to preserve its relationship with the supplier and is reluctant to break the connection with the supplier, even if there are other competing suppliers providing better services (Skarmeas et al., 2008). In fact, commitment is the firms' motivation to stay in the relationship with their partners (Rauyruen & Miller, 2007). In other words, commitment is the desire to maintain and resistance of relationship (Liao et al., 2010). Therefore, commitment can be considered as the firms' tendency to be in relationship with their partners. It is discussed that commitment is a key factor in the successful relationship and without trust, it leads firms to be vulnerable (Morgan and Hunt, 1994; Liao et al., 2010). Having a relationship based on trust and commitment could positively affect companies' performance related to their supply chain (Han et al., 1993; Handfield and Bechte, 2002).
Supply risk is one of main types of risk associated with the supply chain activities. A review of the literature shows a limited number of definitions in the field of supply risk. Kraljic (1983) characterized supply risk by supply deficiency, technology acceleration, alternative materials, entry barriers, logistics cost, and complexity or oligopoly conditions. Another view in the literature refers supply risk to all situations which prevent the entry of a new product or disrupt production (Zsidisin, 2003). Wagner and Bode (2008) consider supply chain risk in different categories derived from the risk sources and define supply risk as a risk transferring from upstream members in the supply chain which comes from sources including purchasing, suppliers, supplier relations, and supply networks. Based on Wuttke et al. (2013), supply risk is a confronted risk by buyers stemming from the supplier defaults on his supply obligations. Following the literature we define supply risk is a risk perceived by buyer and associated with the possibility of any default from supplier to fulfill its obligations.
In power and dependency theory, resources availability specifies the level of dependency in supply chain parties (Ramsay, 1996; Speckman & Davis, 2004; Gao et al., 2005). In many studies power and dependency are considered as mutual factors from both the buyer's and supplier's points of view (Caniëls & Gelderman, 2005). In this regard, previous studies assess the level of dependency by buyer's and supplier's dependence (Kim, 2000; Hallikas et al., 2005; Caniëls & Gelderman, 2005). In fact, ***supplier dependence*** can be considered as the level of supplier difficulty to find alternative customers. In this paper, since we focus on delivered risk by the supply side, we treat supplier dependence as the powerful factor in the relation between relationship quality dimensions and supply risk reduction. The summery of key studies in the literature is presented in Table 1. Also, Figure 1 presents the research conceptual framework.

2.1. Relationship Quality and Supply Risk Reduction

Buyer-supplier relationship quality can be taken into account as an important factor in supply chain risk by considering the role of close relationship between buyer and supplier, and efficient relationship based on trust (Ritchie and Brindley, 2007). Trust is one of the main drivers to prevent opportunism among supply chain partners (Morgan and Hunt, 1994; Spekman and Davis, 2004; Faisal et al., 2006) which in turn enables companies to diminish the potential risks associated with their supply chain activities (Spekman and Davis, 2004; Wagner and Bode, 2008; Wuttke et al., 2013). Although a supply risk can occur since the relationship between buyer and supplier is started, however it can be controlled and decreased when level of trust between partners increases (Zsidisin, 2003). Furthermore a good level of trust between buyers and suppliers can also enhance information sharing and problem-solving capability which consequently can have a positive impact on adaptability with changes, identifying appropriate solutions for organizational problems, monitoring costs and more income (Fynes et al., 2010). Relationship without commitment and trust lead companies to be vulnerable. In contrast, a relationship characterized by trust and commitment holds the network together and leads firms to have better joint decision making. In addition the role of commitment, degree of comfort, and willingness to exchange information as the important factors in supply chain risk should not be neglected. In fact, commitment should be considered as a part of the partner assessment process (Spekman and Davis, 2004). Long-term relationship with supplier reduces stress and risk and increases reliability of supply (Van Bruggen et al., 2005). This discussion suggests the following hypotheses:

H1a: Trust has a positive effect on reducing supply risk.
H1b: Commitment has a positive effect on reducing supply risk.

