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Relationship Learning and International Customer Involvement in New Product Design : The Moderating Roles of Customer Dependence and Cultural Distance

ABSTRACT

This study focuses on relationship learning and its implications for international customer involvement during the design stage of the new product development (NPD) process. It utilizes relationship learning capability perspective to investigate the linkages between relationship learning, international customer involvement, and suppliers' performance. We also investigate whether customer dependence and cultural distance moderate the association between (a) relationship learning and international customer involvement and (b) international customer involvement and supplier performance. Using 264 respondents from Chinese manufacturing firms that have international customers, this study identifies that international customer involvement partially mediates the link between relationship learning and supplier performance. Furthermore, customer dependence strengthens, and cultural distance weakens, the effect of relationship learning on international customer involvement. However, only cultural distance negatively moderates the relationship between international customer involvement and supplier performance.

Keywords: international customer involvement, new product development, relationship learning, supplier performance, customer dependence, cultural distance.

1. INTRODUCTION

Current business research and practice increasingly recognize the crucial role of involving customers in designing and developing superior products (Bendig, Enke, Thieme, & Brettel, 2018; Cui & Wu, 2016; Griffith & Lee, 2016). Customer involvement includes supplier-initiated activities with the purpose of acquiring customer information, feedback, and knowledge to (co-)develop new products or improve existing ones (Menguc, Auh, & Yannopoulos, 2014). At the international level, in addition to the significant cost of directly conducting market research in a foreign market, cultural and linguistic differences limit suppliers' ability to understand accurately export markets' preferences (Choi & Contractor, 2016; Jean, Sinkovics, & Hiebaum, 2014). For this reason, and to remain competitive, many firms increasingly involve their international customers in new product development (NPD) processes (Zhang, Zhong, & Makino, 2015). As an example, Hilti Corporation, a global manufacturer of construction tools headquartered in Schaan, Liechtenstein, works closely with its international and local customers to develop new products that respond better to diverse needs of global markets (Cui & Wu, 2017).

Despite the great scholarly attention that has been devoted to customer involvement, a number of important research gaps remain. First, design is a crucial stage in the NPD process which has direct implications for firms' new product success (Moultrie, Clarkson & Probert, 2007). By involving customers in the design process, firms can offer tailored solutions that meet customers' unique needs and preempt product failures (Luchs, Swan & Creusen, 2016). To date, very few studies have dealt exclusively with customer involvement at this stage (Menguc et al., 2014), especially at the international level. Such a practice would help suppliers better identify new product ideas, which creates additional value for those international customers (Griffith & Lee, 2016).

Second, existing studies on drivers/antecedents of customer involvement in the NPD processes are predominantly limited to scrutinizing the role of organizational related factors such as technical innovation capability, process and output control, and strategic flexibility and/or the role of market related factors such as competitor orientation, market ambiguity, and customer need heterogeneity (e.g., Cui & Wu, 2016; Svendsen, Haugland, Grønhaug, & Hammervoll, 2011; Zhang et al., 2015). Only scant attention has been paid to the relational capabilities needed to facilitate customer involvement (e.g., Mahr, Lievens, & Blazevic, 2014). Nonetheless, recent contributions to supply chain and business marketing literature have emphasized the importance of relational capabilities such as relationship learning as mechanisms to enhance the effectiveness of governing customer-supplier exchanges (Chen, Lin, & Chang, 2009; Cheung, Myers, & Mentzer, 2011; Kohtamäki & Partanen, 2016).

For instance, Lai et al. (2009) and Ling-Yee (2006) demonstrate that relationship learning enhances interfirm relationship performance. Similarly, Huikkola et al. (2013) find a positive association between joint (i.e. relationship) learning and R&D services provided, and Kohtamäki & Partanen (2016) found that relationship learning is critically important in value co-creation from supplier's offerings. In all these studies, relationship learning involves the frequent exchange of knowledge, which is then jointly interpreted and integrated in a shared relationship domain-specific memory (Selnes and Sallis 2003). While these studies point to the important implications that relationship learning holds for interfirm exchanges, to our best knowledge, no empirical study has yet examined the association between relationship learning and international customer involvement in the NPD processes. We argue that such learning mechanisms can enhance a firm's understanding of international customer's knowledgeability and attitudes towards collaboration, and subsequently impact the firm's willingness to engage a particular customer in new product design.

Third, little consensus exists regarding the performance implications of customer involvement for suppliers. Whereas some studies have found that customer involvement has a positive impact on supplier's innovation performance (Chatterji & Fabrizio, 2014), interfirm relationship profitability (Svendsen et al., 2011), and internationalization performance (Zhang et al., 2015), others did not find any effect on sales performance (Carbonell, Rodríguez-Escudero, & Pujari, 2009), or even found negative impact on supplier performance (Anning-Dorson, 2018), suuplier innovative performance (Knudsen, 2007), and human capital (Skaggs & Youndt, 2004). These inconsistencies are typically attributed to the lack of attention to factors that condition the consequences of customer involvement (Chatterji & Fabrizio, 2014).

These highlighted gaps demonstate that our existing knowledge is insufficient for providing theoretically sound and managerially useful recommendations regarding whether, and under what conditions, relationship learning leads to more effective international customer involvement during design stage of the NPD process and what are the performance implications of such arrangements. Given that suppliers are becoming more reliant on their international customers to help with the development of new products (Griffith & Lee, 2016; Menguc et al., 2014), we focus in our study on the role of customer dependence and cultural distance as two critical factors that could condition the effectiveness of international customer involvement.

Against this backdrop, the current study addresses the following research questions: (1) does international customer involvement during the NPD design stage mediate the link between relationship learning and supplier performance? and (2) whether and how cultural distance and customer dependency condition the effects of (a) relationship learning on international customer involvement and (b) international customer involvement on supplier performance. In doing so, we conducted our study in the context of Chinese manufacturing firms and their international customers. The geographic separation is best to capture the role of cultural distances on the matter in hand.

This study makes three important contributions. First, our study integrates the customer involvement literature with organizational learning perspective and adopts the relationship learning perspective (Albort-Morant, Leal-Millán, & Cepeda-Carrión, 2016; Cheung et al., 2011). This study, hence, answers recent scholarly calls (e.g., West, Salter, Vanhaverbeke, & Chesbrough, 2014) to link customer involvement with established perspectives. Our results indicate that relationship learning as an interfirm capability is an important facilitator of international customer involvement in NPD processes without which suppliers will not be able to make best use of their international customers.

Second, we go beyond assuming that relationship learning always facilitates international customer involvement by empirically scrutinizing the contingent effects of both customer dependence and cultural distance that condition the effectiveness of relationship learning on customer involvement. Our results indicate that suppliers can benefit more from relationship learning capabilities when they share a similar culture and when the level of customer dependence is high. These findings signify that strategic decisions regarding developing and maintaining interfirm relational capabilities should be in line with contextual factors such as cultural distance and customer dependence.

Third, our study advances the business literature on international customer involvement, specifically at the "fuzzy" front-end design stage (Menguc et al., 2014) by further examining the impact of customer dependence and cultural distance on customer involvement-supplier performance link. In doing so, we address earlier calls (e.g., Chang & Taylor, 2016) to examine the conditions under which customer involvement is beneficial to a focal supplier. Our results suggest that while customer dependence has no effect, cultural distance significantly decreases the effectiveness of international customer involvement on supplier performance. These findings are further explained in the discussion section.

2. Literature Review

2.1. Theoretical Background

Superior product design capability has become critical to companies' sales growth and performance (Luchs, Swan, & Creusen, 2016; Ulrich, 2011). Design contributes to improved product value offerings by boosting product quality and user interface experience (Menguc et al., 2014). It has been argued that customer-oriented design increases the NPD performance (Veryzer & Borja de Mozota, 2005). Involvement of international customers at the design stage becomes even more important for NPD and hence suppliers' performance considering their lack of foreign market knowledge and experience (Zhang et al., 2015). The feedback, information, and knowledge provided by international customers substantially assist suppliers to overcome such liabilities of foreignness (Smets, Langerak, & Rijsdijk, 2013). Consequently, by involving international customers, suppliers can offer tailored solutions that better meet an individual customer's unique needs, which ultimately reduces the risk of product failure (cf: La Rocca, Moscatelli, Perna, & Snehota, 2016). Despite the importance of the design stage in the NPD process, few studies have dealt exclusively with customer involvement —especially of international customers— at this stage (Menguc et al., 2014).

This study, therefor, focuses on international customer involvement at the design stage of NPD project. While the importance of customer involvement has been acknowledged in the literature, very limited attention has been given to the relational capabilities that can encourage customer involvement (see table 1). Therefore, we propose that while having access to strategic *resources* is important to gain competitive advantage, suppliers need to possess *capabilities* to utilize such resources effectively (Newbert, 2007). By that rationale and following an organizational learning perspective (Fang, Fang, Chou, Yang, & Tsai, 2011; Huikkola et al., 2013), we argue that the involvement of international customers in new product design provides opportunities for suppliers to access foreign-market knowledge, but that in order to

realize such potentials, the exchange partners should first have the relationship learning capability in place. Following Selnes and Sallis (2003, p.80), relationship learning is "*a joint activity between a supplier and a buyer in which the two parties share information, which is then jointly interpreted and integrated into a shared relationship-domain-specific memory that changes the range or likelihood of potential relationship-domain-specific behavior*".

