Networking Capability in Supplier Relationships and its Impact on Product Innovation and Firm Performance

1. Introduction

Successfully managing supplier relationships, including overall supply portfolios, has been shown to increase the purchasing and manufacturing efficiency of firms by streamlining resource acquisition and optimizing operational costs (Da Silveira and Arkader, 2007; Ketchen and Hult, 2007). Having close relationships with firms in the supply chain has also been discussed as being instrumental for firms' innovation activities through joint research and product development (Szwejczewski *et al*., 2005; Johnsen, 2011). Innovation is often the outcome of collaborative work between partners pooling their resources rather than the result of isolated firms exploiting their own resources (Chesbrough, 2003; Smart *et al.,* 2007; Azadegan *et al.,* 2013). Suppliers constitute important providers of such resources (e.g. technologies, knowledge, skills), which firms may lack in their innovation activities. Therefore, supply chain management as well as innovation literature posit the management of supplier relationships as a key mechanism for increasing a firm's innovativeness (e.g. Wognum *et al*., 2002; Zirpoli and Caputo, 2002). Besides managing individual supplier relationships, there is also the need to constantly re-shape the overall innovation partner portfolio (Smart *et al.,* 2007), as mature portfolios could become stale, limiting product design and development (Capaldo, 2007). For example, over time the portfolio of supplier relationships may not provide access to the resources necessary to accomplish successful product innovation as a result of changing customer requirements, new regulations, or different technological possibilities (Hauser *et al.,* 2006; Bohlmann *et al.,* 2013). Hence, to enhance innovation success, managing supplier relationships as part of an overall portfolio is

a key managerial challenge and requires specific strategies and capabilities (Smart *et al.,* 2007, Johnsen, 2011).

While the majority of the extant literature has focused on issues around supplier selection and relationship development activities in isolation (Wu *et al*., 2013; Sjoerdsma and van Weele, 2015), research on relationship portfolios suggests the importance of an integrated approach. This includes the management of initiating, developing and ending business relationships (Reinartz *et al*., 2004). In this context, less research has so far been conducted on how to deal with problematic collaborative relationships (Wognum *et al*., 2002). For example, some supplier relationships may have inherent dysfunctional features from the beginning due to wrong partner selection (Lavie, 2007). Such relationships may become a burden for the firms involved, hampering their innovation activities (Capaldo, 2007; Håkansson and Ford, 2002). Thus, supplier relationships may degenerate over time and create opportunity costs. Therefore, managing supplier portfolios effectively to drive innovation requires an integrative approach to relationship initiation, development and ending.

Relatively little research exists on the business capabilities that underpin and enable supplier relationship and portfolio management. Studies using a capability perspective in the context of relationship portfolios and innovation are rarely partner-specific, do not focus on capabilities specific to the relationship stages that allow for dynamic management of the composition of portfolios, or do not consistently understand capabilities as organizational processes and routines (Ritter 1999: Ritter *et al.*, 2002). For example, while Ritter and Gemünden (2003, 2004) assess the importance of network competence for innovation success, and Walter *et al.* (2006) stress the role of network capabilities for the success of entrepreneurial firms, no integrated conceptual study of dynamic capabilities enabling supplier relationship management exists in the context of product innovation.

Therefore, the starting point for our study relates to a dynamic approach to supplier relationship management (Aláez-Aller and Longás-Garcia, 2010). We argue that while developing relationships is important for innovation, some supplier relationships cannot be sustained and should be ended. On the other hand, firms must be able to sense future beneficial supplier relationship opportunities and initiate new partnerships to enhance their innovativeness (Moeller *et al*., 2006). We follow Mitrega *et al*.'s (2012) suggestion that such a dynamic orientation towards supplier relationship management can be conceptualized as *networking capability* (NC), which is defined as the "*set of activities and organizational routines which are implemented at the organizational level of the focal company to initiate, develop, and terminate business relationships for the benefit of the company*" (p. 741). In their study, Mitrega *et al.* (2012) provide only general evidence as to the performance-enhancing effect of NC without empirically testing the detailed mechanisms or potential contingency factors. We argue that networking capabilities are important in the context of innovation; however, they do not alone guarantee superior performance outcomes, such as innovation. For this, a certain organizational context is necessary, such as relationship proclivity, i.e. the extent to which firms value business relationships as an important driver of their success (Johnson and Sohi, 2001). Overall, *the research objective of this study is to understand how firms can utilize NC and its components to improve firm performance through product innovation*.

This study uses a sample of 156 firms in the Iranian automotive supplier industry to test the relationship between NC, product innovation and firm performance as well as the role of relationship proclivity. This study contributes to the literature in several ways. First, based on a theoretical grounding in the relational view of the firm and the dynamic capability theory, we show how supplier relationship management from a portfolio perspective is related to product innovation. For this purpose, we introduce the concept of networking

capability (NC) to the supplier context, based on an understanding of supplier relationship dynamics, and provide evidence of its positive effect on product innovation. The concept of NC is informed by a portfolio perspective and captures three important relationship stages that allow for a dynamic portfolio management, i.e. initiation, development and ending. This extends the current literature, which has either singled out isolated relationship stages or focused on network management activities in general. Furthermore, our conceptualization of NC as a dynamic capability constitutes organizational routines and practices that can be developed by firms to manage their supplier portfolios. Secondly, this study contributes to the ongoing discussion about the importance of the organizational context in the effective deployment of capabilities by showing that relationship proclivity amplifies the positive effect of NC. This shows that capabilities with respect to supplier relationships need to go hand in hand with the organizational attitudes within the firms deploying them. Thirdly, this study demonstrates the differential effects of the individual components of NC, i.e. initiation, development and ending. Furthermore, it identifies latent classes of companies that exemplify two different mechanisms of how firms utilize NC components to achieve product innovation. We find that both of these mechanisms are equally successful and represent alternative supplier portfolio management strategies in the context of product innovation. This allows firms to choose NC approaches that are best aligned with their characteristics as well as their business environment.

The article is structured as follows. We first ground the NC conceptualization in a theoretical framework. Next, we discuss the literature on aspects of NC, i.e. business relationship initiation, development and ending, and derive specific hypotheses with regard to product innovation. We then present our research design, which is followed by a discussion of our analyses and results. Finally, the findings of the study as well as their theoretical and

managerial implications are outlined, and limitations and directions for further research are introduced.

2. Conceptual Background and Development of Hypotheses

We couch our argument in the *resource-based view of the firm*, or RBV (Barney, 1991) and the *relational view of the firm*, or RV (Dyer and Singh, 1998). The RBV argues for the importance of valuable as well as non-imitable and rare resources, which are combined into capabilities that lead to firm-specific advantages such as efficient operations or superior product quality (Das and Teng, 2000). The RV extends this view by emphasizing the importance of business relationships in mobilizing and combining such resources from external partners, leading to relationship-specific advantages, such as the collaborative development of unique technologies (Eisenhardt and Martin, 2000).

Our research follows the RBV as well as the RV and argues for the importance of relationships with suppliers to access and develop resources such as technologies, knowledge, and skills (Mesquita *et al*. 2008), which are critical for product innovation. Regarding the management of such relationships, we argue that successful firms require a dynamic approach going beyond existing supplier relationships. This is supported by research that has shown that an overly strong focus on existing relationships may decrease firms' innovative potential (Capaldo, 2007; Lavie and Rosenkopf, 2006; Smart *et al.* 2007). Adopting a dynamic perspective, our study suggests that supplier relationship management in the context of product innovation relates to a combination of organizational efforts to benefit as much as possible from resources dedicated to existing partnerships (e.g. exchanging knowledge with strategic suppliers) as well as efforts to avoid getting stuck in unprofitable partnerships. This can be achieved by anticipating threats embedded in the current portfolio of supplier relationships, and by searching for promising opportunities via new supplier relationships. Therefore, we combine the RBV and RV with the dynamic capabilities approach as an

important theoretical framework applied in general management (e.g. Easterby-Smith *et al*., 2009; Protogerou *et al*., 2012) and in the operations and supply chain management literature (e.g. Azadegan *et al.,* 2008; Perunovic *et al.*, 2012).

The *dynamic capability approach* (DC) to firm strategy (Teece, *et al*., 1997; Zollo and Winter, 2002), which also builds on the RBV, suggests that firms should continuously transform themselves by reshaping resource configurations to establish and sustain their competitive advantage. Such configurations may combine resources and capabilities possessed by the firm itself or mobilized through its partners in the supply chain. DC suggests developing organizational routines and processes that enable firms to adjust to changes in their external business environment, i.e. to cope with emerging threats and to seize arising opportunities. Following this DC perspective, we argue that firms can accomplish such resource reconfigurations by implementing systematic processes for reconfiguring their supplier relationship portfolio, e.g. initiating new supplier relationships, developing existing ones, as well as ending those that are performing sub-optimally. Mitrega and colleagues (2012) offer the concept of networking capability (NC) to capture such dynamic capabilities.