2.2. Moderating effect of supplier dependence

Gao et al. (2005) defined dependency as the number of better alternatives available in the market (Gao et al., 2005). In this regards, fewer options in supply chain parties lead them to the greater levels of dependency (Speckman & Davis, 2004). In the relationship between two firms, the firm with less dependency feel power (Ramsay, 1996). Indeed,

the power is the level of each party's resources attractiveness. In other words, power can be seen as the amount of alternative resources availability (Ramsay, 1996). While power and dependency are considered as important factors to understand buyer-supplier relationship, they have been neglected in empirical researches especially from purchasing portfolio approach. Purchasing portfolio can be used in analyzing the buyer-supplier relationship (Olsen & Ellram, 1997). Based on Kraljic matrix containing four quadrants –strategic, bottleneck, leverage, and non-critical quadrant- the level of profit impact and supply risk is different in each quadrant. In the leverage segment supplier and products are interchangeable and the level of supply risk is low. Also, in this quadrant buyer dominates supplier. In this situation the buyer have enough power to negotiate with available suppliers (Caniëls & Gelderman, 2005). In contrast, when supplier dependence is low, it will have many choices among buying firms and causes to increase supply risk for buyers (Hallikas et al., 2005). In fact, organization's relative power position and dependency are the major factors in risk analysis (Hallikas et al., 2005). When levels of suppliers' dependency increase, suppliers endeavor to improve their perceived image by the buyer and to consequently serve the buyer in the best possible way (Gao et al., 2005). So, as a result, it is anticipated that supply risk in buyer firm decreases. Moreover, opportunism behavior, which comes from the degree of interdependence among partners and their tendency of self-interest actions causes the lack of honesty in a relationship. So, each party's obligations cannot be done completely. Furthermore, when a supplier depends on a buyer firm, it tries to satisfy all of the buyer's product characteristics requirements (Gao et al., 2005) and fulfill its commitment to the buyer; resulting in supply risk reduction. This leads to the following hypothesis:

H2a: The positive impact of trust on supply risk reduction is increasingly manifested as supplier dependence level increases.
H2b: The positive impact of commitment on supply risk reduction is increasingly manifested as supplier dependence level increases.

2.3. Supply Risk Reduction and Supply Chain Performance

Supply chain operational risk is argued to have three aspects namely as supply risk, demand risk, and process risk (Chen et al., 2013), in which supply risk is argued to be one the most important one as it represents the risk associated with upstream supply chain activities. Supply risk can result not only in firm's inability to meet the customers' needs, but also may be the main reason of reducing income and profitability (Zsidisin, 2003). Supply risk also can have detrimental influence on outbound logistics as a part of supply chain performance (Chen et al., 2013). On the other hand, controlling and managing supply risk can enhance organization's outcomes, reduce cost, and improve utilization of existing sources. Supply risk reduction can be thus considered as an important factor in supply chain performance improvement. Therefore, hypothesis 3 can be formulated as:

H3: reducing supply risk has a positive effect on supply chain performance.

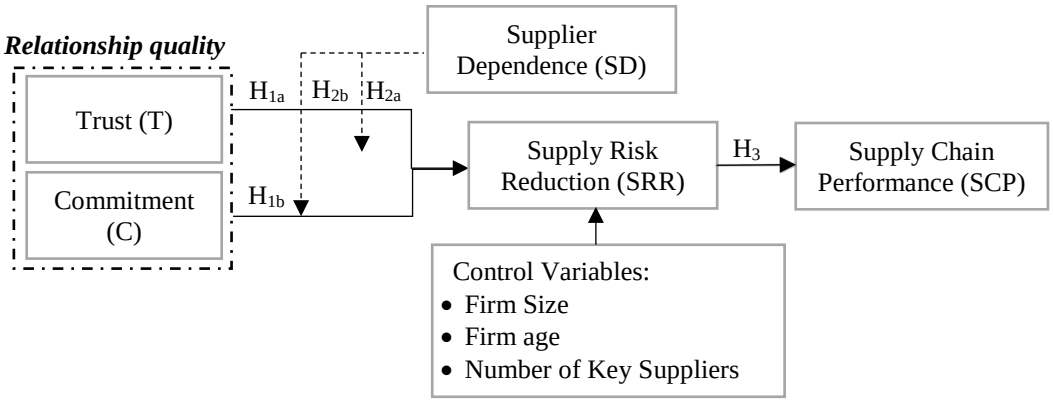

Fig. **1**. Conceptual framework.