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Earlier contributions have emphasized the importance of relationship learning as a way to decrease the risks inherent in international collaborations and as a mechanism to enhance the effectiveness of governing international customer-supplier relationships (Bendig et al., 2018; Chen et al., 2009; Jean, Kim, & Bello, 2017). Relationship learning creates collaborative advantages for channel partners (Huikkola et al., 2013) by facilitating interfirm exchange of detailed information and, hence, enhancing a supplier's ability to understand and respond to partners' needs (Cheung, Myers, & Mentzer, 2010). Possessing relationship learning capabilities yields appropriate learning mechanisms (Albort-Morant et al., 2016) that explain heterogeneity in outcomes of inter-firm relationships (Cheung et al., 2010, 2011; Selnes & Sallis, 2003). Such learning mechanisms can enhance a potential supplier's understanding regarding international customer knowledgeability and attitudes towards collaboration before involving customers in the design stage of NPD (Chen et al., 2009). With this level of understanding, relationship learning, relationship learning not only affects a supplier's willingness to involve a particular international customer, but also serves as a buffer against the risk of involving unsuitable and unqualified customers in a NPD project. This study, therefore, assesses the association between relationship learning and international customer involvement and determines whether such an association ultimately improves suppliers' performance (see Figure 1).

Drawing on capability related research in general (Narver, Slater, & MacLachlan, 2004) and relationship learning in particular (Jean et al., 2017), we also anticipate that the association between relationship learning and international customer involvement, and their impact on supplier performance, are likely to be contingent on the contextual factors such as level of cultural distance and customer dependency. Cultural distance may distort communication between a focal supplier and its customers, thereby decreasing the firm's motivation and ability to identify and utilize the customer's competencies (Elia, Messeni Petruzzelli, & Piscitello, 2019; Gu, Wang, & Wang, 2019; Johnston, Khalil, Jain, & Cheng, 2012). In contrast, customer dependency increases harmony and decreases the possibility of opportunistic behavior in an inter-firm relationship (Barnes, Leonidou, Siu, & Leonidou, 2010), which in turn has been shown to increase the motivation and commitment of channel partners both before and during cooperation (e.g., Scheer, Miao, & Garrett, 2010; Yeniyurt, Henke, & Yalcinkaya, 2014). These two factors (i.e. cultural distance and customer dependency) have constantly been the focus of business and marketing scholars on relationship learning and international customer collaboration (e.g., Hewett & Krasnikov, 2016; Jean et al., 2017; Johnston et al., 2012).

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2.2. Hypothesis Development

When firms are involved in international cooperation, they must make significant investment in human and location assets, which mostly turn into sunk costs in the case of relationship termination (Zaefarian, Forkmann, Mitręga, & Henneberg, 2017; Mitręga, Forkmann, Zaefarian, & Henneberg, 2017). An increase in the retrospective costs of relationship termination and lack of commitment escalates the likelihood that exchange partners engage in opportunistic behaviors, thereby enhancing the perceived risk of involvement in international collaborations (Gençtürk & Aulakh, 2007, Shiu, Jiang, & Zaefarian, 2014). In other words, a supplier may question the motives and/or be suspicious

about specific behaviors of the international customer and therefore be less willing to involve the international customer in product design. As both channel partners get involved in forming and sustaining the business relationship, the process of learning from that relationship begins, and with time, they begin to develop positive feelings towards their exchange partner, where they value the relationship, feel more comfortable with their exchange partner, and believe that their mutual needs are addressed (Cheung et al., 2010; Huikkola et al., 2013).

Moreover, relationship learning involves frequent exchanges of information and joint sense making activities (Selnes & Sallis, 2003), and provides opportunities for a customer to communicate their motives and clarify misunderstandings with a supplier, This can not only improve customer's experiences in their relationship with the supplier and so their satisfaction and loyalty (Kohtamäki & Partanen, 2016), but also it would earn the supplier's trust in and satisfaction with the relationship (Johnston et al., 2012). In addition, increased frequency of interaction (Jean, Sinkovics, & Kim, 2010) with the customer enhances the supplier's ability to understand the value and relatedness of the international customer's resources (cf: Menguc et al., 2014), and become more willing to involve their customers in co-creation activities. Consequently, we believe that as the level of relationship learning increases, suppliers to become more willing to involve their customers in the design processes.

The results of earlier studies on product design indicate that customer involvement in NPD processes boosts supplier performance (Anning-Dorson, 2018) through enhancing the performance of new products (e.g., Lau, Tang, & Yam, 2010). The incentive for involving customers in the design process is so that a supplier can exploit a customer's tangible and intangible resources (including product-market knowledge) that the supplier may lack internally (Menguc et al., 2014). International customer involvement enables the supplier's design team to anticipate a product's potential problems earlier and take appropriate actions in rectifying those issues (Fang, 2008). Moreover, by using customer's know-how, suppliers can

more acurately filter and choose promising ideas more efficiently, since through co-creation activities, customers can provide feedback on design ideas (Chang & Taylor, 2016). In this way, by involving international customers in the design process, the focal supplier develops a better understanding of market needs which should then result in the development of better-performing new products with an enhanced products-market fit (Carbonell et al., 2009). Thus, in line with previous studies, we believe that customer involvement in NPD processes can increase supplier performance. Taken together, we hypothesize that:

> ***Hypothesis 1:*** *International customer involvement in product design mediates the positive relationship between relationship learning and supplier performance.*

Dealing with culturally distant exchange partners is one of the key challenges in international collaborations (Hewett & Krasnikov, 2016; McGrath & O'Toole, 2014). Cultural distance refers to the degree of divergence between the cultural norms and values of the exchange partners from distinct geographical regions (Sousa & Bradley, 2006). As mentioned earlier, relationship learning increases international customer involvement by easing the exchange of knowledge and information between suppliers and customers (Chen et al., 2009). However, cultural differences can hinder if not distort the process of learning from the relationship. It is a company's unique capability to perform effectively in situations characterized by cultural diversity (Najafi-Tavani et al., 2018). By contrast, partners from culturally similar backgrounds can more readily understand each other since they often share a common point of reference (McGrath & O'Toole, 2014). The cognitive awareness of differences among two cultures enable partners to develop a better understanding of each other and their expectations. Such a cognitive awareness of cultural differences can therefore lead to motivational and behavioural aspects of cultural intelligence.

Relationship learning facilitates the exchange of information and encourages suppliers to overcome uncertainty and involve their customers in co-creation activities (Selnes & Sallis,

2003). If cultural distance is low, there is more common ground to share knowledge. Therefore, the supplier is able to more readily recognize the relatedness and value of such a customer's knowledge. This, in turn, enhances suppliers' willingness to involve customers more in co-creation activities. By contrast, a high level of cultural distance can impede the supplier's ability to understand the information exchanged through relationship learning, and thus underestimate a customer's competencies, which in turn demotivates a focal supplier from engaging their international customers in the design process.

Moreover, it has been argued that cultural distance can damage supplier-customer relationships through hindering or distorting communications (Rosenbloom & Larsen, 2003). When the level of cultural distance is high, the supplier may misinterpret the customer's communication, which can increase the level of stress and conflict in a relationship (Johnston et al., 2012). Therefore, through relationship learning, a supplier may identify customer competencies that can benefit product design, but because of their cross-cultural differences and subsequent conflicts and uncertainties, it may be reluctant to involve the customer. This is particularly the case when the cost of interpreting partners motives and behavioural intentions is high. Conversely, when suppliers and customers share similar cultural values, they can better understand their partners' behavior. Such understanding then decreases conflict and increases satisfaction and trust in the relationship (Leonidou, Samiee, Aykol, & Talias, 2014). Therefore, while relationship learning augments the supplier's awareness regarding the value of customer knowledge, a low level of cultural distance reduces the conflict and perceived risk, resulting in a greater probability of the supplier involving the customer at the design stage.

Overall, cultural distance negatively affects the initial stage of involving customers in the design process by diminishing the link between relationship learning and international customer involvement. Because of dissimilarities, a supplier may become (a) less capable of

identifying customers' competencies and (b) less willing to involve them at the design stage. We therefore suggest the following:

> ***Hypothesis 2:*** *A high level of cultural distance weakens the positive relationship between relationship learning and international customer involvement.*

Lau et al., (2010) assert that firms must involve their customers in the design process to understand their complex needs, and to improve products and overall firm-performance. We, however, suggest that such a favorable outcome (i.e. consequences of involving the customer in design process) depends on context-related factors such as cultural distance that can influence the effectiveness of involving customers mainly in two distinct ways.

First, it has been shown that cultural distance diminishes the effectiveness of the two-way communication between channel partners (e.g., Elia et al., 2019; Rosenbloom & Larsen, 2003; Schmitt & Van Biesebroeck, 2013). Channel partners with a high level of cultural distance are more exposed to communication disruptions, and hence misinterpretation of customers' information, due to heterogeneity in values, approaches, and motivations (Lew, Sinkovics, Yamin, & Khan, 2016). Moreover, the combination and coordination of resources — provided by customer involvement in NPD process— becomes more difficult for channel partners with diverse cultures as they are exposed to different psychological environments (Abdi & Aulakh, 2012). As such, while involvement of an international customer in the NPD process may provide learning opportunities in terms of design ideas and solutions needed for the creation of superior products, cultural distance limits suppliers' ability to fully realize such potentials. In contrast, a lower cultural difference, or its absence, facilitates more meaningful two-way communication between suppliers and their international customers. When cultural differences are negligible, supply partners are better able to adjust their behaviours in ways that are more precisely in line with what is culturally acceptable by the partner. Consequently, a supplier will be in better position to exchange and link its current resources to those of the

international customer, leading to enhanced supplier ability in developing new designs that meet market requirements.

Secondly, cultural distance can lead to decreased harmony (Leonidou, Katsikeas, & Hadjimarcou, 2002) and heightens misunderstandings in interfirm exchanges, which ultimately decreases the positive association between international customer involvement and supplier performance. Once involved in design processes, customers and suppliers actively participate in joint problem-solving activities, enabling a supplier to develop new products that offer important benefits to customers (Griffith & Lee, 2016). However, high cultural distance impedes joint actions, and hence limits the effectiveness of international customer involvement, by reducing partners' ability to understand each other's behaviors, generating a perception of opportunism and unfairness, and eroding trust and satisfaction in the interfirm relationship (Johnston et al., 2012; Katsikeas, Skarmeas, & Bello, 2009). In contrast, cultural closeness facilitates joint problem-solving activities between a supplier and its international customer through fostering trust, facilitating relationship building, reducing misinterpretations, and eradicating ambiguities (Hewett & Krasnikov, 2016; Johnston et al., 2012).