NC implies that the locus of innovation success is situated within the network or portfolio of firms' business relationships (Gulati, 1999) rather than in any single partnership, because every partnership may sooner or later lose its rent-generating function. This corresponds with concepts of knowledge networks (Powell *et al.*, 1996) and innovation networks (Dhanaraj and Parkhe, 2006; Smart *et al.,* 2007), according to which firms systematically increase their partnership experiences, utilize their absorptive capacity and mobilize network resources through the dynamic management of their inter-organizational links to improve product innovation. However, in contrast to prior studies on innovation business networks (Capaldo, 2007; Schilling and Phelps, 2007), this study does not focus on the structural characteristics of the supplier network in which a firm is embedded (e.g.

centrality or density, direct and indirect ties) but is instead devoted to studying the networking capabilities (i.e. organizational routines) of the firm that help to actively shape the supplier relationship portfolio to maximize its product innovation potential.

Prior research in the area of networking-related capabilities is fragmented, with most research focusing on activities to develop already existing relationships or without clear distinctions between activities implemented by firms to start, develop and end business relationships (Lorenzoni and Lipparini, 1999; Ritter, 1999; Kale *et al.,* 2002; Kale and Singh, 2007) although they are acknowledged as crucial in managing relationship life cycles (Ozcan and Eisenhardt, 2009; Ritter and Geersbro, 2011). In line with the DC perspective, we position our research within the existing literature by following the conceptualizations of NC by Mitrega *et al*. (2012) and focus on dynamically managing supplier relationships specific to their life-cycle phase, in line with Reinartz *et al*.'s (2004) suggestions for portfolio management. Mitrega *et al*. (2012) posit that NC in supply relationships has three distinctive components, i.e. those behavioral routines aimed at initiating; those aimed at developing; and those aimed at terminating business relationships. The following will outline these components of NC and their relationships with firms' product innovation.

2.1. Supplier Relationship Initiation Capabilities (SRIC)

The RV emphasizes business relationships as the source of inter-firm learning and increased innovativeness (Cheng and Huizingh, 2014; Chesbrough, 2003), because such relationships create the appropriate atmosphere that fosters cooperation and collaboration while mitigating opportunism (Dyer and Singh, 1998). To this end, the RV also stresses the necessity to identify and evaluate partners as the building block of inter-firm competitive advantage, and thus provides, together with DC, the underpinning for *Supplier Relationship Initiation Capabilities (SRIC)* as the first NC component. SRIC focuses on organizational routines to utilize the potential of new supplier relationships for product innovation. While

some literature covers supplier selection criteria, there is no extensive literature on how firms navigate the relationship initiation stage (Edvardsson *et al.*, 2008, La Rocca *et al.*, 2013; Tóth *et al*., 2015). Supplier relationship initiation may be used by firms to exploit the potential of new supplier partnerships within their portfolio for product innovation (Hennart *et al*., 1999; Mesquita *et al*., 2008). We posit, in line with suggestions by Mitrega *et al*. (2012), that SRIC is composed of two sub-components, i.e. *selecting new suppliers* as well as *attracting new suppliers*.

2.1.1. Supplier Selection Capability

Selecting new supply partners requires screening potential suppliers and acquiring knowledge about potential partners (Mitrega *et al*., 2012). However, the literature does not offer a clear picture with regard to factors or processes that are most important in screening and selecting suppliers for collaborative innovation projects (e.g. Birou and Fawcett, 1994). Research by Wagner and Hoegl (2006) shows that R&D managers expect supply partners to possess both 'hard skills' as well as openness and credibility as a reflection of 'soft skills'. Firms tend to assess new business partners through various channels, such as word-of-mouth, managers' personal ties (Gulati, 1998), or other partners outside of their immediate business network (Beckman *et al*., 2004). Therefore, we argue that successful firms use various information sources to find and subsequently assess new suppliers for collaborative innovation relationships (e.g. suppliers' online presence, professional social media, and professional and personal relationships with other network actors).

Successful partner selection minimizes the risk of supplier opportunistic behavior (e.g. appropriation of knowledge by the supplier), and creates the potential for resource synergies (e.g. successful collaborative new product development projects). However, developing business relationships is an interactive process based on the cognition and behavior of all networking firms (Forkmann *et al*., 2012) and all actors, including suppliers,

aiming to select the best partners (Håkansson and Ford, 2002). Thus, besides being able to select an appropriate new supply partner, firms should also be able to attract selected suppliers for relationship initiation.

2.1.2. Supplier Attraction Capability

Attracting new supply partners for collaborative innovation relies on signaling, which refers to activities informing the selected partner that a firm is open to forging business relationships, e.g. for collaborative product innovation activities, or for sharing knowledge (Fontana *et al*., 2006). Such signaling activities could include various features such as cues focusing on financial and non-financial benefits, costs, trust and dependency (Tóth *et al*., 2015). Proposing a staged process of buyer–seller relationship development, Dwyer *et al*. (1987) suggest that business partners might be attracted by demonstrating similarity of values and complementarity of resources. Thus, we argue that attracting supply partners in order to enhance product innovation comprises informing the environment, and in particular suppliers, about relevant focal firm features, including technological capabilities, trustworthiness, and relationship propensity.

2.1.3. SRIC and Product Innovation

We argue that SRIC may help firms to innovate in two ways. First, carefully selected new supply partners will reveal appropriate supplier behavioral intentions (Ramsay *et al*., 2013), such as a willingness to get involved in collaborative new product development projects as well as minimizing possible opportunism during such projects (Yam and Chan, 2015). Furthermore, such selection will also identify suppliers with important resources for innovation. Secondly, being able to effectively attract selected partners allows innovation-related resources to be accessed and may potentially shorten new product development times (King and Penlesky, 1992). Based on the RV, SRIC will allow firms to be able to find (selection capability) and bond with (attraction capability) supply partners with

complementary and synergistic resources and technologies (Dyer and Singh, 1998). In line with Mitrega *et al.*'s (2012) conceptualization, these two aspects are independent sub-components of SRIC.

However, complementary to the RV and based on RBV arguments, firms may also exploit SRIC to benefit from short-term knowledge acquisitions during the early relationship stages – an approach entitled 'creaming-off' (Lavie, 2007; Mesquita *et al*., 2008). We argue that knowledge and resources accumulated during initial interactions with potential suppliers strengthen firms' resource base (e.g. technological or market knowledge) by adding currently inaccessible resources, thereby contributing to their innovativeness. Thus, based on the considerations regarding SRICs' ability to initiate potentially important supplier relationships for collaborative product innovation, and due to the creaming-off benefits of SRIC, we hypothesize:

H_{1a} – SRIC is positively related to Product Innovation.

2.2. Supplier Relationship Development Capabilities (SRDC)

Supplier Relationship Development Capabilities (SRDC) is the second NC component and follows the logic of the RV (Dyer and Singh, 1998). It refers to actions routinized at the firm level to strengthen relationships with supply partners. Strong or deep relationships are usually based on specific assets dedicated to the relationships (e.g. mutually adapted processes and technologies) in order to enhance collaborative product innovation (Jean *et al.,* 2014). Several pivotal factors were discussed in prior research, which help firms to strengthen their supply relationships: strategic integration with suppliers (Johnson, 1999), supplier development programs (Wagner, 2006), or collaborative communication and supplier control (Joshi, 2009). These studies concentrate generally on procedures and systems implemented at the inter-organizational level; however, business relationships are also operating via social ties, i.e. the inter-personal levels (Granovetter, 1985; Håkansson and

Ford, 2002). Consequently, we recognize *inter-personal* and *inter-organizational* aspects as important sub-components with regard to supplier relationship development.

2.2.1. Inter-organizational SRDC

For the development of supplier relationships aimed at product innovation, often various inter-firm adjustments and relationship-specific investments are necessary, which cannot easily be re-deployed as part of other supplier relationships (Bensaou and Anderson, 1999). Safeguarding such relationship-specific assets against opportunism as well as enhancing product innovation benefits requires effective communication and information sharing (Eckerd and Hill, 2012). In line with the RV (Dyer and Singh, 1998), we argue that inter-organizational relationship development capabilities in the context of supply partnerships aim at creating relationship-specific assets and formal governance mechanisms, which take the form of resource links and mutual adjustments as well as improved communication and information sharing between supply partners. This strengthens supplier relationships and has been shown to have a positive effect on product innovation activities, for example through increased knowledge exchange and risk mitigation (Cheng and Huizingh, 2014; Jean *et al.*, 2014), or through technology transfer (Lawson *et al*., 2015).