Table1. Summary of previous researches

Author, Year	**Research Methodology**	**Research Area**	**Findings**
Han et al., 1993	Survey, sample of 123 buyers and 123 suppliers	Examining advantages and problems resulted from long term relationship between buyer and supplier and the role of factors that lead companies to use fewer suppliers.	Providing empirical support for the relationship between long term relationship of and using fewer supplier, the role of investigated factor on improving performance, reducing purchasing costs, and increasing technical cooperation by considering the role of mutual trust and good relationship between them.
Morgan and Hunt, 1994	First: nine interview and second: sample of 204 firms	Conceptualizing relationship marketing, investigating the role of commitment and trust in relationship marketing and their mediating role,	The key role of trust and commitment in a successful business relationships
Ramsay, 1996	Theoretical – conceptual	Providing measurement methods for potential and actual power in market, organizational, divisional, and individual product level	Analyzing potential and actual power help to identify companies' behavior
Handfield and Bechte, 2002	Survey, sample of 97 manufacturing firms	Examination the role of suppliers' investment in site-specific and human assets, and applying contracts by buyers to control levels of dependence in building relationships based on trust.	Relationship based on trust can improve supplier responsiveness
Zsidisin, 2003	Nine case studies	Investigation of effective factors on supply risk, it's measurement	purchasing organizations assessment in supply risk and their actions in response to it
Spekman and Davis, 2004	Theoretical – conceptual	Investigation of six areas of supply chain-related risk and developing a typology for risk classification	Providing an implication for supply chain managers to manage their supply chain parties
Caniëls & Gelderman, 2005	Survey, sample of 1153 firms' purchasing manager	Investigating buyer- supplier relationship based on power and mutual dependency and Kraljic's purchasing portfolio approach	Positive relationship between power and dependency and Kraljic matrix strategies
Hallikas et al. 2005	Survey, sample of 42 supplier firms	Developing network risks and risk-management measures by means of factor analysis, and a supplier classification by means of cluster analysis	Highest level of exploitation of collaborative risk management and learning among the most strategic supplier relationships.
Faisal et al. 2006	Interpretive Structural Modeling	Examination of the dynamics between various enablers in order to effective supply chain risk mitigation	Identifying two groups of enablers with high driving power/ dependence requiring maximum attention and strategic importance/ are the resultant actions.
Liao et al., 2010	Survey, sample of 251 buyer and distributor firms	Developing buyer- supplier relationship quality matrix to identify changes in the use of selected control mechanisms	The significant roles of contract, the limited roles of coercive power, and changing roles of non-coercive power and relational norms in four distinct contexts of RQ.
Wuttke et al., 2013	Theoretical – conceptual, eight case studies	Developing financial supply chain management framework	Buyer- supplier relationship and dependency affect selecting FSCM practices, financial and supply risk
Chen et al., 2013	Survey, sample of 203 manufacturing firms	examining supply chain collaboration as a risk mitigation strategy	Positive effect of each area of collaboration on its respective supply chain risk mitigation, direct effect of the mitigation of process risk and demand risk on supply chain performance

3. Method

3.1. Sample and data collection

In this research, data were collected from Iranian manufacturing firms to test the research hypotheses by conducting an online questionnaire survey. The specific item indicators and questions for each survey measure are adopted from the pertinent literature. Professional translators translate the questionnaire from English into Farsi and again into English to reduce concern regarding the face validity of measures. Data collection takes place in 2016. The vice presidents and senior managers of 700 firms received our questionnaire. In total, we received 143 usable responses representing a response rate of 20.4 percent. The responding companies belong to various manufacturing sectors, including medical equipment industry, information technology, wood, textile and consumer goods, and their sizes ranged from 4 to 42,592 employees.