In sum, we posit that a high level of cultural distance reduces the benefits of international customer involvement by disrupting communication and distorting trust and harmony in interfirm exchanges. We therefore suggest:

> ***Hypothesis 3:*** *A high level of cultural distance weakens the positive relationship between international customer involvement and supplier's performance.*

Customer dependence refers to the extent to which a customer needs to retain a relationship with a specific supplier to gain access to particular resources (Fang, Palmatier, & Evans, 2008). The nature of customer dependency can be based on positive motives e.g. due to the inherent benefits associated with the core offering or operations capability of the supplier or based on negative motives e.g. switching costs (Scheer et al., 2010). Customer dependence however is

more prevalent when replacing a supplier is difficult because of either high switching costs and/or a lack of suitable alternatives. The extent of customer dependence can strengthen the association between relationship learning and international customer involvement in two ways. First, without direct customer participation in sharing their knowledge and/or showcasing their competencies and capabilities, the supplier may easily overlook such opportunities to use the customer's unique set of skills that are often tacit and complex but vital for the supplier wishing to differentiate their product designs from those of competitors. In other words, the customer may well be resourceful and knowledgeable, but the supplier may well fail to realize the full potential of such a customer to contribute to the design process.

When the level of customer dependency is high, the customer becomes more motivated to form and maintain its business relationship with the supplier (Skarmeas, Katsikeas, & Schlegelmilch, 2002), and thus becomes more interested in and committed to proactively assisting the supplier to identify and understand its competencies, for example through training and knowledge dissemination workshops. As a result, while relationship learning can enhance supplier awareness of explicit customer capabilities, without the customer's proactive role in showcasing its skills, such learning mechanisms may not be sufficient to fully comprehend customer capabilities. Conversely, if the level of customer dependency is low, the relationship becomes less important for customers and thus they may become less motivated, if not reluctant, to showcase their capabilities to the supplier. Under these circumstances, and through relationship learning, a supplier may merely recognize the customer's explicit rather than tacit competencies, in which case it reduces the supplier's willingness to involve international customers in co-creation activities.

Secondly, fostering cooperation between suppliers and international customers requires specific investments in the relationship, which increases the possibility (or at least the perception) of opportunistic behaviors (Jean et al., 2017). Therefore, while relationship

learning facilitates suppliers' recognition of the customers' competencies that are useful to product design, due to the inherent risks of international cooperation, suppliers may refuse to involve their international customers in design processes. However, when the level of customer dependency is high, the supplier may become more confident in the customer's behavior and compliance, since it knows that the customer performance will suffer considerably if the relationship is terminated (Jap & Ganesan, 2000).

Therefore, a high level of dependency assures a focal supplier that the international customer (identified through relationship learning) will not involve in opportunistic behavior, which in turn increases the possibility of engaging such a customer in design processes. In contrast, since a low level of customer dependency means that the customer can easily terminate the relationship (Barnes et al., 2010), the supplier becomes less certain of the customer's intentions. Under these circumstances, even though relationship learning can help a supplier to comprehend the potential contribution of a given customer in design processes, it may refuse to participate in co-creation activities with that customer due to uncertainty regarding the customer's commitment that stems from low levels of customer dependency. Therefore, the following is proposed:

> ***Hypothesis 4:*** *A high level of customer dependence strengthens the positive relationship between relationship learning and international customer involvement.*

We also anticipate that customer dependency conditions the association between international customer involvement and supplier performance in two different ways. First, customer dependence has been consistently conceptualized as a predictor of commitment or loyalty i.e. in the form of relational or behavioral loyalty. Repeated episodes of quality interaction between a customer and its supplier result in a positive relationship between the two parties and the unique benefits received by the customer lead to higher relationship satisfaction, and therefore high relational and behavioral loyalty (Scheer et al., 2010). As customer dependency on the

supplier increases, the opportunity cost of not contributing to co-creation activities increases (Yeniyurt et al., 2014). Consequently, in order to reduce its economic exposure, the customer becomes more willing to increase the depth and breadth of its interactions with the supplier that ultimately results in the creation of stronger orientation towards information sharing and cooperation (Kim & Henderson, 2015).

Within the context of our study, this means that at high levels of customer dependency, the customer becomes more committed to assist the supplier in developing superior designs. A customer's willingness to become more closely involved in the co-development process is mainly due to inherent benefits associated with core offerings of the supplier (positive motivations) but also to restore the power balance and hence decrease its vulnerability (Gençtürk & Aulakh, 2007). For this reason a highly dependent customer makes significant efforts to openly and frequently transfering information regarding product design architecture or the design requirement of the market with the aim to ultimately enjoy the long-term benefits (Yan & Dooley, 2014). Conversely, when the level of dependency is low, the relationship becomes less important for the international customer as it can easily switch to other suppliers (Barnes et al., 2010). Considering the non-monetary and monetary costs of participating in co-development activities (Hoyer, Chandy, Dorotic, Krafft, & Singh, 2010), the customer becomes even less committed and less willing to actively contribute to supplier NPD activities. Without customer commitment, co-creation activities with suppliers will not be fruitful and are more likely to result in suboptimal designs and lower supplier performance.

Secondly, from a supplier's perspective, a higher level of customer dependency reduces the perceived risk of customer opportunistic behavior. When involving customers in the design process, it is imperative that the focal supplier allocates critical resources to enhance the effectiveness of co-creation activities (Fang et al., 2008). Such investments are highly relationship specific, and thus incur high switching costs if the relationship is terminated (Heide

& John, 1988). When the level of customer dependency is low, the supplier may feel reluctant to further invest in co-innovation due to the possibility of customer opportunistic behavior (Gençtürk & Aulakh, 2007). The supplier's uncertainty over the customer's behavior reduces the supplier's willingness to allocate those resources needed for the success of co-creation activities, thereby decreasing the effectiveness of international customer involvement in the design stage of the NPD. The resultant lack of supplier support potentially reduces the quality of co-creation, leading to less successful designs and, eventually, lower supplier performance. However, a higher level of international customer dependency increases the supplier's willingness to dedicate more resources during the process of co-creation, given that such dependency assures the supplier that the international customer is willing to sustain the relationship and will not engage in opportunism (Gao & Shi, 2011). We, therefore, hypothesize the following:

> ***Hypothesis 5:*** *A high level of customer dependence strengthens the positive relationship between international customer involvement and supplier performance.*

3. Method

3.1. Context and Data Collection Procedures

The research examines the relationship between suppliers in medium to large (i.e., those with more than fifty employees) manufacturing firms in China and their international customers. China was chosen for a number of reasons. First, it now has the world's biggest manufacturing economy, and over the past decade has become the largest exporter in the world (Statista, 2020). Secondly, in order to maintain their competitive advantage, China is actively attempting to improve their innovation record by pursuing international NPD opportunities (Bao, Chen, & Zhou, 2012; Liu, Luo, & Shi, 2003; Zhou, Tse, & Li, 2006). They are doing this by learning

from external parties to reduce the competency gap between Chinese firms and long-standing firms from developed countries (Atuahene-Gima, 2005). Finally, Chinese firms, when interacting with others, traditionally use social relationships (e.g., *guanxi*) (Zhou, Zhang, Sheng, Xie, & Bao, 2014).

Our respondents were managers, which included CEOs, presidents, vice presidents, production managers, sales managers, and R&D managers who were directly involved in designing new products and who had direct involvement in the management of international customer relationships. We asked these respondents to select one of their leading international customers (top-five) by sales value (Zhou et al., 2014) with whom they had had a relationship for longer than twelve months (Wang, Bradford, Xu, & Weitz, 2008).

In order to test our hypotheses, a cross-sectional online survey was developed. To validate the conceptual equivalence of our survey, the questionnaire was first developed in English, and then translated by independent translators into Chinese, before being translated back into English (Poppo & Zhou, 2014). A group of five senior marketing managers were interviewed to check the content and face validity of the constructs (Poppo, Zhou, & Li, 2016). The questionnaire was given to thirty senior managers for their feedback on wording and design in order to finalize the questionnaire (Zhou et al., 2014). We then sent the survey to a random selection of 1000 managers, incentivized by a market research firm. The data was collected during autumn 2017. We received a total of 264 responses from managers across different managerial grades and diverse industries. Table 2 illustrates the summary of the respondent profiles.

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The firms had been established for an average of 14.5 years. The majority of the firms (75.1%) had 100 to 500 employees, 17.1% had more than 500 employees, whilst 8% had less

than 100 employees. Annual sales of these companies averaged ¥16.5 billion, with R&D investment an average of ¥306 million. The respondents had been with their firms for an average of 9.3 years and had been in their present position for almost five years. The average length of the relationship surveyed was five years. The statistics show that the respondents had reliable knowledge about their firms and their international customers, indicating that the relationship between suppliers and their identified customers was meaningful (Larwood, Falbe, Kriger, & Miesing, 1995; Wang et al., 2008). The respondents' knowledge about their firm's relationship with the selected customer and their level of confidence in answering the questionnaire were also assessed. We found that the respondents' knowledge level and confidence level on a scale from 1 to 7 (very low to very high) has means of 6.32 and 6.39 respectively.