2.2.2. Inter-personal SRDC

The inter-personal aspects of supplier relationship development have received increased attention in recent years and were conceptualized as the foundation of supply chain relational capital (Cousins *et al*., 2006), in particular in the context of product innovation (Lawson *et al.,* 2009). The importance of building inter-organizational relationships through inter-personal ties was suggested not only in studies grounded empirically in Eastern business cultures (Michailova and Worm, 2003) but also in studies conducted in Western countries (Hutt *et al*., 2000; Lawson *et al*., 2009). Inter-personal aspects of SRDC are also emphasized in the RV (Dyer and Singh, 1998) where they are treated as fundamental for creating informal

and self-enforcing relational governance mechanisms, such as trust and commitment, which in turn drive communication and knowledge exchange (Morgan and Hunt, 1994). Therefore, we treat inter-personal aspects as inherent elements of *SRDC*, with similar positive effects on product innovation as inter-organizational SRDC (Lawson *et al*., 2015).

2.2.3. SRDC and Product Innovation

We argue that the positive effect of SRDC on firm innovativeness is based on the positive influence of SRDC on inter-firm trust, commitment, and relationship-specific assets, which in turn work as a relationship governance mechanism by mitigating threats of opportunistic behavior and by creating the appropriate climate for collaborative projects (e.g. sharing ideas via open communication) (Cheng and Huizingh, 2014). Such mechanisms were illustrated by Dyer and Hatch (2006) in the context of the automotive industry, where manufacturers that provide more assistance in collaborative projects also benefit more from their supply chain relationships. SRDC increases both: occasions for joint new product development (e.g. organizing inter-firm meetings for offering development, stimulating procedural adjustments with suppliers) (Jean *et al.*, 2014), as well as appropriate partner attitudes for joint new product development (e.g. through organized socialization) (Lawson *et al*., 2009, 2015). This results in the improved availability and development of supplier-based innovation resources through stronger and more collaborative business relationships (Takeishi, 2001; Azadegan *et. al*., 2013), especially in cases in which such resources are expensive or unavailable via the initiation of new supplier relationships. Thus, we hypothesize:

H_{1b} – SRDC is positively related to Product Innovation.

2.3. Supplier Relationship Ending Capabilities (SREC)

The RV, as an important rationale for business networking, in general does not suggest implementing any systematic actions at the firm level that would help eventually end

some selected relationships (Dyer and Singh, 1998). In fact, as partnering usually requires "*non-recoverable investments*" (Dyer and Singh, 1998, p. 663), the RV implicitly discourages managers from ending relationships. However, the ending of business relationships is becoming a more important research area (Tähtinen and Halinen, 2002) and is perceived as a building block of supplier relationship management (Moeller *et al*., 2006). Diminishing performance from mature supplier relationships as well as from mature supplier portfolios is well documented (e.g. Capaldo, 2007; Wagner, 2006), and negative effects on product innovation have been outlined (Moeller *et al*., 2006). The process of relationship-ending is compatible with the DC perspective that sees sources of competitive advantage as temporary, thereby emphasizing a systematic reconfiguration of firms' strategic focus (Teece, 1997; Zaefarian et al., 2016). In line with the DC, this research treats *Supplier Relationship Ending Capabilities* (SREC) as the actions or behavioral routines implemented at the firm level oriented towards the systematic withdrawal of supplier relationships that are hampering innovation. Consequently, such suppliers are deliberately eliminated from the supply portfolio even if they may be re-engaged in future interactions. We argue in line with Zaefarian et al. (2016) that, in the context of supplier relationships, ending management comprises two components: *ending preparation* (i.e. selecting non-performing supplier relationships by evaluating their value and identifying sub-optimal ones) and *ending processes* (i.e. establishing procedures for how to phase out or end sub-optimally performing supplier relationships).

2.3.1. SREC Preparation

Without selection routines in place, firms may be affected by what is known as supplier-switching inertia and therefore become locked into non-performing supplier relationships, with stifling effects on product innovation (Moeller *et al*., 2006). Such non-performing supplier relationships are therefore binding resources while not providing

adequate product innovation benefits; these resources could otherwise be used in a more optimal manner for product innovation. Systematic supplier evaluation has been discussed as a tool to assess partner contribution in business relationships and therefore to identify those relationships with a deficient value (Wagner, 2006). Implementing firm routines oriented at identifying non-performing supply partners provides an appropriate basis for further actions, including minimizing collaborative projects or downsizing relationships to more transactional levels (Wagner, 2006).

2.3.2. SREC Process

We build on the few recent studies that have treated relationship dissolution as an organizational competence (Havila and Medlin, 2012; Mitrega *et al*., 2012; Ritter and Geersbro, 2011), and we argue that successful business networking demands not only monitor non-performing supplier relationships in order to improve them (Wagner, 2006) but also develop concrete routines (e.g. assessing costs of ending, exploiting specific supply contract elements) devoted to relationship dissolution. These may be utilized after existing supply partners have been carefully evaluated and deemed as non-performing for product innovation activities. Such processes and routines would allow for a disengagement from supply partners and therefore the freeing of resources otherwise bound up in these supplier relationships (Moeller *et al.,* 2006).

2.3.3. SREC and Product Innovation

Studies on the effects of relationship-ending capabilities in the context of supplier relationship management are rather scarce and not often related directly to product innovation (Ritter and Geersbro, 2011; Havila and Medlin, 2012; Mitrega *et al*., 2012). Utilizing SREC in relation to collaborative product innovations does not question the idea that some investments dedicated to supplier relationships are not retrievable (Dyer and Singh, 1998). We acknowledge that some, but not all, innovation-related benefits may be lost if firms end

certain non-performing relationships. However, we argue for the existence of positive influences from SREC on product innovation based on two main reasons. First, supplier evaluation helps to identify non-performing supplier relationships but, combined with feedback to suppliers, also motivates those suppliers to improve their relationship performance (Wagner, 2006). Thus, non-performing supplier relationship assessment should have a positive impact on supplier relationships that are oriented towards innovation activities because they motivate non-performing partners to increase their collaborative activities and decrease opportunistic behavior (Yam and Chan, 2015). Furthermore, this safeguards against suppliers appropriating collaborative innovation outcomes, i.e. being able to withdraw from such relationships before such an appropriation by the supplier happens (Noordhoff *et al.,* 2011). Secondly, we argue for a positive impact of SREC on firm product innovation via freeing certain organizational efforts as well as such retrievable resources (e.g. skills of specialists employed by the firm that are dedicated to the collaboration with a specific supply partner), which can be used for alternative supplier relationships (i.e. initiating partnerships with new prospective suppliers, or deepening other well-performing existing supplier relationships) to improve product innovation (Zaefarian et al., 2016). This mechanism reflects a DC approach in the context of inter-firm networking because it assumes that firms systematically reconfigure resource bundles (Teece *et al*., 1997) through 'making space' in the supplier relationship portfolio for collaborative projects with new partners focused on product innovations. Thus, we hypothesize:

H_{1c} – SREC is positively related to Product Innovation.

2.4. Higher-order NC and Product Innovation

Based on our considerations regarding the different NC components, i.e. initiation (SRIC), development (SRDC), and ending capabilities (SREC), and their respective positive effect on product innovation, a higher-order conceptualization can be derived. All three NC

components are independent of each other, as they are aimed at different supplier relationship phases. However, together they form the dynamic networking capability that allows firms to re-configure their supplier relationship portfolio and optimize their product innovation performance. Thus, in line with DC, we provide an overall higher-order hypothesis:

H_1 – NC is positively related to Product Innovation.

2.5. Moderation Effects through Attitudinal Relationship Proclivity

As our conceptualization of NC is grounded in the dynamic capabilities view of strategy (Teece *et al*., 1997), it relates to actions and behaviors that are learned and institutionalized within firms and are oriented towards their supplier relationships. The literature suggests that such actions are grounded in (or moderated by) firms' make-up, which in turn affects the prevailing organizational attitudes (Henneberg *et al*., 2010). This mechanism (i.e. attitudes moderating behaviors) has been documented in several studies, e.g. Ritter (1999) found that firms' ability to develop technologies through business relationships is influenced by the extent to which attitudes of an entrepreneurial spirit and openness towards the business environment exist within such firms.

We use the construct of relationship proclivity to capture the attitudes held by firms regarding managing relationships with suppliers. Specifically, in line with Johnson and Sohi (2001), we treat relationship proclivity as the *"...strength of the general tendency held by a firm to seek out, engage in and make close partner-style IFRs* [interfirm relationships] *as opposed to conducting interfirm interaction at arm's-length"* (p. 302). Consequently, if the firm's top management introduces product innovation projects in collaboration with suppliers, such projects are likely to experience implementation barriers when there exists a lack of relationship proclivity within the organization (i.e. there is a lack of institutional willingness to share knowledge in relationships, or to develop interdependencies).