3.2. Measures

In this section, the measures for our research constructs are explained. The eight-item scales from the study of Skarmeas et al. (2008) is adapted to measure buyer-supplier relationship quality (trust and commitment). Following the study of Skarmeas et al. (2008), a seven-point Likert-type measurement scales was employed ranging from "strongly disagree(1)" to "strongly agree (7)" to assess the relationship quality dimensions. Supplier dependence was measured using three items developed and refined by Kumar et al. (1995) based on a seven-point Likert scales ranging from "strongly disagree" to "strongly agree". Six items were used to measure the supply risk reduction from Chen et al. (2013). A seven-point scales was also utilized to measure this variable, with 1 indicating strongly disagree and 7 indicating strongly agree. For the measures of supply chain performance, we adapts 10 item scales from the study of Lee et al. (2007), in which a seven-point Likert scoring format from strongly disagree (1) to strongly agree (7) was used. Moreover, "firm size", firm age, and number of key suppliers are considered to be our control variables in the research model. It should be noted that, previous studies (e.g. Han et al., 1993; Ramsay, 1996) suggested that a number of key suppliers can affect the byers' power and perceived supply risk. As argued by Ramsay (1996), a number of key suppliers highlights the ability of buyer to replace its supplier with other alternative options (Ramsay, 1996). The list of the research's employed scales is provided in Table 2.

4. Analysis

4.1. Reliability, validity, and descriptive statistics

We used CFA method to purify the measurements and validity, and reliability of the measurement scales by employing LISREL 8.8. As a result of CFA, we extracted items with a loading below 0.5. The final model after removing three items (C2= 0.34, SCP6= 0.32, and SCP10= 0.17), suggests a good fit, RMSEA= 0.078, CFI = 0.95, IFI = 0.95, with$X^2 = 459.95$; df = 242 (the ratio of X^2 to degree of freedom is satisfactory, equal to 1.9). Also, Cronbach's alpha, the composite reliability (CR) and average variances (AVE) for each research construct are higher than the cut-off points of 0.6, 0.7, and 0.5 respectively (Hair et al., 2010). Moreover, all item loadings are greater than 0.5 and significant at the 0.05 representing convergent validity. The summary of measurement analysis is presented in Table2, which contains items, loadings, composite reliabilities (CRs), average variances extracted (AVE), and Cronbach's alpha.

Table 2. Summary of statistical measurement analysis.

Latent variables(α)	Items	Items	Loading	CR	AVE
Trust (0.83)	Supplier's honesty about problems that might arise (i.e., shipment delay).	T1	0.57	0.84	0.56
	Feeling that the supplier has been on our side.	T2	0.79		
	Supplier's not making false claims.	T3	0.77		
	Supplier's reliability of promises.	T4	0.85		
Commitment (0.81)	Supplier being a very important ally of our distributorship.	C1	0.57	0.84	0.64
	Lacking a strong business link with the supplier (R)	C2	-		
	Existence of a high sense of unity exists between this supplier and us.	C3	0.88		

Table 2. Summary of statistical measurement analysis.

Latent variables(α)	Items	Items	Loading	CR	AVE
	Development of a close business relationship with this supplier	C4	0.89		
Supplier dependence (0.80)	In our trade area, there are other firms that could be a potential competitor for us.	SD1	0.72	0.82	0.61
	In our trade area the supplier would incur minimal costs in replacing our firm with another firm.	SD2	0.95		
	It would be difficult for the supplier to replace the sales and profits from trading with our firm.	SD3	0.65		
Supply risk reduction (0.92)	Our suppliers meet our quality specification requirement on a consistent basis.	SRR1	0.73	0.93	0.70
	Our suppliers meet our required delivery lead times on a consistent basis.	SRR2	0.86		
	Our suppliers meet our volume requirement on a consistent basis.	SRR3	0.89		
	Our suppliers consistently meet our overall requirement.	SRR4	0.89		
	Our suppliers always deliver our orders as promised.	SRR5	0.84		
	Our suppliers have the capacity to meet our requirement.	SRR6	0.78		
Supply chain performance (0.86)	Our supply chain system reduces inbound costs.	SCP1	0.67	0.89	0.51
	Our supply chain system reduces outbound costs.	SCP2	0.59		
	Our supply chain system reduces warehousing costs.	SCP3	0.87		
	Our supply chain system reduces inventory-holding cost.	SCP4	0.87		
	Our supply chain system increases RONA (net income/ net assets).	SCP5	0.62		
	Our supply chain system increases our order fill rate.	SCP6	-		
	Our supply chain system increases our inventory turns.	SCP7	0.52		
	Our supply chain system reduces our safety stocks.	SCP8	0.73		
	Our supply chain system reduces our inventory obsolesces.	SCP9	0.76		
	Our supply chain system reduces our product warranty claims.	SCP10	-		