3.2. Variables and Measures

Relationship learning was measured using the three sub-dimensions of information sharing, knowledge integration, and joint sense making adapted from Selnes and Sallis (2003). It refers to joint activities between the supplier and its customer, wherein the two parties share information, jointly interpret and make sense of information, and integrate acquired information into a shared relational memory that improve the range or likelihood of potential relationship-domain-specific behavior (Selnes & Sallis, 2003). *International customer involvement in the design stage* was measured using items adapted from Menguc et al. (2014). It refers to the frequency of particular activities (e.g., cross-functional design teams with customers and reviewing designs by customers) where customers participate in supplier-initiated practices, providing information, feedback, and knowledge in order to ensure that customers' requirements are met in new product designs (Menguc et al., 2014). *Supplier performance* (adapted from Katsikeas, Samiee, & Theodosiou, 2006) was measured using the

three sub-dimensions of financial performance (in terms of profitability as a percentage of sales, return on investment, and profit growth), sales performance (assessing sales volume, sales growth, and new product sales), and customer performance (in terms of customer satisfaction, customer retention, and customer referral) in comparison to their main competitor. *Customer dependence*, the need to retain a relationship between the supplier and customer, was adapted from Fang et al. (2008). It evaluates the supplier's perceived dependence of the customer on them. The *cultural distance* between supplier (China) and international customer's country of origin was measured using the Kogut and Singh (1988) model based on Hofstede's (1980) four dimensions of culture. The cultural distance was calculated based on the deviation (corrected for differences in the variances) along the four cultural dimensions of each international customer's country from China's scores. The average of these deviations was calculated as follows:

$$CD_j = \sum_{i=1}^{4} \{(D_{ij} - D_{ic})^2 / V_i\} c/4$$

Where CD_j represents the cultural distance of the *j*th country from China, D_{ij} represents the index for the *i*th dimension in *j*th country, and D_{ic} is the equivalent dimension for China.

Control variables: Heterogeneity was controlled at four different levels. First, *relationship age* and *mutual relationship-specific investment (RSI)* were considered as two exchange characteristics. Stable inter-firm relationships that come with age, thrive learning initiatives, and provide an environment for better and more effective engagement with long-standing suppliers (Jean, Kim, & Sinkovics, 2012; Ryu, Park, & Min, 2007). We measured relationship age as the number of years the two companies had been doing business with each other. The level of mutual RSI, which captures the level of investments made by both customer and the supplier dedicated to the relationship, may affect their performance (Palmatier, Dant, & Grewal, 2007).

Second, we controlled for six firm-level variables namely *supplier size*, *supplier age, overseas market age, R&D expenditure, number of New Products Developed (NPD),* and *joint innovation activities*. Typically, larger firms have greater power compared to smaller counterparts (Poppo & Zhou, 2014). This power asymmetry exists because larger firms tend to have a greater resource base, which they can use to generate better synergies, leading in turn to increased performance (Jean et al., 2012). Therefore, we controlled for *supplier size* which was measured by number of employees categorized into seven groups starting from the smallest category l, from 50 to 100 employees, to the largest category 7, greater than 500 employees. We also controlled for *supplier age* because older firms tend to have additional resources, knowledge, and capabilities accumulated over the duration of their existence (Lazzarini, Claro, & Mesquita, 2008). However, older firms are more susceptible to organizational inertia, which makes them less innovative (Phelps, 2010). In addition, we controlled for the *overseas market age* by measuring the number of years that the supplier had operated in the international market to capture firm's experience for international presence, which can impact its performance (Brouthers, O'Donnell, & Hadjimarcou, 2005). R&D expenditure is typically an indication of how much a firm is focusing on new product development and often to certain extend can define or influence firm's performance (Cui & Wu, 2016), hence we controlled for firm's yearly *R&D expenditure* in our model. For the same reason, we captured the firms' *number of new products developed* in the previous three years as a measure of the firm's experience with, and emphasis on NPD (Kuester, Homburg, & Hildesheim, 2017). Finally, we controlled for *joint innovation activities*, which captured the degree of joint innovation efforts by both parties as an indication of how much the focal firm emphasizes on international customer involvement in design and learning through building relationships.

Third, adapting from Lavie et al. (2012), we controlled for *customer's value proposition* and *customer's global reach* to consider their likely influence on the supplier's performance.

Customer's value proposition was measured in terms of: (1) knowledge about the firm's products and platforms, (2) efforts to promote these products and platforms, (3) ensuring quality of services, and (4) viability of their business model. *Customer's global reach* indicates the level of the customer's operations at regional, national, or global level.

Fourth, we captured and controlled for *market conditions* that could influence the supplier's performance (Lavie et al., 2012). Finally, the *respondent's tenure* (i.e., the number of years the respondent had been employed by the company) was controlled for possible respondents' effects (Zhou & Li, 2012).

4. Analyses and Results

4.1. Measurement Checks

Common Method Bias Assessment: Since we collected our survey data through a single informant, we checked for the potential existence of common method bias (CMB). We ran the Harman single-factor test (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003) which loads all the items into an exploratory factor analysis. Factor one explained 30.3% of the variance, indicating that CMB is not a substantial issue in this study. We also employed Lindell and Whitney's (2001) method variance (MV) marker variable analysis. We used the company's attention to their management (a four-item scale with Cronbach's α of 0.710 and mean score of 5.13) as the marker variable, since it was theoretically unrelated to the main constructs in the model. The adjustment of the correlations among constructs and statistical significance for the smallest positive correlation between the marker variable and others (r= 0.01), revealed that the pattern of significant and insignificant correlations maintained the same, indicating that CMB is not a concern in our study.

Measurement Model Assessment: We used AMOS 22.0 to perform a confirmatory factor analysis (maximum likelihood estimation) with all eight first-order factors in our model.

The measurement model fit was satisfactory ($\chi^2_{(df=467)}$= 721.03; CFI= 0.95; IFI= 0.95; TLI= 0.94; RMSEA= 0.04) and all items factor loadings were over 0.65 (p < 0 .01). All composite reliabilities and Cronbach's alphas exceeded 0.79 (Appendix 1) and average variance extracted (AVE) measures were over 0.52. Moreover, the square root of the AVE for each construct exceeded the correlation estimate between all pairs involving that construct and other constructs (Table 3).

We also performed pairwise chi-square difference tests twice for the research model constructs. First, the *f* coefficient was set to be free (model 1), and then it was constrained to unity (model 2). The ΔX^2 between all pairs confirmed that model 1 is better than the model 2 at a significant level, p < 0.01. These results confirm the discriminant validity of the measurement model. Table 3 illustrates the correlations and descriptive statistics for the model constructs.

---------- Insert Table 3 about Here ----------

Endogeneity Assessment: our analysis and therefore the findings of the consequences of relationship learning might be misleading because of endogeneity bias, given that relationship learning is a variable that is not randomly assigned across our sample (that is, managers could choose the extent to which they learn from relationships, i.e., how much they share, make sense of, and integrate information and knowledge) (Zaefarian, Kadile, Henneberg, & Leischnig, 2017). We used the control function approach (Petrin & Train, 2010) to assess whether our analysis was subject to self-selection bias. Such a procedure has received support in the marketing literature (e.g., Wang, Lee, Fang, & Ma, 2017). In this approach, the residuals for our predictor are obtained through regressing the relationship learning on the selected instrumental variable (i.e. supplier size), the moderating variables (i.e. customer dependence and cultural distance), and all control variables. The instrumental variable should affect the endogenous variable, i.e., relationship learning but should not be related to the

customer involvement as the dependent variable (Ullah, Zaefarian, & Ullah, 2020). We used supplier size as the instrumental variable because relationship learning is generally greater in larger firms. However, we found no evidence that the size of a firm affects the customers' involvement at the design stage of the NPD. We use Eq1 to predict the residuals:

Eq1: $RL = \alpha_0 + \alpha_1 CDep + \alpha_2 CDis + \alpha_3 SS + Controls + \zeta$

Wherein RL refers to relationship earning, CDep refers to customer dependence, CDis refers to cultural distance, and SS refers to supplier size. The results from the first stage model suggest that supplier size is positively related to relationship learning ($\alpha_3 = 0.12$, $p<0.05$), indicating satisfactory instrument strength. In the second stage, we use the predicted residuals as a control variable to address the self-selection bias using Eq2.

Eq2: $$ICInv = \beta_0 + \beta_1 RL + \beta_2 CDep + \beta_3 CDis + \beta_4 RL \times CDis + \beta_5 RL \times CDep + \beta_6 Residual + Controls + \zeta$$

Wherein ICInv refers to international customer involvement in the design stage. In order to examine whether our analyses are subject to self-selection bias, we compared our results in Eq2 with the rival model (Eq3) wherein the residuals obtained from Eq1 were not included in the model:

Eq3: $$ICInv = B_0 + \beta_1 RL + \beta_2 CDep + \beta_3 CDis + \beta_4 RL \times CDis + \beta_5 RL \times CDep + Controls + \zeta$$

Comparison of our results from Eq2 and Eq3 (see Table 4) suggest that the overall pattern of significance remained the same, confirming that our analyses are not affected by self-selection bias.

---------- Insert Table 4 about Here ----------

4.2. Structural Model Results

We draw on structural equation modelling approach to examine our hypotheses. Lower order variables were represented in the model by their indicators. Sub-dimensions of relationship learning and those of supplier performance were aggregated to create corresponding first-order factors. In doing so, we took the arithmetic average of the scores of items for each second-order construct into an aggregate score. The standardized factor loadings of the three first-order factors of information-sharing, joint-sensemaking, and knowledge-integration for the second-order factor of relationship learning were significant and well above the cut-off point of 0.7 (information sharing= 0.71; joint sensemaking= 0.82; knowledge integration= 0.91) as were the standardized loadings for the second-order factors of the supplier performance (sales performance= 0.90; financial performance= 0.83; customer performance= 0.84). Thus, in our structural model, both relationship learning and supplier performance were treated as first-order constructs with three aggregated items.

We also created four interaction terms, i.e., Relationship Learning x Cultural Distance, Relationship Learning x Customer Dependence, International Customer Involvement x Cultural Distance, and International Customer Involvement x Customer Dependence, which were added to our structural model in line with the suggestion of Ping (1995). We mean-centered these constructs before creating the interaction terms, given that product terms can incur collinearity (Aiken, West, & Reno, 1991).