We argue that relationship proclivity works in similar ways for all processes and routines related to reshaping the supplier relationship portfolio, i.e. it positively amplifies the effect of supplier relationship initiation, development, as well as ending capabilities and therefore NC as a whole on product innovation. For example, a firm's capabilities for identifying non-performing supply partners may not be used effectively, if the firm does not perceive supply partnering as important for their innovation activities. Thus, problems with fading relationships are ignored until they become demonstrably disturbing for the firm's innovation objectives. In the same spirit, low levels of relationship proclivity will hinder firm programs oriented at initiating new, or developing existing supplier relationships. Intuitively, if firm attitudes persist which treat firm-internal proprietary knowledge and skills as the sole source of innovation success, such organizations will be resistant to engage with and learn from suppliers in collaborative innovation projects.

Thus, we hypothesize a positive moderating effect of relationship proclivity on the effect of NC with regard to product innovation:

H_2 – Relationship Proclivity positively moderates the relationship between NC and Product Innovation.

2.6. Product Innovation and Firm Performance

We follow Ritter and Gemünden (2003) in assuming that firms' innovativeness includes introducing new effective solutions in two main areas: a firm's offerings and its operations. Specifically, our research is focused on product (offering) innovations as the key innovation outcome of a firm's interactions with its suppliers. Product innovation has been established in the management and strategy literature as an important driver of firm performance (Han *et al*., 1998). Thus, our hypothesis is:

H_3 –Product Innovation is positively related to Firm Performance.

The overall nomological model, which will be tested in our research is presented in Figure 1.

INSERT FIGURE 1

3. Research Design

3.1. Sample

To test the proposed model, we collected data from a sample drawn from the Middle East, specifically the Iranian automotive parts industry. Iran's economy, alongside that of many other Middle Eastern countries, is growing. Iran's automotive industry (i.e. car manufacturers and parts suppliers) is its second largest and most established industry after the oil and gas industry. The automotive industry's growth in Iran is reported to be around 25% between 1995 and 2005, with total yearly car sales of more than $8.7bn. The automotive industry overall accounts for 10% of Iran's GDP (Azar *et al*., 2009). Today, this industry is led by a number of public and privately owned car manufacturers that annually produce more than 1.6 million vehicles in Iran. The size of the Iranian automotive market, as well as that of the entire Middle East, has attracted the attention of major international car manufacturers as well as automotive parts suppliers to this previously untouched market. The demand for cars has pushed the automobile industry in the Middle East to also enter into joint ventures with international car manufacturers and automotive parts suppliers who are interested in systematically increasing their market share in the region. The resulting mutual benefits have led to the signing of several joint venture agreements such as Peugeot, Citroen (France), Volkswagen (Germany) and Kia Motors (South Korea) in Iran; Land Rover (UK) in Jordan; and BMW (Germany), Nissan (Japan) and Hyundai (South Korea) in Egypt (Killing, 2012). As a result of these joint ventures, the competition in the automotive industry in Iran and other Middle Eastern countries is increasingly fierce, and the supplier relationships in this sector are an important factor of innovativeness and firm competitiveness, both for

automotive manufacturers as well as their parts suppliers. We assume that in such a setting, NC with respect to the supply chain plays a vital role in firms' long-term success, specifically in the context of product innovation.

We collected data from the automotive parts industry in Iran for which questionnaires were initially developed in English and then translated into Persian. In order to increase conceptual and translational equivalence between the two versions, the Persian questionnaires were back-translated into English (Brislin, 1970). As a result of this process, a small number of questions were re-worded to increase the precision of the translation. As a final step, face-to-face interviews were conducted with ten CEOs of automotive parts suppliers in Iran in order to pre-test the translated questionnaires, ensure their comprehensibility, as well as gauge ideal key informants for the specific content of the questionnaire, i.e. aspects related to supplier relationship management and innovation.

As a result of the pre-test, a multiple-key-informant approach was chosen to collect data from automotive parts firms regarding their supplier relationship management as well as their performance. Data regarding antecedent (NC), moderator (relationship proclivity) and final outcome (firm performance) constructs of our proposed model were collected from purchasing managers. Data regarding the central mediator construct (product innovation) were collected from R&D managers. Such a research design based on collecting data regarding independent and dependent variables from different respondents was chosen to mitigate against common method bias (Podsakoff *et al*., 2012) in addition to increasing the knowledgeability of respondents, as indicated in the pre-test.

The purchasing and R&D managers of 500 parts suppliers of major Iranian car manufacturers were contacted by phone and asked to participate in the survey. As such, we utilized a cross-sectional study design in line with prior studies on dynamic capabilities (Drnevich and Kriauciunas, 2011; Vanpoucke *et al.,* 2014). 340 firms indicated their

willingness to participate and we mailed the respective questionnaires separately to the purchasing and R&D managers of those firms. Initially, we received 143 matched questionnaires back (i.e. including both purchasing and R&D responses). After a reminder phone call, we received another 51 matched questionnaires, totaling 194 matched firm responses (i.e. 388 questionnaires), resulting in a response rate of 38.8%. Responses from firms that only returned one of the questionnaires (either purchasing or R&D) were excluded from further analyses.

In order to verify each respondent's knowledge, and to increase the validity of our findings, we added the following items to the purchasing and R&D questionnaires respectively: "To what extent do you feel knowledgeable about issues relating to the performance of your firm" (purchasing questionnaire) and "To what extent do you feel knowledgeable about issues relating to the innovativeness of your firm" (R&D questionnaire). Both items were measured on seven-point bipolar scales anchored at poor knowledge (1) and excellent knowledge (7). Firms for which either one of the two respondents indicated knowledgeability below the mid-point of four on the seven-point scale were removed from further analyses, thereby arriving at a purified sample size of 156 firms (i.e. 312 questionnaires) with an adjusted response rate of 31.2%.

The large majority of respondents have been with their firms in their current position for more than two years (95.3%) (see Table 1). Half of the respondents are in senior-level positions at their firms (48.5%) while the other half are middle-level managers (51.5%). While 70.7% of the firms are small and medium sized, 29.3% have more than 250 employees. All of the firms appear to be well established in the market, with 74.5% operating for more than 10 years. The vast majority of the firms surveyed are pure manufacturing companies (92.6%).

INSERT TABLE 1

3.2. Non-response and Common Method Bias

To assess potential non-response bias within our sample, we first follow Armstrong and Overton (1977) and compare early versus late respondents across various firm and respondent characteristics as well as central constructs in our model. Therefore, responses received after the reminder phone call were treated as late responses and compared with those received before the reminder, which served as early responses. Chi-square and t-tests did not show any significant differences between those two groups, suggesting that late-response bias is not an issue. Next, a short telephone survey about our key constructs was conducted with 50 firms randomly chosen from those firms of the initial sample that did not respond to the questionnaire. No significant differences between respondent firms and actual non-respondent firms were detected, providing further evidence that non-response bias is not a problem.

We controlled for common method bias through our multiple informant research design (Podsakoff *et al*., 2012). Also, various other research design procedures suggested by Podsakoff *et al*. (2003) were used in order to reduce *ex-ante* the risk of common method bias: random question order, neutral wording, assurance of the respondents' anonymity, and data confidentiality. In addition to these preventive procedures, we followed several steps to assess *ex-post* whether common method bias is problematic within our data. First, we used Harman's single factor test. Common method variance is problematic if either a single factor emerges from the exploratory factor analysis (EFA) or if a single factor accounts for the large majority of the explained variance. According to the results of the unrotated EFA, the biggest factor explains only 33.61% of the variance, while all factors with Eigen values above one altogether account for 68.32% of the explained variance. As an alternative to Harman's one-factor test, Chang *et al*. (2010) suggest using a confirmatory factor analysis (CFA). Following their suggestions, we restrained all items to load on only one factor in a CFA. The fit

statistics (RMSEA (<0.08) = 0.129; NFI (>0.9) = 0.473; CFI (>0.9) = 0.544; IFI (>0.9) = 0.555; χ^2 = 1767.117 (DF=495); χ^2/ DF (<2) = 3.570) did not show good fit, indicating that a single factor does not account for all the variance in the data.

3.3. Construct Operationalization

The focal constructs of the proposed model are measured using existing and already tested multi-item measurement models that are based on seven-point Likert scales (anchored at 1 "strongly disagree" and 7 "strongly agree"). As suggested by Mitrega *et al*. (2012), the NC components of supplier relationship initiation, development, and ending capabilities were operationalized as second-order formative constructs (Diamantopoulos, 2008). Supplier relationship initiation capability was composed from the two conceptually distinct but inter-connected sub-components of selection and attraction. Similarly, supplier relationship development capability was constructed from the two distinct sub-components of inter-organizational and inter-personal supplier relationship development. Finally, the third NC component – supplier relationship ending capability – was formed by the two conceptually distinct sub-components of ending preparation and process.