*Item loadings after deleting values less than 0.5

To test the research hypotheses we used a partial least square approach using SmartPLS (v.3.2.6). R-square were used to measure the explained variance. The cut-off point of R^2 small= 0.02, R^2 medium= 0.13, and R^2 large= 0.26 considered for R-square analysis (Cohen, 1992).Results are presented at Table 3.

Table 3. The result of inner-model analysis.

Latent variables	R squared	Adj. R^2	Effect size (f^2)
Trust			0.201
Commitment			0.067
Supplier Dependence			0.074
Supply Risk Reduction	0.557	0.530	0.261
Supply Chain Performance	0.207	0.201	

4.2. Results

As mentioned earlier, the study tests the hypothesized relationships using partial least square approach. The model was employed to verify the relationships between buyer-supplier relationship quality (RQ), supply risk reduction (SRR), and supply chain performance (SCP). The summary of the findings are presented in Table 4. All hypotheses were supported except H2b. Moreover, control variables including firm size, firm age and number of key suppliers do not result in significant association with supply risk reduction and supply chain performance. As can be seen in Table 4, the path coefficient for the T-SRR relationship, 0.449, is positive and significant. Thus, hypothesis H1a, which claims a positive association between trust (T) and supply risk reduction, is supported. Our finding is consistent with

previous studies (e.g Zsidisin (2003); Spekman and Davis (2004); Ritchie and Brindley (2007); Wagner and Bode (2008); and Wuttke et al. (2013). This reveals that the level of supplier's honesty about problems, reliability of promises, and avoidance of false claims can positively lead buyer firms to reduce their supply risk. Furthermore, data analysis shows the path coefficient between commitment (C) and supply risk reduction is also positive and significant (β=0.261, $p < 0.05$), supporting hypothesis H1b. This result is similar with Morgan and Hunt (1994) statements and depicts the prominent role of high sense of unity between buyer and supplier, existence of strong business link with supplier, and supplier commitment toward its obligations on decreasing the level of supply risk imposed to buyer. In other words, the level of supply risk perceived by the buyer which associated by the risk of supplier's inability to meet the buyer's quality specification requirement, required delivery lead times, etc., depends on the level of buyer trust to supplier honesty as well as supplier's commitment toward its promises. After considering the moderating effect of supplier dependence, the results show that the coefficient estimate for T×SD is positive and significant (β=0.209, $p < 0.05$ respectively). In other words, the interaction between trust and supplier dependence positively impacts on supply risk reduction, which supports H2b. On the other hand, the cross-product between commitment and supplier dependence is found to be not significantly associated with supply risk reduction ($\beta = -0.069$, $p > 0.05$); thus H2b is not supported. This findings suggest that while supplier dependence as the supplier ability to replace its customer with minimal costs strengthens the positive impact of trust on supply risk reduction, it cannot significantly strengthen the association between commitment and supply risk reduction.
In addition, statistical analysis asserts that, supply risk reduction has a positive and significant impact on supply chain performance (β=0.455, $p < 0.05$), supporting H3. This result is in line with the proposition of Chen et al. (2013) and indicates that the supply risk reduction can enhance supply chain performance.

Table 4. Summary statistics of the measurement analysis.