We estimated the structural model in AMOS 22.0 with the maximum likelihood method for estimation. We obtained good fit for the structural model: $X^2_{(df=322)}$= 488.93; RMSEA= 0.05; CFI= 0.92; TLI= 0.90. Table 5 provides the standardized path coefficients (SPC) for all relationships in the structural model and the control variables. We also report the 95% confidence intervals for the direct effects in this table. These confidence intervals were generated from bootstrapped procedure in AMOS with 1000 samples.

To examine the mediation effect for H_1, we ran a full mediation model in which international customer involvement fully mediates the effects of relationship learning on supplier performance. As expected, the path from relationship learning to international customer involvement was positive and significant (SPC= 0.36, $p < 0.01$). Similarly, the path from international customer involvement to supplier performance was significant (SPC= 0.24, $p < 0.01$). To better understand the mediating role of international customer involvement, we compared these results against a rival model of partial mediation in which we included a direct link from relationship learning to supplier performance in addition to the effects mediated through international customer involvement. The result for the partial mediation model is also provided in Table 5. The partial mediation model obtained slightly better fit: $X^2_{(df=321)}= 467.39$; RMSEA= 0.05; CFI= 0.93; TLI= 0.91. The addition of this direct link from relationship learning to supplier performance significantly improved the model ($\Delta X^2_{df=1}= 21.54$, $p < 0.01$). The direct link between relationship learning and supplier performance was significant (SPC= 0.38, $p < 0.01$) as were the paths from relationship learning to international customer involvement (SPC= 0.35, $p < 0.01$) and from international customer involvement to supplier performance (SPC= 0.15, $p < 0.05$). These results indicate that international customer involvement partially mediates the path from relationship learning to supplier performance.

As illustrated in Table 5, the standardized path coefficient for the interaction term Relationship Learning x Cultural Distance is negative and significant in both models (SPC= -0.18, $p < 0.01$ in both models), providing support for the second hypothesis. In hypothesis 3, we proposed that cultural distance negatively moderates the path from international customer involvement to supplier performance. This hypothesis is also supported, given that the standardized beta coefficient is negative and significant (SPC= -0.22, $p < 0.01$ for the full mediation model and SPC= -0.19, $p < 0.01$ in the partial mediation model). Hypothesis 4 suggested that customer dependence positively moderates the effect of relationship learning on

international customer involvement. We found support for this hypothesis: the standardized path coefficient for the interaction term Relationship Learning x Customer Dependence is positive and significant (SPC= 0.14, $p < 0.05$ in both models). However, customer dependence does not moderate the positive effect of international customer involvement on supplier performance, hence rejecting H_5.

---------- Insert Table 5 about Here ----------

We further tested the direct relationships in our model for potential non-linearity effect as an alternative explanation. We run three different regression tests to check for potential existence of curvilinear effect in (1) the path from relationship learning to international customer involvement, (2) the path from international customer involvement to supplier performance, and (3) the path from relationship learning to supplier performance. We included both our moderators and all the control variables in all these regressions models. We also mean-centered our predictor construct before creating the quadratic term.

As for the first model (i.e. relationship learning to international customer involvement), path coefficient for the quadratic term (RL^2) was -0.012 (t=-0.161, not significant). In the second model (i.e. international customer involvement to supplier performance), path coefficient for the quadratic term ($ICInv^2$) was also negative but not significant -0.063 (t=-0.973). In the third model (i.e. relationship learning to supplier performance), the quadratic term RL^2 was not significant (B=-0.006, t= -0.078). Hence, we can safely conclude that the relationships between the main constructs are linear.

5. DISCUSSION

The importance of customer involvement in NPD has been widely recognized in the literature, however there are very few studies that examine how and under what conditions relational capabilities such as relationship learning facilitates such activities. Moreover, relatively little

attention has been devoted to the effectiveness of customer involvement during the design stage of NPD, particularly at international level in customer-supplier relationships. The aim of this study is to answer two questions: first, whether the international customer involvement mediates the association between relationship learning and supplier performance. Second, whether and how cultural distance and customer dependency condition the link between (a) relationship learning on international customer involvement and (b) international customer involvement on supplier performance. Our results indicate that international customer involvement only partially mediates the association between relationship learning and supplier performance given that relationship learning can directly increase supplier performance. Regarding the second research question, cultural distance decreases the effectiveness of both relationship learning and international customer involvement, while customer dependency conditions only the effectiveness of relationship learning.

5.1. Theoretical Contributions

This study contributes to the existing literature on customer involvement in NPD processes in three ways. First, this study contributes to theoretical development by being the first to examine the effects of relationship learning on international customer involvement. In doing so, this study addresses the earlier calls for using established perspectives in examining customer involvement (West et al., 2014). Our results reinforce the conventional view that emphasizes the key role played by relational investment in generating a platform necessary for success of interfirm collaborations (Chen et al., 2009; Huikkola et al., 2013; Jean et al., 2017). Relationship learning enhances the supplier's willingness to involve its international customer in development of new designs by not only decreasing the perceived risk of engaging in such activities (e.g. opportunistic behavior), but also enhancing the supplier's ability to more precisely evaluate the value of customers' ideas and knowledge. Along with the work of Jean et al. (2017) and Huikkola et al. (2013), our research points to relationship learning as an

effective theoretical perspective in developing an understanding of international customer involvement as a joint learning process and not just as an outcome of firm knowledge management processes, channel partners' slack resources, or environmental attributes.

The second contribution of this study is to demonstrate that the effectiveness of relationship learning rests upon contextual factors governing the international interfirm relationships. In particular, our findings indicate that cultural distance decreases the effectiveness of relationship learning. The identified novel contingent effect is in line with an emerging line of enquiry on the role of cultural distance in interfirm collaborations (Cheung et al., 2011; Elia et al., 2019). A high level of cultural distance can create misunderstanding and conflict between channel partners (Katsikeas et al., 2009) which ultimately discourages a supplier from involving its international customers in development of new product designs. Our results also demonstrate the need to include customer dependence when examining effectiveness of relationship learning. Despite the presumed importance of customer dependence on marketing channels' attitude and orientation towards engaging in interfirm collaborations (Gao & Shi, 2011; Kim & Henderson, 2015), there exist no empirical investigation of how customer dependence conditions the relationship learning – customer involvement link. Our research addresses this gap by empirically investigating and demonstrating the moderating effects of customer dependence on effectiveness of relationship learning. Overall, our findings challenge the conventional belief that the relationship learning always enhances interfirm collaborations (e.g., Chen et al., 2009; Cheung et al., 2010), and suggest a need for careful considerations of contextual factors such as cultural distance and customer dependence when examining the consequences of relationship learning.

Third, while a number of earlier studies (e.g., Morgan, Obal, & Anokhin, 2018; Zhang et al., 2015) point to the importance of involving international customers in NPD processes, they paid little attention to how cultural distance, as an important boundary condition in

international exchanges, challenges the effectiveness of such activities. We address this limitation by being the first to check the conditioning effect of cultural distance on success of international customer involvement. The rationale is that cultural distance impedes supplier ability to acquire and correctly interpret customer's knowledge regarding market needs by disturbing communications (Schmitt & Van Biesebroeck, 2013) and decreasing the harmony in interfirm relationships (Leonidou et al., 2002), thereby lessening the benefits of involving customers in development of new designs. Our findings demonstrate that the supplier's ability to benefit from international customer involvement in design stage of NPD project significantly depends on the cultural distance between channel partners. As such the moderating role of cultural distance can explain the inconsistencies in literature regarding the consequences of customer involvement.

Opposite to our expectations, our findings did not support the moderating role of customer dependency in the relationship between international customer involvement and supplier performance. Increased supplier dependency on international customer involvement may explain this result. When suppliers involve their international customers in co-creation activities, they should make RSIs that have no value outside of the relationship itself (Fang et al., 2008). Consequently, such arrangements increase suppliers' dependency on their international customers by increasing the switching costs in the event of relationship termination (Heide & John, 1988). Under such circumstances, regardless of customer dependency, given the importance of the relationship, a focal supplier commits more resources to assure the success of international co-development activities, which then leads to more successful designs and improved supplier performance. Put differently, supplier dependency —created as a result of international customer involvement — compensates for the lack of customer commitment resulting from low levels of customer dependency.

5.2. Managerial Contributions

Our research has a number of important managerial implications. In order to gain a better understanding of their international customers' needs and preferences, suppliers should have such customers involved in development of new designs. This would help them to assess whether a specific new product design feature/idea will be effective internationally, leading to better product-market fit and so enhanced supplier performance. However, managers should be aware of the impact of cultural differences. Our research highlights that a greater cultural distance means international customer involvement becomes less successful due to possible communication problems leading to misunderstanding and eventually to tension in interfirm relationships. Consequently, when the cultural distance is high, managers should disengage and consider terminating new design co-creation as a strategic move to enhance NPD project success. Such terminations release the sub-optimally invested resources that can be reinvested in other developments or relationships that potentially have a better business outcome (Zaefarian et al., 2017). In addition, our findings suggest that to increase the extent of international customer involvement in developing new designs, managers should invest in developing and maintaining interfirm relationship learning capabilities, which involve knowledge exchange and joint problem solving. This can be an effective way for suppliers to understand and respond to changes in foreign markets demands. Engaging international customers in co-creation activities is difficult due to geographical distances. Managers can overcome these challenges using relationship learning, leading to more successful cross-country collaborations.

The findings indicate that when capitalizing on relationship learning, managers should pay attention to the extent to which their international customers depend on them. Relationship learning is a mutual and long-term activity; thus, to be effective, both firms should be committed to such activity. When customer dependency is high, the relationship with the supplier becomes more important, which in turn increases customer commitment and hence

willingness to allocate important resources to the relationship. On the other hand, low level customer dependency decreases customer commitment and orientation towards cooperation. Hence, managers should be careful about how much time and resource they invest in relationship learning when customer dependency is low. Finally, our study finds that when the cultural distance is significant, relationship learning does not improve international customer involvement. Through increasing frictions and misunderstandings between suppliers and the international customer, cultural distance heightens the risk perceived by the supplier in engaging in international co-creation activities, which then dampens the effectiveness of relationship learning. Consequently, managers may benefit from evaluating cultural differences and their associated risks before investing in such relational capabilities.