In line with the theoretical argument, initiation, development and ending are conceptually non-overlapping but interrelated components of NC (Jarvis *et al*., 2003). Thus, NC itself is operationalized accordingly as a third-order formative construct. As a composite variable, increases and decreases of NC can thus be either caused by the components independently or jointly (Diamantopoulos and Winklhofer, 2001). The items used for all first order constructs of supplier relationship initiation (i.e. selection and attraction), development (i.e. inter-organizational and inter-personal) and ending (i.e. preparation and process) capabilities were adapted from Mitrega *et al*. (2012) to the supplier context. The mediating construct of product innovation was measured with scales from Shu *et al*. (2012) based on Li and Atuahene-Gima (2001). The moderating construct of relationship proclivity was

measured using scales from Johnson and Sohi (2001). Firm performance as our focal outcome variable was measured according to Reinartz *et al*. (2004). Table 2 provides an overview of the item wordings. We also included the availability of alternative supply partners, firm size, and firm age as control variables.

INSERT TABLE 2

3.4. Assessing Measurement Models

Before estimating the proposed model, we first assess the reliability and validity (i.e. convergent and discriminant validity) of the measurement model. According to the EFA results (oblique/non-orthogonal rotation using Direct Oblimin with principle components extraction method; SPSS 17.0), the two sub-components of supplier relationship development capability (i.e. inter-organizational and inter-personal) load together on one common factor (see Table 3). This suggests that they are not conceptually distinct sub-components (as theoretically argued) but rather jointly reflect one common construct of supplier relationship development capability. We attribute this finding to the specific context of our study (i.e. Iranian automotive industry). The business culture in the Middle East (i.e. Iran) often does not exhibit a clear distinction between inter-personal and inter-organizational relationship management. This is expected as Iran tends strongly towards the collectivist end on the cultural continuum of individualism-collectivism (House *et al*., 2004). In such a context, top managements' personal networks become a key competitive advantage for the firm, since many of the key decisions are made through lobbying within such personal networks. Similar observations can be made in the business cultures in Far East Asia, i.e. Guanxi in China (Gu *et al*., 2008). Furthermore, while Mitrega *et al*. (2012) did not find any empirical support for their original conceptualization of relationship ending capability as being two-dimensional in nature, our EFA results suggest that respondents distinguished between the ending preparation and the ending process, thereby justifying the existence of two distinct sub-

components for relationship ending. Our findings differ from Mitrega *et al.* (2012) as we specifically sample purchasing managers. The more general sampling frame of Mitrega *et al.* (2012) may have masked the dimensionality of the construct.

We adopt the emerged factor structure moving forward and all items of the final measurement model load on their respective factor, with most loadings consistently above 0.6 and no cross-loadings above 0.3. According to our analysis, both the average variance extracted (AVE) as well as the scale composite reliabilities (SCR) for all constructs are above the thresholds of 0.5 and 0.6 respectively in support of convergent validity (see Table 4). Also, the square root of the AVE for each construct is larger than their respective correlations with the other constructs in the model in support of discriminant validity (Fornell and Larcker, 1981; Hair *et al*., 2009). Finally, we performed a CFA of the overall measurement model in LISREL 8.80 (Jöreskog and Sörbom, 2006). The CFA results indicate adequate fit (RMSEA (<0.08) = 0.064; NFI (>0.9) = 0.917; CFI (>0.9) = 0.965; IFI (>0.9) = 0.965; χ^2 = 780.868; χ^2 / DF (≤2) = 1.672).

INSERT TABLES 3 AND 4

4. Analysis and Findings

4.1. Main Model Analysis and Moderation Effects

We used the partial least square structural equation modeling (PLS-SEM) technique to test the proposed model. PLS-SEM has been increasingly popular in business and management research (Hair *et al*., 2012a, 2012b). PLS-SEM is advantageous for relatively small sample sizes and complex models (Fornell and Cha, 1994; Hair *et al*., 2012a; 2012b; Henseler *et al*., 2014; Reinartz *et al*., 2009) and allows the testing of models that simultaneously use formative and reflective measurement as well as hierarchical models (Becker *et al*., 2012; Hair *et al*., 2012b), which makes this a particularly useful analysis technique for our hypothesized model.

As empirically demonstrated in the EFA and discriminant validity analysis, the first-order factors of supplier relationship initiation (i.e. selection and attraction) and ending (i.e. preparation and process) capabilities are distinct and non-overlapping constructs. In line with our theoretical argument that those first-order factors form important independent sub-components of their higher-order constructs, we operationalize supplier relationship initiation and ending capabilities as a reflective-formative hierarchical latent variable model using the repeated indicator approach with Mode A as the mode of measurement on the second-order construct, and by applying the path-weighting scheme. The first-order constructs show strong and highly significant links with their higher-order constructs. The path coefficients for selection and attraction on supplier relationship initiation capability are 0.476 (t-value=9.083) and 0.748 (t-value=11.525) respectively. The path coefficients for ending preparation and process capabilities on supplier relationship ending capability are 0.518 (t-value=22.160) and 0.593 (t-value=20.838) respectively.

Furthermore, NC is operationalized as a reflective-formative-formative hierarchical latent variable model using the repeated indicator approach with Mode A as the mode of measurement on the third-order construct and by applying the path-weighting scheme. The corresponding regression weights for SRIC, SRDC and SREC on NC are 0.289 (t-value=11.500), 0.397 (t-value=13.320), and 0.457 (t-value=17.019) respectively, indicating that NC is appropriately measured by the three components (Hair *et al.*, 2012b). As suggested for formative measurement models, we assess multi-collinearity (Diamantopoulos and Winklhofer, 2001). The variance inflation factors (VIF) for all constructs show values well below 5 (highest VIF=2.070), suggesting that multi-collinearity is not an issue (Hair *et al*., 2012a).

SmartPLS 3.0 (Ringle et al., 2014) was used to test the hypothesized model. We follow the suggestion of Hair *et al*. (2012a) and test our main model using a path-weighted

procedure with a maximum of 300 iterations. A bootstrapping procedure with 5000 bootstrap samples was used to compute the t-statistics. Table 5 provides an overview of the PLS results for the main model testing H_1, H_2, and H_3. According to Table 5, this model explains 29.0% and 29.4% of the variance in firm product innovation and performance respectively. Also, Stone-Geisser's Q^2 (Geisser, 1974; Stone, 1974) indicates good predictive validity of the model for both firm product innovation (0.118) and performance (0.191). A blindfolding procedure with an omission distance of 9 (to ensure that the number of observations divided by omissions distance is not an integer) was used to compute the cross-validated redundancies (Hair *et al*., 2012a).

INSERT TABLE 5

According to the results, NC has a strong and positive effect on product innovation (β=0.332, t-value=3.716) in support of H_1. Further, the results show that product innovation has a strong and positive effect on firm performance (β=0.297, t-value=3.552) in support of H_3. The results also show a significant positive direct effect of NC on firm performance (β=0.211, t-value=2.394). Thus, the effect of NC on firm performance is partially mediated by product innovation. The indirect effect of NC on firm performance can be computed as 0.332×0.297=0.099. The total effect can then be calculated as the sum of the direct and indirect effects (0.211+0.099=0.310). The variance accounted for (VAF) through the mediation is 0.099/0.310=0.318, which suggests that product innovation success mediates 32% of the effect from NC on firm performance. In a further step, we analyzed the moderation effect of relationship proclivity (see Table 5). The results provide evidence in support of H_2, i.e. that relationship proclivity positively moderates the effect of NC on product innovation (β=0.119, t-value=2.122). In our model, we controlled for the effects of firm size and firm age as well as the availability of alternative supply partners on product innovation and firm performance.

4.2 Disaggregated NC and Latent Class Analysis

In order to test H_{1a}, H_{1b}, and H_{1c} (i.e. the sub-hypotheses which disaggregate H_1 into separate hypotheses relating to the three components of NC), we model the direct effects of the NC components, i.e. supplier relationship initiation, development, and ending capabilities, on product innovation. According to the results (see Table 6, row 'overall'), supplier relationship development capability (H_{1b}; β=0.324, t-value=2.600) has a significant and positive effect on product innovation in support of H_{1b}. However, the effects of supplier relationship initiation (H_{1a}; β=0.043, t-value=0.630) and ending (H_{1c}; β=0.135, t-value=1.407) capabilities on product innovation are not significant.