Hypothesis	***β***	**T**	**Result**
H1a	0.449	5.344	Supported
H1b	0.261	2.959	Supported
H2a	0.209	1.993	Supported
H2b	-0.069	0.606	Not supported
H3	0.455	6.238	Supported

P<0.05

5. Conclusion

The key objective of this study was to investigate the contingency relationships between relationship quality, supply risk, supplier dependence, and supply chain performance. Most of the studies have considered trust and commitment as dimensions of relationship quality (Skarmeas et al., 2008; Athanasopoulou, 2009). Thus, this study considered these dimensions to measure quality of relationship between buyer and supplier. This paper investigates the mediating role of supply risk reduction between relationship quality and supply chain performance and also moderating impact of supplier dependence on association between relationship quality and supply risk reduction. For this purpose, the effect of relationship quality dimensions on supply risk reduction was analyzed. Then, the interaction effect of these dimensions and supplier dependence on supply risk reduction was investigated. Finally, the role of reducing the supply risk on supply chain performance was studied. Furthermore, the role of firm size, firm age and number of key suppliers considered as the control variables to reduce confounding effect on supply risk reduction. The result of hypothesis H1a is consistent with Ritchie and Brindley (2007); Spekman and Davis (2004); Wagner and Bode (2008) and Wuttke et al. (2013) studies, and indicates the positive impact of trust on reducing the supply risk. There is also a direct connection between commitments and supply risk reduction that is consistent with the results of previous researches (e.g. Morgan and Hunt, 1994; Liao et al., 2010). Additionally, the results reveal a positive moderating effect of supplier dependence on the relation between trust and supply risk reduction. On the contrary, the interaction effect of supplier dependence and commitment on supply risk reduction was not supported by our statistical analysis. On the other hand, the study confirmed Zsidisin (2003) suggestion regarding the relationship between supply risk reduction and supply chain performance. Ultimately, the control variables have had insignificant influence on the supply risk reduction.
Our study makes important contributions to the supply chain management literature in a number of ways. First, the research outcomes assert how firms' inter-relationships led them to be less vulnerable by reducing risks associated with the supply side. Firms need to understand the level of their suppliers' opportunistic behavior, trust, and commitment to identify their future potential supply risk and manage it. The findings also indicate that building inter-

firm relationship with good levels of trust and commitment enables firms to reduce supply risk. This finding provides insightful implication for buyer firms to take more attention to their interrelationship with the supplier.
Second, our results confirm the contingency association between relationship quality and supply risk reduction which is positively moderated by supplier dependency. Investigating firms' power and dependency and analyzing the quality of their relationship with their suppliers help them to anticipate the risk of suppliers default in their obligations. Finally, as mentioned earlier, reducing supply risk can enhance supply chain performance in terms of outbound costs, warehouse costs, inventory-holding cost, safety stocks, and inventory obsolesces reduction. Therefore, managers by improving the level of trust and commitment in firms' relationship with supplier can control and decrease the risk associated with a supply side which in turn would enables them to achieve superior firms' supply chain related outcomes and performance.

5.1. Research limitations

This study has a number of limitations which present future research opportunities. Since data were collected from Iranian manufacturing firms, the generalisability of findings can be seen as one of the main limitations of our study. In order to be able to generalize it to the global level, further validation is needed. Also, as study was conducted at the time of economic instability in Iran, the research findings may not accurately envisage the picture of relationships between research variables. Moreover, the study does not consider the interaction of Iranian firms with international suppliers which can be an important issue in studying the buyer-supplier relationship context. Finally, since we collected data using a single informant approach, a common method bias might be a concern in this research.

5.2. Future prospects

The study has hopefully opened the door to the further research questions for scholars. Based on the research findings and limitation our suggestions for future research are as follows:

- Extending the study to other developing and develop regions
- Collecting data from different sources (e.g. suppliers) in order reduce concern regarding the common method bias;
- Reexamining the relationships presented in our research model by considering both local and international suppliers network;
- And, investigating the contingent roles of relationship quality and supplier power and dependency on the relationship between inter-firm collaboration and capability development of firms using dynamic capability perspective.

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