5.3. Limitations and Suggestions for Future Research

While our study adds to the business literature in several important ways, it has a number of limitations that provide an avenue for the future research. Current literature recognizes different roles played by customers in terms of involvement in NPD namely, information providers, co-developers, and innovators (e.g., Cui & Wu, 2016). These roles vary based on the level of involvement the international customer has in NPD. Our study does not differentiate between these roles. Therefore, future research can explore the impact of relationship learning on each of these roles separately.

In addition, we have considered only the design stage, as it is one of the key stages of NPD (Menguc et al., 2014). We accept that the importance of international customer involvement on other stages of NPD may differ (Hoyer et al., 2010). Thus, a further development would be to study how relationship learning affects supplier performance through international customer involvement at other stages of the NPD process. Furthermore, we collected data from suppliers and not from customers. As a result, customer dependency

measures are perceptual. While including customer dependency enabled us to investigate how it strengthens the relationship, there are some uncertainties related to the accuracy of managers' evaluation of customer dependency. Hence, it might be worthwhile to re-examine the moderating effects of customer dependency using both supplier and customer data.

Indeed, geographical distance have cost implications in terms of both complexity of knowledge search and the effectiveness of knowledge transfer (Ambos & Ambos, 2009; Hansen & Løvås, 2004). It could potentially jeopardize the efficiency of communication (Daft & Lengel, 1986; Katz & Allen, 1982), and as such create some obstacles to innovation generation in customer-supplier relationships (Jean et al., 2014). Hence future studies ought to control for this as well as other country level factors in their research.

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Table 1: Selected Empirical studies on antecedences and consequences of business customer involvement

Source	Conceptualization / context and sample	Antecedences	Consequences	Moderators	Summary of Key Findings
Joshi & Sharma (2004)	Customer involvement (customer knowledge development) of group of customers/Survey of 169 manufacturing firms in Canada	- Provision of resource slack - Intelligent-failure reward system - Creation of cross-functional new product development teams - Integration mode of conflict resolution - Championing the organizational goal of product leadership - Projects members' goal of product leadership	New product performance	--	Provision of resource slack positively related to customer knowledge development only under high level of intelligent-failure reward system. Creation of cross-functional new product development teams positively affects new product performance and this association is stronger under high level of integration mode of conflict resolution. Championing the organizational goal of product leadership positively affects new product performance.
Skaggs & Youndt (2004)	Customer involvement (customer co-production) of groups of customers/ Survey of 234 service firms in the US	--	-Human capital - Firm performance	Human capital	Customer co-production negatively affects human capital. Human capital negatively moderates the relationship between customer co-production and firm performance
Knudsen (2007)	Customer involvement of groups of customers/ Survey of 557 manufacturing and service firms across Europe	--	- Innovative performance	--	Customer involvement negatively affects innovative performance
Fang, Palmatier, & Evans (2008)	Customer involvement (customer participation) of a single customer/ Survey of 188 manufacturing firms (country was not specified)	--	- Supplier relationship-specific investment - Customer relationship-specific investment - Information sharing - Coordination effectiveness - New product value - Customer perception of "fair share" - New product value obtained by customer - Customer dependence - Supplier dependence	Customer participation formality	Customer participation positively affects information sharing, coordination effectiveness, customer and supplier relationship-specific investment. The association between customer participation and customer and supplier relationship-specific investment is positively moderated by customer participation formality.
Fang (2008)	Customer involvement (customer participation) of a single customer/ Survey of 143 manufacturing firms (country was not specified)	--	- New product innovativeness - New product speed to market	- Customer network connectivity - Process interdependence - Process complexity	Customer participation as information provider positively affects new product speed to market and this association is positively moderated by downstream customer network connectivity. Downstream customer network connectivity negatively moderates the association between customer participation as information provider and new product innovativeness. Process interdependence negatively moderates the relationship between customer participation as co-creator and new product speed to market. Process interdependence positively moderates the relationship between customer participation as co-creator and new product innovativeness.
Carbonell et al. (2009)	Customer involvement of group of customers/ 102 service firms in Spain	- Technological novelty - Technological turbulence	- Innovation speed -Technical quality - Competitive superiority	Stage of the process development	Customer involvement positively affects technical quality and innovation speed, but does not directly affect competitive superiority and sale performance. Technological turbulence positively affects customer

			- Sale performance		involvement. Stage of the process development does not moderate the consequences of customer involvement.
Feng et al. (2010)	Customer involvement of group of customers/Survey of 139 firms operating in various industries in China	--	- Cost leadership -Product quality - Delivery reliability - Process flexibility - Customer service	--	Customer involvement positively affect product quality, delivery reliability, process flexibility, and customer service.
Lau, Tang, & Yam (2010)	Customer involvement (product co-development) of groups of customers/ Survey of 251 manufacturing firms in China	--	- Product performance - Product innovation	--	Product co-development with customer positively affects product performance.
Melton & Hartline (2010)	Customer involvement of group of customers/ Survey of 160 service firm in the US	--	- Service marketability - Launch preparation	--	Customer involvement in design positively affects launch preparation and service marketability. Customer involvement in development positively affects launch preparation. However, Customer involvement in full launch does not have any significant effect on service marketability.
Svendsen et al. (2011)	Customer involvement of a single customer/ Survey of 324 manufacturers in Norway	- Product differentiation - Competitor orientation - Brand profiling emphasize - Supplier specific investment	Relationship profitability	--	- Competitor orientation and supplier-spec investments positively affect customer involvement. Customer involvement positively affects relationship profitability.
Al-Zu'bi & Tsinopoulos (2012)	Customer involvement (collaboration with lead users) of group of customers/ Survey of 313 manufacturing firms in the UK	--	Product variety	--	Collaboration with lead users positively affects product variety.
Ngo & O'Cass (2013)	Customer involvement (customer participation) of group of customers/ Survey of 155 Australian service firms	- Technical innovation capability - Non technical innovation capability	- Firm performance - Service quality	--	Customer participation fully mediates the relationship between technical innovation capability and service quality. It, however, partially mediates the relationship between non-technical innovation capability and service quality. Service quality positively affects firm performance.
Smets, Langerak, & Rijsdijk (2013)	Customer involvement (customer participation) of a single customer/ Survey of 63 collaborative projects between a focal manufacturer and its customers	- Process control - Output control	- New product performance	--	Process and output control positively affect customer participation. Customer participation positively affects new product performance.
Chatterji & Fabrizio (2014)	Customer involvement (inventive collaborations with product users) of groups of customers/ Panel dataset of medical firms in the US	--	- Corporate innovative performance	- New/old technology area - Radical/incremental innovations	Inventive collaborations with product users positively affects corporate innovative performance and this association positively moderated by new technology and radical innovation.
Mahr, Lievens, & Blazevic (2014)	Customer involvement (value of customer co-created knowledge) of a single customer/ Survey of 126 service firms across Europe	- Closeness in customer–firm relationship - Lead user status	- Market/ financial success - Customer acceptance - Learning success	Communication channels	Customer acceptance and learning success positively affect market/ financial success. Knowledge relevance positively affects customer acceptance and learning success. Knowledge novelty has an inverted U shape relationship with customer acceptance and it positively affects learning success. Knowledge costs negatively affects customer acceptance. Lead user status positively affects knowledge relevance and novelty. Closeness in customer–firm relationship positively affects knowledge relevance but negatively affects knowledge costs. Face to face communication negatively moderated the association between closeness in customer–firm relationship and knowledge novelty. Bit to bit communication negatively moderated the association between closeness in customer–firm relationship and knowledge costs. Voice to voice communication positively moderated the association between lead user status and relevance.