INSERT TABLE 6

To understand the robustness of these results with regard to the components of NC, i.e. supplier relationship initiation, development, and ending capabilities, a latent class analysis was conducted using finite mixture modeling in PLS (FIMIX PLS) (Hair *et al*., 2012a, Money *et al*., 2012). This analysis allows detecting whether any meaningful segments exist within the sample for which the strength, direction, as well as statistical significance differ for the estimated model. It represents a homogeneity test as overall results often mask more fine-grained details (Hair *et al.,* 2012a). In particular, the latent class analysis is aimed at understanding whether the non-significant results for H_{1a} and H_{1c} are a result of such a 'masking' and thus spurious, or if they are replicated in a rigorous FIMIX analysis. To determine the appropriate number of segments, a range of indices are used; most importantly the Akaike's Information Criterion (AIC) and Bayesian Information Criteria (BIC) should be minimized, while the entropy statistic (Ramaswamy *et al*., 1993), measuring the degree of separation between the estimated individual cluster probabilities (defined between 0 to 1), should be maximized (Hair *et al*., 2012a). In addition, Sarstedt and Ringle (2010) suggest that in order to avoid "*unreasonable FIMIX-PLS results, a useful indicator is the small size of*

additional segments" (p. 1303). Table 7 shows the different index values for solutions with two to five clusters, altogether pointing to the existence of two dominant segments.

INSERT TABLE 7

In Table 6, we contrast the PLS results of the NC component path model between the two segments (n=27) and (n=129). The sample size of segment 1 is relatively small, however, PLS permits path modeling with smaller sample sizes but the results need to be interpreted tentatively (Hair et al., 2011; 2012a, 2012b). Our comparison shows that the impact of supplier relationship initiation (β=0.250, t-value=2.431) and ending capabilities (β=0.426, t-value=3.812) on product innovation are strong positive and significant for segment two, while that of supplier relationship development capability is insignificant (β=-0.082, t-value=1.020). *Vice versa*, segment one shows a strong positive and significant effect of supplier relationship development capability on product innovation (β=0.740, t-value=5.259), while the effects of supplier relationship initiation (β=-0.216, t-value=1.357) and ending capabilities are insignificant (β=-0.192, t-value=1.022). The observed differences in the effects of the three NC components on product innovation are significantly different (SRIC: t-value=2.501, SRDC: t-value=5.160, SREC: t-value=2.874). The effect of product innovation on firm performance is positive and significant for both segments (segment 1: β=0.355, t-value=2.378; segment 2: β=0.524, t-value=7.605) and not significantly different between the two segments (t-value=1.045), which is in line with the findings for the overall sample. The FIMIX results therefore indicate the existence of two groups of firms in the automotive parts industry in Iran, which use different combinations of the components of networking capability to leverage their product innovations through supply relationships.

To further investigate the two segments as well as explore their consequence, we carry out a further FIMIX analysis, first in terms of the performance of the segments with respect to our focal constructs, i.e. firm performance and product innovation, and secondly in

terms of control variables in particular firm size, firm age, and the availability of alternative supply partners. Table 8 provides an overview of our findings. The results show that there is no significant difference between the two segments for firm performance and product innovation. These results indicate that both approaches present viable (equifinal) manifestations of NC with regard to fostering product innovation success and achieving higher firm performance. Furthermore, we were not able to detect any significant difference between the two segments in terms of firm size, firm age, or the availability of alternative supply partners.

INSERT TABLE 8

5. Discussion and Theoretical Contributions

This study uses a sample of 156 firms in the Iranian automotive supplier industry to test the relationship between NC, product innovation, and firm performance as well as the role of relationship proclivity. The results for the overall sample show that NC has a positive effect on product innovation. Furthermore, relationship proclivity amplifies the positive effect of NC on product innovation. A more detailed analysis at the NC component level reveals that overall only NC routines oriented at developing existing supply relationships influence product innovations. However, these results are further qualified by a more detailed latent class analysis, which identifies two subgroups among the surveyed firms: in one subgroup product innovation results purely from relationship development capabilities, while in the other (larger) subgroup initiation and ending capabilities are positively related to product innovation, with development capabilities showing no significant impact. We therefore provide evidence of a 'masking effect' when analyzing the overall sample (Hair et al. 2012a).

This study informs research on supplier networks (Harland and Knight, 2001; Mills *et al.,* 2004; Johnsen, 2011; Smart *et al*., 2007) by introducing a dynamic capability framework that provides an understanding for how firms can manage the composition of their supplier

portfolio. We argue that such dynamic supplier relationship management allows firms to continuously align their resource base with their innovation resource needs. We extend existing knowledge about such networking-related capabilities (e.g. Ritter *et al.*, 2002, 2003, 2004; Mort and Weerawardena, 2006; Walter *et al.*, 2006; Mitrega and Pfajfar, 2015) by empirically illustrating their importance with respect to supplier relationships, in particular for product innovation, which mediates around one third of the effect of NC on firm performance. Furthermore, we empirically show that distinct components of NC suggested by Mitrega *et al*. (2012), namely relationship initiation capability, relationship development capability, and relationship ending capability, have different performance implications for product innovation. While in the overall sample, only the effect of relationship development capabilities on product innovation is significant, our more fine-grained FIMIX analysis found that this result masks two underlying mechanisms, suggesting that firms may use two different 'recipes for success' in supplier relationship management (Dittrich and Duysters, 2007; Mesquita *et al*., 2008), both of which can be equally successful (equifinality). Thus, NC and its three components provide companies with 'ingredients' which can be combined in different 'recipes', i.e. NC configurations, as part of choosing how to use them.

Our results further indicate that the organizational attitudes moderate the effect of NC on product innovation. We specifically show how relationship proclivity amplifies the effectiveness of NC. Thus, if external partnerships are perceived as important drivers of firm success, networking capabilities are utilized better, while low relationship proclivity dampens the effectiveness of NC. This result is in line with research in management that suggests the importance of alignment between organizational attitudes and capabilities for firm performance (Schein, 2010). Our research thus extends the literature on networking-related capabilities (e.g. Ritter 1999; Mitrega *et al*., 2012) by examining an important contingency factor for their deployment.

The results of our FIMIX analysis provide tentative support for the thesis that firms may implement distinct networking capabilities in different ways to achieve product innovation and ultimately firm performance. The two resulting clusters of firms identified in our research seem to be based on very different supplier portfolio management mechanisms. In the first cluster of firms, which represents a small proportion of our empirical dataset (n=27), product innovation success is driven by NC routines aimed at existing collaborative supply partnerships, i.e. these firms leverage their product innovation within the boundaries of their current supplier relationship portfolio. We call this mechanism '*static optimization*'. In the second and larger cluster (n=129), firms benefit mainly from implementing NC routines aimed towards reconfiguring their supplier relationship portfolios by terminating selected partnerships and initiating new ones. We call this mechanism '*dynamic optimization*'. Our exploratory latent class analysis research results do not explain if these two optimization mechanisms are intentionally chosen by those firms or not.

However, the overall results provide a contribution in the area of dynamic capabilities aimed at managing supply relationship portfolios by suggesting that not only supplier development with existing partners within the portfolio contribute to success (Wagner, 2006) but that also the dynamic reconfiguration of the supplier relationship portfolio itself may be an effective strategy in supply chain management. We see our research results in line with the 'exploitation' versus 'exploration' approaches previously discussed in research on inter-organizational learning (Lavie and Rosenkopf, 2006; Mesquita et al., 2008) as well as collaborative innovation (Dittrich and Duysters, 2007). Both of these networking approaches are fostering product innovation, but exploitation is status-quo-oriented, usually taking the form of technology refinement in existing (inter-)organizational settings, whereas exploration is dynamic and demands new resources and competences (e.g. to enable radical new product designs), which might be acquired by forming new supplier relationships (Lavie and

Rosenkopf, 2006). Our research results suggest that such an orientation towards forming new supply partnerships as well as ending non-performing ones is indeed a valuable strategic option for firms. In fact, our analysis shows that firms utilizing a dynamic optimization approach can be as successful as firms utilizing a static optimization approach.

In sum, our research results provide evidence for the positive influence of networking capabilities on product innovation, as well as overall firm success. At the same time, the research illustrates that such capabilities may be applied in various combinations in the context of supplier relationship portfolio management, as well as highlights the key role of organizational attitudes regarding the importance of relationships for firm success. We believe that our research also corresponds with the need to make today's supply chains more agile (Van Hoek *et al*., 2001), thereby facilitating the adjustment and flexibility of the supply chain with regard to turbulent environments. As all business relationships lose, sooner or later, their value and become costs (Capaldo 2007), the most successful firms may need to maneuver over time between various approaches to using NC in supply relationships.

6. Managerial Contributions

Our study contributes to managerial knowledge by illustrating the need for a selective approach with regard to networking-related routines in a product innovation context. As distinct networking mechanisms for supply relationship portfolio management emerge from our analysis, this study suggests that managers should devote equal attention to strengthening existing relationships on the supply side as well as to initiating new partnerships (e.g. screening for promising partners and signaling their firms' relationship value to attract new counterparts) and managing fading relationships (e.g. by developing routines to exit from sub-optimal relationships). Additionally, as relationship termination processes are often neglected in management practice, partly due to the mind-set embedded in some organizational cultures (Ritter and Geersbro, 2011), our study calls for greater managerial

interest in concrete organizational routines that may be useful for disengaging from those supply relationships that are no longer fruitful in terms of their impact on product innovation. In this context, firms should also heed the fact that capabilities themselves are only one aspect of successful management but that certain attitudes, in our case relationship proclivity, are important success factors in utilizing these capabilities. It is therefore pivotal to provide training, education and incentives to instill a management mindset, which embraces business relationships but also allows for a flexible dealing with under-performing relational partners.