Menguc et al. (2014)	Customer involvement of group of customers/ Survey of 216 high-tech industries in Canada	--	- Product performance	- Incremental product innovation capability - Radical product innovation capability	Customer involvement positively affects new product performance. Radical innovation capability negatively and incremental innovation capability positively moderate this association.
Zhang et al. (2015)	Customer involvement of group of customers/ survey of 208 service firms in China	- Legitimacy pressure - Market ambiguity	Internationalization performance	- Relational capability - Absorptive capacity	Customer involvement positively affects internationalization performance. Legitimacy pressure positively affects customer involvement. Relational capability positively moderates the relationship between legitimacy pressure and customer involvement.
Griffith & Lee (2016)	Customer involvement (customer participation) of groups of customers/ Survey of 201 firms in the US	--	New product advantage	Cross-national collaboration	Customer participation as co-developer and information provider have no significant effects on new product advantage. Cross-national collaboration positively moderates the association between customer participation as information provider and new product advantages. Cross-national collaboration negatively moderates the association between customer participation as co-developer and new product advantages.
Cui & Wu (2016)	Customer involvement of group of customers/ Survey of 245 firms operating in various industries in the US	- Customer need heterogeneity - Customer need tacitness - Market exploitation - Market exploration - Inter-functional coordination - Strategic flexibility	- New product performance	- Technological capability	Customer involvement as co-creator positively influence new product performance and that this relationship is negatively moderated by technological capability. Customer need heterogeneity, market exploitation, and inter-functional coordination positively and market exploration negatively affects customer involvement as co-creator. Customer need tacitness negatively and market exploitation and inter-functional coordination positively affect customer involvement as information provider.
Cui & Wu (2017)	Customer involvement of group of customers/ Survey of 245 firms operating in various industries in the US	--	- New product innovativeness - New product advantage - New product financial performance	Experimental NPD approach	Customer involvement as information source positively affects new product innovativeness and that this relationship is positively moderated by experimental NPD approach. Customer involvement as a co-creator positively affects new product innovativeness only under high level of experimental NPD approach. New product innovativeness positively affects new product financial performance only through new product advantage.
Saldanha et al. (2017)	Customer involvement of group of customers/Secondary data of 310 manufacturing firms in the US	--	Amount of innovation	Analytical and relational information processing capability	Both product and information based customer involvement positively affect amount of innovation and these relationships are positively moderated by analytical and relational information processing capabilities.
Anning-Dorson (2018)	Customer involvement capability of group of customers/ Survey of 201 service firms located in Ghana and 171 service firms located in the UK	--	- Service firm performance - Product innovation - Process Innovation	- Country (i.e. Ghana and UK)	Customer involvement affects firm performance positively in Ghana and negatively in the UK. The link between customer involvement and product innovation is mediated by product and process innovation within both contexts.
Morgan, Obal, & Anokhin (2018)	Customer involvement (customer participation) of groups of customers/ Survey of 243 manufacturing firms in the US	--	- New product performance - New product innovativeness	Absorptive capacity	Customer participation positively affects new product performance and innovativeness. Absorptive capacity positively moderates these associations.
Storey & Larbig (2018)	Customer involvement of group of customers/ Survey of 126 leading international service firms operation in various countries.	--	- Customer knowledge assimilation - Concept transformation - New service success	Resource slack	Customer involvement positively affects customer knowledge assimilation and concept transformation. Customer knowledge assimilation positively affects concept transformation and new product success. Concept transformation positively affects new service success only under high level of resource slack.
This Study	Customer involvement/ Survey of 264 manufacturing firms in China	Relationship Learning	Supplier Performance	- Buyer Dependence on Supplier - Cultural Distance	Customer involvement positively affects supplier performance. Relationship learning positively affects customer involvement and supplier performance. Cultural distance and customer dependence positively moderate the association between relationship learning and customer involvement. Cultural distance and customer dependence positively moderate the association between customer involvement and supplier performance.

Table 2: Descriptive Profile of Respondents

Respondents' Profile	Percent
Industry	
Information technology	26%
Electronic	22.5%
Mechanical and electric equipment	14.7%
Pharmaceuticals	12.9%
Chemicals and allied	12.5%
Apparel	11.4%
Managerial grade	
Top executives (presidents, CEOs, and vice presidents)	65.5%
Sales managers	20.8%
R&D managers	12.2%
Production managers	1.5%

Table 3: Descriptive Statistics

Construct	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. Information Sharing	**0.72**	0.60	0.64	0.25	0.01	0.36	0.32	0.35	0.34	0.28	0.17	0.26	0.14	0.34	0.05	-0.02	0.11	0.37	0.25	0.18	0.05
2. Joint Sensemaking	0.61**	**0.73**	0.70	0.30	0.01	0.36	0.37	0.45	0.46	0.21	0.22	0.18	0.19	0.33	0.08	0.02	0.15	0.34	0.20	0.22	0.05
3. Knowledge Integration	0.65**	0.71**	**0.72**	0.28	0.02	0.38	0.39	0.44	0.41	0.14	0.22	0.18	0.21	0.38	0.07	0.02	0.13	0.41	0.26	0.19	0.09
4. International Customer Involvement in the design stage	0.26**	0.31**	0.29**	**0.79**	-0.11	0.10	0.22	0.25	0.32	0.16	0.13	0.00	0.10	0.10	0.02	0.07	0.08	0.30	0.08	0.00	0.04
5. Cultural Distance	0.02	0.02	0.03	-0.10	**NA**	-0.17	0.11	0.12	0.09	0.07	-0.02	0.09	-0.02	-0.10	0.03	0.02	-0.02	0.02	0.01	0.29	-0.03
6. Customer Dependence	0.37**	0.37**	0.39**	0.11	-0.16**	**0.78**	0.24	0.21	0.22	0.03	0.16	0.24	0.11	0.42	0.00	-0.04	0.13	0.29	0.21	0.15	0.09
7. Sales Performance	0.33**	0.38**	0.40**	0.23**	0.12*	0.25**	**0.75**	0.76	0.75	0.09	0.07	0.18	0.09	0.23	0.10	0.09	0.21	0.28	0.18	0.18	0.06
8. Financial Performance	0.36**	0.46**	0.45**	0.26**	0.13*	0.22**	0.77**	**0.80**	0.70	0.14	0.11	0.12	0.10	0.18	0.07	0.03	0.13	0.28	0.15	0.17	0.04
9. Customer Performance	0.35**	0.47**	0.42**	0.33**	0.10	0.23**	0.76**	0.71**	**0.77**	0.07	0.03	0.12	0.06	0.20	0.10	0.02	0.17	0.28	0.22	0.19	0.03
10. Supplier Size	0.29**	0.22**	0.15*	0.17**	0.08	0.04	0.10	0.15*	0.08	**NA**	0.29	0.29	0.29	0.07	-0.02	0.12	0.11	0.11	0.05	0.22	0.00
11. Supplier Age	0.18**	0.23**	0.23**	0.14*	-0.01	0.17**	0.08	0.12*	0.04	0.30**	**NA**	0.39	0.66	0.17	-0.06	0.09	0.15	0.08	-0.09	0.00	0.57
12. Relationship Age	0.27**	0.19**	0.19**	0.01	0.10	0.25**	0.19**	0.13*	0.13*	0.30**	0.40**	**NA**	0.44	0.28	-0.05	-0.06	0.15	0.08	0.02	0.29	0.18
13. Overseas Market Age	0.15*	0.20*	0.22**	0.11	-0.01	0.12*	0.10	0.11	0.07	0.30*	0.67**	0.45**	**NA**	0.14	-0.12	0.07	0.14	0.11	-0.02	0.08	0.40
14. Mutual RSI	0.35**	0.34**	0.39**	0.11	-0.09	0.43**	0.24**	0.19**	0.21**	0.08	0.18**	0.29**	0.15*	**NA**	-0.03	-0.02	0.00	0.26	0.29	0.12	0.04
15. Customer's Value Proposition	0.06	0.09	0.08	0.03	0.04	0.01	0.11	0.08	0.11	-0.01	-0.05	-0.04	-0.11	-0.02	**NA**	0.02	0.05	0.09	0.01	-0.08	0.06
16. R&D Expenditure	-0.01	0.03	0.03	0.08	0.03	-0.03	0.10	0.04	0.03	0.13*	0.10	-0.05	0.08	-0.01	0.03	**NA**	0.09	-0.07	-0.14	0.00	0.06
17. Number of NPD	0.12*	0.16**	0.14*	0.09	-0.01	0.14*	0.22**	0.14*	0.18**	0.12*	0.16*	0.16**	0.15*	0.01	0.06	0.10	**NA**	0.16	-0.02	0.11	0.12
18. Joint Innovation Activities	0.38**	0.35**	0.42**	0.31**	0.03	0.30**	0.29**	0.29**	0.29**	0.12*	0.09	0.09	0.12	0.27**	0.10	-0.06	0.17**	**NA**	0.30	0.20	0.14
19. Market Conditions	0.26**	0.21**	0.27**	0.09	0.02	0.22**	0.19**	0.16**	0.23**	0.06	-0.08	0.03	-0.01	0.30**	0.02	-0.13*	-0.01	0.31**	**NA**	0.16	-0.10
20. Customer's Global Reach	0.19**	0.23**	0.20**	0.01	0.30**	0.16**	0.19**	0.18**	0.20**	0.23**	0.01	0.30**	0.09	0.13*	-0.07	0.01	0.12*	0.21**	0.17**	**NA**	-0.19
21. Respondent's Tenure	0.06	0.06	0.10	0.05	-0.02	0.10	0.07	0.05	0.04	0.01	0.58**	0.19**	0.41**	0.05	0.07	0.07	0.13*	0.15*	-0.09	-0.18**	**NA**
22. Marker Variable (MV)	0.07	0.08	0.07	-0.03	0.07	0.05	0.06	0.14*	0.04	0.04	0.01	0.02	-0.13*	0.14*	0.10	-0.08	-0.04	-0.01	0.18**	-0.07	-0.01
Mean	5.56	5.75	5.71	5.01	3.34	5.30	5.43	5.37	5.57	5.41	1.16	0.70	9.07	5.43	5.90	30.67	4.47	5.91	5.52	2.24	9.28
Standard deviation	0.73	0.75	0.67	1.11	1.06	0.99	0.81	0.91	0.87	1.27	0.22	0.23	5.12	1.25	0.95	78.26	2.36	0.90	1.05	0.76	4.82

Note:
Correlations below the diagonal are before the MV adjustment.
Correlations above the diagonal are after the MV adjustment.
Correlations above 0.12 are significant at $p<0.05$.
Bold and underlined numbers on the diagonal show the square root of the AVEs
n= 264
** $p < 0.01$, * $p < 0.05$

Table 4: Results of regression test for self-selection bias

	Model1 (includes correction term)	Model2 (Exclude correction term)
RL	0.30 **	0.27**
CDep	-0.05	-0.06
CDis	-0.09	-0.10
RL x CDis	-0.21**	-0.21**
RL x CDep	0.14*	0.13*
R^2	0.20	0.19

Note:

RL: relationship learning; CDep: customer dependence; CDist: cultural distance;
n= 264
** $p < 0.01$, * $p < 0.05$

Table 5: Results of structural equations analyses

Structural Model Statistics	Full Mediation Model				Partial Mediation Model				
X^2	488.93				467.39				
d.f.	322				321				
CFI	0.92				0.93				
TLI	0.90				0.91				
RMSEA	0.05				0.05				
	Path		**95%CI**		**Path**		**95%CI**		
Path	**Estimate**	**S.E.**	**Lower**	**Upper**	**Estimate**	**S.E.**	**Lower**	**Upper**	
Main effects									
RL → SP	--	--	--	--	0.38**	0.12	0.26	0.58	
RL → ICInv	0.36**	0.14	0.22	0.47	0.35**	0.14	0.22	0.46	
ICInv → SP	0.24**	0.05	0.11	0.37	0.15*	0.04	0.02	0.29	H1 Accepted
Interactions									
RL x CDist → ICInv	-0.18**	0.10	-0.30	-0.05	-0.18**	0.10	-0.30	-0.05	H2 Accepted
ICInv x CDist → SP	-0.22**	0.03	-0.35	-0.09	-0.19**	0.03	-0.32	-0.07	H3 Accepted
RL x CDep → ICInv	0.14*	0.09	0.01	0.26	0.14*	0.09	0.01	0.26	H4 Accepted
ICInv x CDep → SP	0.02	0.03	-0.11	0.14	-0.02	0.03	-0.15	0.11	H5 Rejected
Controls									
Supplier Size	-0.02	0.04	-0.14	0.12	-0.02	0.04	-0.14	0.11	
Supplier Age	-0.04	0.30	-0.22	0.14	-0.10	0.28	-0.28	0.07	
Relationship Age	0.11	0.22	-0.02	0.25	0.11	0.21	-0.02	0.26	
Overseas Market Age	-0.02	0.01	-0.18	0.15	-0.03	0.01	-0.19	0.12	
Mutual RSI	0.14*	0.04	0.02	0.27	0.03	0.04	-0.10	0.18	
Customer's Value Proposition	0.09	0.04	-0.03	0.20	0.07	0.04	-0.05	0.17	
R&D Expenditure	0.08	0.00	-0.05	0.19	0.08	0.00	-0.05	0.18	
Number of NPD	0.13*	0.02	0.02	0.25	0.12*	0.02	0.00	0.23	
Joint Innovation Activities	0.13*	0.05	0.02	0.30	0.05	0.05	-0.08	0.20	
Market Conditions	0.11	0.04	-0.02	0.23	0.06	0.04	-0.05	0.19	
Customer's Global Reach	0.08	0.06	-0.06	0.23	0.05	0.06	-0.10	0.18	
Respondent's Tenure	0.02	0.01	-0.13	0.17	0.06	0.01	-0.09	0.19	
Marker Variable (MV)	0.05	0.04	-0.07	0.17	0.05	0.04	-0.07	0.17	

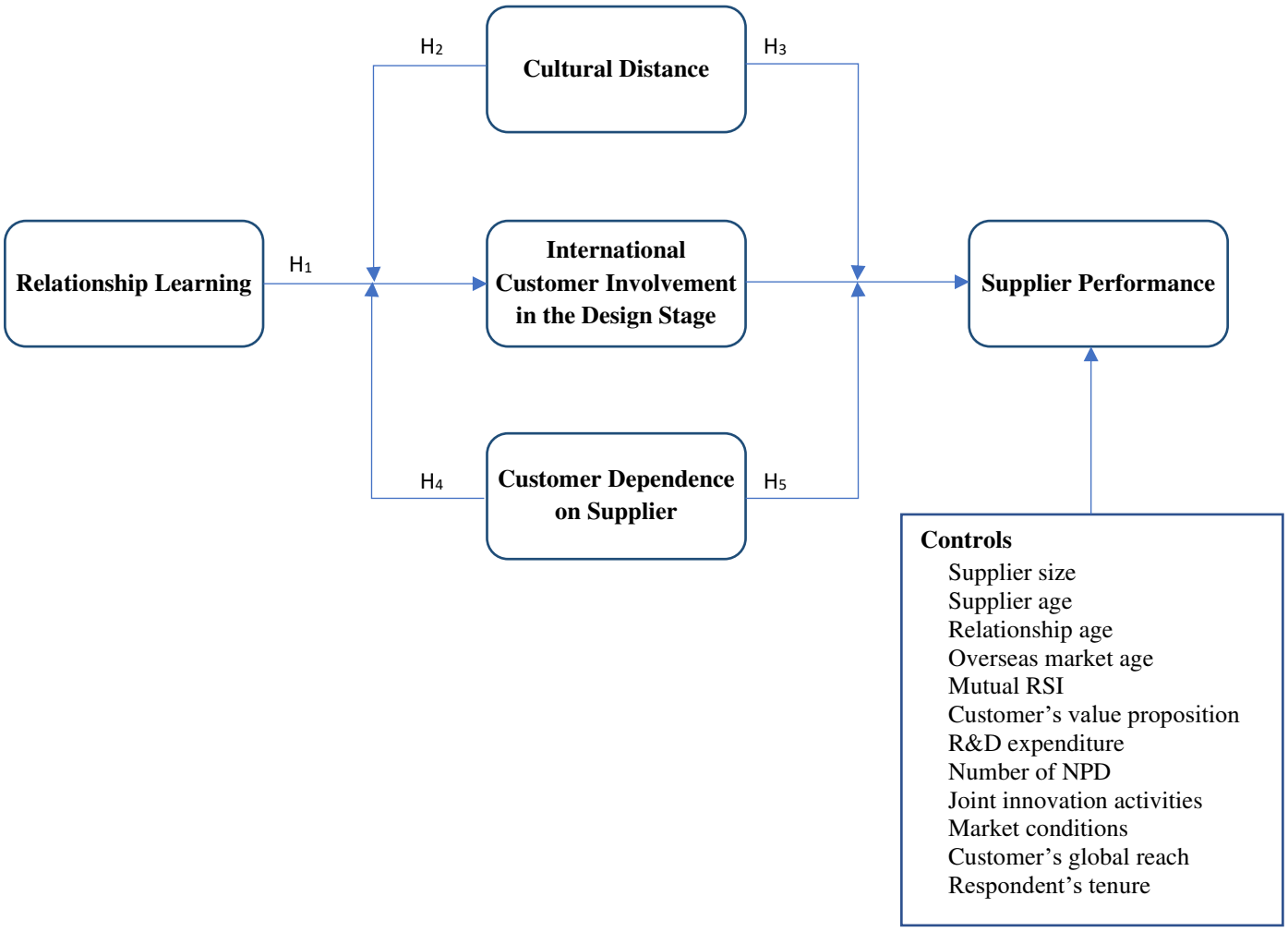
Note:

RL: relationship learning; ICInv: international customer involvement in the design stage; SP: supplier performance; CDist: cultural distance; CDep: customer dependence

S.E.: Standard Error; CI: Confidence Interval; n= 264

** $p < 0.01$, * $p < 0.05$

Figure 1: Conceptual Model



Appendix 1: Measurement Items and Model Results

Constructs and items	Standardized loading
Relationship learning – adapted from Selnes and Sallis, 2003	
(Likert Scales: 1= strongly disagree, 7= strongly agree)	
– Information sharing (α=0.88, CR=0.88, AVE=0.52)	
Our two firms exchange information on successful and unsuccessful experiences with products exchanged in the relationship.	0.77
Our two firms exchange information related to changes in end-user needs, preferences, and behavior.	0.70
Our two firms exchange information related to changes in market structure, such as mergers, acquisitions, or partnering.	0.66
Our two firms exchange information related to changes in the technology of the focal products.	0.70
Our two firms exchange information as soon as any unexpected problems arise.	0.73
Our two firms exchange information related to changes in the two organizations' strategies and policies.	0.78
Our two firms exchange information that is sensitive for both parties, such as financial performance and company know-how.	0.70
– Joint sensemaking (α=0.84, CR=0.83, AVE=0.54)	
It is common to establish joint teams to solve operational problems in the relationship.	0.75
It is common to establish joint teams to analyze and discuss strategic issues.	0.76
The atmosphere in the relationship stimulates productive discussion that encompasses a variety of opinions.	0.73
We have a lot of face-to-face communication in this relationship.	0.71
– Knowledge integration (α=0.86, CR=0.86, AVE=0.52)	
Our two firms frequently adjust our common understanding of end-user needs and behavior.	0.71
Our two firms frequently adjust our common understanding of trends in technology related to our business.	0.76
Our two firms frequently evaluate and, if needed, adjust our routines in order-delivery processes.	0.65
Our two firms frequently evaluate and, if needed, update the formal contracts in our relationship.	0.69
Our two firms frequently meet face-to-face to refresh the personal network in this relationship.	0.72
Our two firms frequently evaluate and, if needed, update information about the relationship stored in our electronic databases.	0.78
International customer involvement in the design stage *(α=0.86, CR=0.86, AVE=0.62)* – adapted from Menguc et al., 2014.	
What is the frequency with which these practices are used to verify that the design meets customer requirements?	
(Likert Scales: 1= never—0% of the time; 7= always 100% of the time)	
Cross-functional design teams with customers	0.66
Design reviews by customers	0.83
Design review teams with customer representatives	0.84
Customer pilot runs	0.80
Customer's dependence on supplier *(α=0.82, CR=0.82, AVE=0.61)* – adapted from Fang et al., 2008	
(Likert Scales: 1= strongly disagree, 7= strongly agree)	
It would be difficult for this international customer to replace us.	0.71
This international customer is quite dependent on us.	0.81
If this relationship ended, this international customer would face a significant loss.	0.82
Supplier performance – adapted from Katsikeas et al., 2006	
(Likert Scales: 1= Much worse, 7=Much better)	
– Sales performance (α=0.79, CR=0.79, AVE=0.56)	
Sales volume	0.74
Sales growth	0.75
New product sales	0.75
– Financial performance (α=0.84, CR=0.84, AVE=0.64)	
Profitability as a percentage of sales	0.80
Return on investment	0.82
Profit growth	0.78
– Customer performance (α=0.82, CR=0.82, AVE=0.60)	
Customer satisfaction	0.72
Customer retention	0.75
Customer referral	0.85

Note:
All loadings are significant at $p<0.01$,
Fit statistics: $X^2_{(df=467)}= 721.03$; RMSEA= 0.04; CFI= 0.95; TLI= 0.94; IFI= 0.95.