Our results show two different mechanisms of how firms utilize NC for supply relationship management. The results indicate that most firms in our dataset do not follow a more static approach of exploitation with regard to supplier relationship management. A practical implication of equifinal NC configurations regarding supplier relationship management implies that a 'one-size-fits-all approach' for enhancing product innovation does not exist. Thus, firms can choose which of the NC configurations fits best with their characteristics as well as their business environment

7. Limitations and Future Research

Our research is focused on one setting (i.e. the automotive industry in Iran). Therefore, while such a specific research design allows us to control for many parameters, it limits the generalizability of the findings. Further studies need to broaden our findings to other industries and countries, specifically those which show a different cultural make-up from Iran. It also needs to be noted that after the data collection period, the Iranian automotive industry suffered considerably from more stringent sanctions, with car/bus production falling to just under 800,000 units in 2015 (from a high of over 1.5m in 2011) (Ministry of Industry, Mine and Trade 2016). Therefore, our findings (relating to a period of growth in the industry) are not representative for the downturn and contraction period.

However, as sanctions have again been lifted (in 2016), it can be expected that the Iranian car industry will return to a growth trajectory.

Our research design also has some advantages and disadvantages. Our sample of firms is not very large but is adequate in relation to the size of the automotive supply industry in Iran (Azar *et al*., 2010) and larger in comparison to other studies in this area (e.g. Wagner, 2006). We also provide evidence that non-response bias was not a problem in our research. Using cross-functional survey data is always problematic but we tried to mitigate against such risk by applying a multi-informant research design. We also controlled for this problem by testing common method variance. Taking into consideration that we concentrated on cross-sectional data and phenomena that are not directly observable, our analyses were not causal in a rigorous sense (Iacobucci, 2009).

Furthermore, our findings indicate the existence of two distinct mechanisms as to how different aspects of NC impact product innovation. While it is reasonable to identify these mechanisms as networking 'strategies', it is unclear whether or not these are intended by those firms or are emerging (Mintzberg and Waters, 1985). Additionally, our analysis through PLS-FIMIX did not reveal any descriptive and explanatory variables, which can be used to understand the differences between the firm clusters better. Thus, further research needs to ascertain if supply chain managers intentionally choose to focus on certain aspects of NC as part of supplier relationship portfolio management, and what the contingencies for such strategies are. For example, further research may test the relative influence of networking capabilities on a wider set of supply chain performance measures, including operational and purchasing costs, and supply chain agility, or the appropriateness of different NC configurations for radical versus incremental product innovations.

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FIGURE 1
Nomological Model

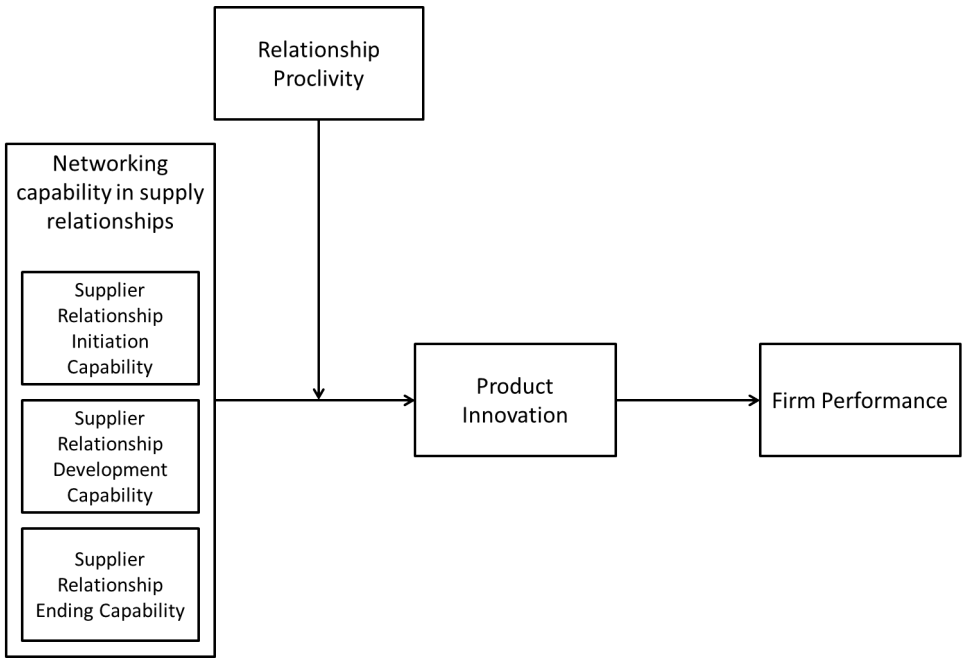

TABLE 1
Overview of Sample Characteristics

	Share
Firm Characteristics	
Number of Employees	
10 or less	2.7%
11-25	10.2%
26-50	19.7%
51-250	38.1%
251-750	22.5%
751-5000	6.1%
5001 or above	0.7%
Company Age	
0 - <2	2.7%
2 - <5	7.4%
5 - <10	15.4%
10 - <20	34.2%
20 - <50	38.9%
50 or more	1.4%
Respondent Characteristics	
Years with the Company	
0 - <2	4.7%
2 - <5	18.3%
5 - <10	41.9%
10 - <20	28.7%
20 or more	6.4%
Position within the Company	
CEO	10.8%
Owner or Co-owner	5.2%
Managing Director	1.6%
Other top-level Director	30.9%
Middle-level manager	51.5%
Years of Employment in Current Position	
0 -<1	9.4%
2 - <5	41.3%
5 - <10	33.9%
10 or more	15.4%

TABLE 2
Measurement Models of Latent Constructs after Purification

Construct	Items	Loadings
Supplier Relationship Initiation Capability (SRIC) – Selection *Mitrega et al. 2012 (adapted)* VE = 70.881 α = .789	To what degree do you agree with the following statements (Strongly Disagree (1) – Strongly Agree (7)):	
	Our company has a formal system for identifying which of the potential Supply partners are attractive to us.	.858
	We rank order and short-list potential Supply partners based on their potential to us.	.911
	We develop a formal list of preferred features of potential Supply partners.	.749
	We systematically gather and review publicly available information to identify potential Supply partners.	-
	We evaluate the resources and capabilities of potential Supply partners.	-
Supplier Relationship Initiation Capability (SRIC) – Attraction *Mitrega et al. 2012 (adapted)* VE = 70.309 α = .858	To what degree do you agree with the following statements (Strongly Disagree (1) – Strongly Agree (7)):	
	We promote our company's successes with previous/current Supply partners.	.788
	We systematically build the image of our company as a "reliable business partner".	.859
	We systematically inform potential Supply partners about our company's offering.	.868
	We systematically use recommendations from our existing Supply partners to attract new ones.	.837
Supplier Relationship Development Capability (SRDC) - Inter-company & Inter-personal development *Mitrega et al. 2012 (adapted)* VE = 64.456 α = .887	To what degree do you agree with the following statements (Strongly Disagree (1) – Strongly Agree (7)):	
	We try to customize cooperation with our Supply partners (e.g. technology/product/process adaptations).	.846
	We try to "lock in" our Supply partners in cooperation with us.	.799
	We work closely with our Supply partners when developing our offerings.	.696
	We provide our Supply partners with valuable information that can help them better serve their customers.	-
	We continuously communicate with our Supply partners regarding mutual expectations.	-
	Our company regularly organizes social events involving representatives from our Supply partners.	.811
	Our company motivates us to create close personal business ties with representatives from our Supply partners.	.844
	Our company motivates us to socialize with representatives from our Supply partners at networking events (e.g. trade shows, professional training conferences).	.813
	Our company encourages us to establish inter-personal relationships with multiple stakeholders from different	-

	functional areas within our Supply partners.	
Supplier Relationship Ending Capability (SREC) – Preparation *Mitrega et al. 2012 (adapted)* VE = 66.689 α = .834	To what degree do you agree with the following statements (Strongly Disagree (1) – Strongly Agree (7)):	
	Our company has established a formal system to identify Supply partners where key performance indicators or agreed milestones are not met.	.758
	Our company has a formal system in place to assess the profit and cost associated with existing Supply partners relationships.	.842
	We systematically rank our Supply partners according to their performance.	.841
	We analyse the direct and indirect costs involved in terminating a business relationship with our Supply partners (e.g. searching for new Supply partners, new investments, penalties, etc.).	.823
Supplier Relationship Ending Capability (SREC) – Process *Mitrega et al. 2012 (adapted)* VE = 71.237 α = .863	To what degree do you agree with the following statements (Strongly Disagree (1) – Strongly Agree (7)):	
	Our company has established formal procedures for how to discontinue relationships with unwanted Supply partners.	.806
	Our company formalizes termination conditions within the contracts between us and our Supply partners.	.868
	If we have to terminate a relationship with a Supply partner, we first try to achieve a mutual understanding of the situation and reasons leading to the partnership's discontinuation.	.822
	Our company has established procedures for how to phase out business relationships with Supply partners that are not desirable any more.	.878
Product Innovation *Shu et al. 2012 (adapted)* VE = 62.627 α = .795	To what degree do you agree with the following statements (Strongly Disagree (1) – Strongly Agree (7)):	
	Our company continuously improves the quality of its products.	.679
	Our company continuously introduces new products and develops markets.	.779
	We care a great deal about the new technology breakthroughs.	.854
	The company is a pioneer in developing new markets.	.841
	The number of new products introduced in the past three years increased steadily.	-
Relationship Proclivity *Johnson and Sohi 2001 (adapted)* VE = 66.343 α = .828	To what degree do you agree with the following statements (Strongly Disagree (1) – Strongly Agree (7)):	
	Closer partner-type relationships with Supply partners offer a major advantage in doing business.	.808
	Teaming up and working closely with Supply partners allows us to be more effective.	.874
	It is appropriate to share proprietary information with our	.825

	Supply partners if it is useful to do so.	
	Most often Supply partners can be trusted to meet their obligations.	.746
	Most of the time, Supply partners will not take advantage of us.	-
	The less any Supply partners know about how we do things, the better off we are. (R)	-
Firm Performance *Reinartz, Kraft & Hoyer, 2004 (adapted)* VE = 72.866 α = .873	Evaluate how your company performs concerning the following statements relative to your firm's competitors (Much worse (1) – Much better (7)):	
	Achieving overall performance	.875
	Attaining market share	.847
	Attaining growth	.886
	Current profitability	.805

Note: We used the original item list from Mitrega et al. (2012) as our basis for the networking capability constructs.
SRDC - Inter-company & Inter-personal development: uses items from Mitrega et al.'s (2012) relationship development capability construct, i.e. the social and management sub-components.
SREC Preparation and Process: uses items adapted from Mitrega et al.'s (2012) relationship termination capability construct and therefore correspond to the originally posited two sub-components (i.e. capability to select unfavorable business relationships, and capability to discontinue relationships with unfavorable partners).

TABLE 3
Exploratory Factor Analysis (Direct Oblimin)

	1	2	3	4	5	6	7	8
Supplier Relationship Initiation Capability (SRIC)								
1. Selection								
SRICS1	.749							
SRICS2	.846							
SRICS3	.672							
2. Attraction								
SRICA1		.636						
SRICA2		.762						
SRICA3		.838						
SRICA4		.778						
Supplier Relationship Development Capability (SRDC)								
3. Inter-company								
SRDCIC1			.572					
SRDCIC2			.591					
SRDCIC3			.597					
4. Inter-personal								
SRDCIP1			.710					
SRDCIP2			.738					
SRDCIP3			.611					
Supplier Relationship Ending Capability (SREC)								
5. Preparation								
SRECS1				.746				
SRECS2				.656				
SRECS3				.574				
SRECS4				.752				
6. Process								
SRECP1					.619			
SRECP2					.688			
SRECP3					.621			
SRECP4					.727			
7. Product Innovation								
PI1						.821		
PI2						.589		
PI3						.804		
PI4						.679		
8. Relationship Proclivity								

RP1	.774	
RP2	.835	
RP3	.822	
RP4	.714	
9. Firm Performance		
FPerf1		.759
FPerf2		.895
FPerf3		.764
FPerf4		.770

TABLE 4
AVE, SCR and Correlations

Construct	AVE	SCR	1	2	3	4	5	6	7	8
1 SRIC Selection	.596	.812	**.772**							
2 SRIC Attraction	.609	.861	.320	**.780**						
3 SRDC	.576	.890	.485	.639	**.759**					
4 SREC Preparation	.559	.834	.533	.567	.671	**.747**				
5 SREC Process	.620	.867	.495	.524	.731	.715	**.788**			
6 Product Innovation	.512	.803	.157	.435	.528	.451	.398	**.715**		
7 Relationship Proclivity	.559	.834	.475	.514	.476	.417	.271	.126	**.748**	
8 Firm Performance	.642	.877	.283	.294	.515	.479	.381	.554	.151	**.801**

AVE = average variance extracted; SCR = scale composite reliability; Square root of the AVE along the diagonal

TABLE 5
PLS Estimation of Structural Model

Main Effects	
NC → Product Innovation	0.332[a]*** (3.716)[b]
Product Innovation → Firm Performance	0.297*** (3.552)
NC → Firm Performance	0.211** (2.394)
Relationship Proclivity → Product Innovation	0.020 (0.303)
Interaction Effects	
NC × Relationship Proclivity → Product Innovation	0.119** (2.122)
Control Variables	
Availability of Alternative Supply Partners → Product Innovation Success	0.198** (2.487)
Availability of Alternative Supply Partners → Firm Performance	0.173** (2.428)
Firm Size → Product Innovation	0.105* (1.774)
Firm Size → Firm Performance	0.062 (1.277)
Firm Age → Product Innovation	0.082 (1.367)
Firm Age → Firm Performance	0.077 (1.541)
R^2*(Product Innovation)*	0.290
R^2*(Firm Performance)*	0.294
Q^2*(Product Innovation)*	0.118
Q^2*(Firm Performance)*	0.191

[a]β, [b]t, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

TABLE 6
PLS Estimation of NC Components Structural Model and Corresponding FIMIX Results of Two Latent Segments

	Overall	FIMIX		
		Segment 1 (N=27)	Segment 2 (N=129)	t[W-S]
Main Effects				
SRIC → Product Innovation	0.043[a] (0.630)[b]	-0.216 (1.357)	0.250** (2.431)	2.501**
SRDC → Product Innovation	0.324*** (2.600)	0.740*** (5.259)	-0.082 (1.020)	5.160***
SREC → Product Innovation	0.135 (1.407)	-0.192 (1.022)	0.426*** (3.812)	2.874***
Product Innovation → Performance	0.453*** (6.224)	0.355** (2.378)	0.524*** (7.605)	1.045
R^2*(Product Innovation)*	0.210	0.495	0.304	
R^2*(Performance)*	0.205	0.126	0.275	

[a]β, [b]t, *** $p<0.01$, ** $p<0.05$, * $p<0.1$; t[W-S] = Welch-Satterthwait t-value for multi-group comparison test.

TABLE 7
FIMIX-PLS Evaluation Criteria

Segments	lnL	Akaike's information criterion (AIC)	Bayesian infromation criterion (BIC)	Consistent AIC (CAIC)	Modified AIC (AIC_3)	Normed entropy statistics (EN)
2	692.266	-1,334.533	-1,258.286	-1,233.286	-1,309.533	0.552
3	714.916	-1,353.831	-1,237.937	-1,199.937	-1,315.831	0.680
4	748.999	-1,395.997	-1,240.455	-1,189.455	-1,344.997	0.648
5	1,074.592	-2,021.184	-1,825.993	-1,761.993	-1,957.184	0.755

TABLE 8
FIMIX Segment Characteristics

	Overall	Segment 1 (N=27)	Segment 2 (N=129)	
Firm Performance	5.30	4.94	5.37	*t=-1.233*
				p=0.228
Product Innovation	5.52	5.51	5.52	*t=-0.038*
				p=0.970
Number of Employees				
10 or less	2.7%	0%	3.3%	X^2*=3.785*
11-25	10.2%	7.7%	10.7%	p_{exact}*=0.698*
26-50	19.7%	26.9%	18.2%	
51-250	38.1%	30.8%	39.7%	
251-750	22.5%	30.8%	20.7%	
751-5000	6.1%	3.8%	6.6%	
5001 or above	0.7%	0%	0.8%	
Mean	292.73	215.92	309.23	*t=-0.711*
				p=0.478
Company Age				
0 - <2	2.7%	3.8%	2.4%	X^2*=4.072*
2 - <5	7.4%	3.8%	8.1%	p_{exact}*=0.540*
5 - <10	15.4%	23.1%	13.8%	
10 - <20	34.2%	42.3%	32.5%	
20 - <50	38.9%	26.9%	41.5%	
50 or more	1.4%	0%	1.6%	
Mean	17.66	16.04	18.00	*t=-0.779*
				p=0.437
Availability of Alternatives	4.59	4.52	4.61	*t=-0.229*
				p=0.820