
How inter-firm cooperation and conflicts in industrial clusters influence new product development performance? The role of firm innovation capability

Abstract: Despite ongoing cooperation among firms in industrial clusters, inter-firm conflicts are also prevalent, and little research has explored how these factors impact new product development (NPD) performance. In this study, we examine the influence of inter-firm cooperation and conflicts (i.e., constructive and destructive) on NPD performance, and explore the mediating role of innovation capability (i.e., incremental and radical) and the joint interactive effects of cooperation and conflicts on innovation capability. Based on data collected from a multi-sourced sample of 181 industrial cluster firms, our results confirm that innovation capability mediates the relationship between cooperation/constructive conflict and NPD performance. Specifically, we find that cooperation and constructive conflict positively affect both types of innovation capability, while destructive conflict negatively affects incremental innovation capability. Moreover, we identify a negative interaction effect of cooperation and constructive conflict on radical innovation capability, and a positive interactive effect of cooperation and destructive conflict on incremental innovation capability. These findings contribute to the literature on industrial clusters and provide practical implications for firm managers and government officials interested in regional development through industrial clusters.

Keywords: Cooperation; conflict; Incremental innovation capability; Radical innovation capability; NPD performance

1. Introduction

Industrial clusters, defined by the geographical concentrations of interconnected firms and institutions within a particular region (Porter, 1998; Kukalis, 2010; Matuschewski, 2006), have been recognized as a means of enhancing new product development (NPD) performance by promoting cooperation among firms (Lai et al., 2014; Langerak et al., 1997). However, with multiple actors involved, such as suppliers, buyers, and even competitors, each with their own interests and priorities, inter-firm conflicts also arise, some of which can potentially hinder NPD performance (Bengtsson & Raza-Ullah, 2016). Despite the prevalence of inter-firm conflicts alongside cooperation in industrial clusters (Felzensztein et al., 2018), previous research has primarily focused on one or the other, leaving a significant gap in our understanding of whether, and if so, how the joint presence of both affects NPD performance. Specifically, we lack knowledge of the mechanisms that link cooperation and conflicts with NPD performance in such settings.

We aim to address this gap by drawing on the resource-based theory (Freeman et al., 2021; Barney, 1996; Combs & Ketchen, 1999), which suggests that a firm's resource deployment capabilities are pivotal to attaining superior performance outcomes (Newbert, 2008). We argue that innovation capability is a crucial component of these capabilities, entailing the leveraging of existing knowledge and resources to introduce novel products via screening, integrating, and reconfiguring (Subramaniam & Youndt, 2005), and has been demonstrated to be vital for the NPD process (e.g., Aljanabi, 2020; Liu & Jiang, 2016). Existing literature suggests that inter-firm cooperation and conflicts affect the development of innovation capability by enabling or constraining the acquisition and accumulation of relevant resources and knowledge through inter-firm interactions (Weber & Heidenreich, 2018; Tang et al., 2017). However, the degree to which innovation capability operates as an intermediate mechanism linking cooperation and conflicts to NPD performance, and how it does so, remains unclear. Our study seeks to fill this knowledge gap by examining the extent to which the two types of innovation

capability—incremental innovation and radical innovation—mediate the impact of inter-firm cooperation and conflicts on NPD performance. Specifically, we propose that cooperation and conflicts (individually and jointly) influence innovation capability, which in turn shapes NPD performance outcomes.

In developing our hypotheses, we consider two types of conflict—constructive and destructive—to account for their varying impacts on innovation capability (Bengtsson & Sölvell, 2004; Gallaud & Torre, 2004). Constructive conflict involves productive discussions and arguments (Rawwas et al., 1997; Puck & Pregonig, 2014) that lead to improved innovation capability, while destructive conflict arises from incompatible goals and competing interests, often hindering innovation capability due to suspicion, distrust, and violence (Chen & Wu, 2011). Essentially, both cooperation and conflicts, including both types, affect the processes of information dissemination, knowledge transfer, and resource sharing (Elgoibar et al., 2016; Obul et al., 2021), which are closely related to NPD performance.

Additionally, it is important to recognize that cooperation and the two types of conflict can either complement or constrain each other when it comes to the development of knowledge and resources. Thus, cooperation and conflict have an interaction effect on innovation capability, as the simultaneous presence of cooperation and different types of conflict provide a distinction in the basis for the construction of knowledge and resources for innovation capability. Specifically, constructive conflict and cooperation have overlapping roles in exchanging and sharing knowledge and resources as both can increase friendly inter-firm interactions, and hence, cooperation substitutes for constructive conflict (Li et al., 2011). Conversely, cooperation helps to alleviate the disruptive effects of destructive conflict on knowledge and resource exchange as cooperation complements the reduction in knowledge and resources caused by destructive conflict damaging relationships (Kumar & Van Dissel, 1996; Somech et al., 2009; Stark et al., 2014).

The findings based on a regression analysis of data collected from multiple sources

from 181 industrial cluster firms contribute to the current literature. First, by simultaneously exploring the impact of conflict and cooperation within industrial clusters on NPD performance, this study provides a better picture of the determinants of NPD performance. Second, by highlighting the mediating role of innovation capability, this study serves as a basis for clarifying the complex mechanisms through which cooperation and conflicts affect NPD performance. Finally, the study's findings on the interaction between cooperation and the two types of conflict on reveal that they can complement or constrain each other depending on the innovation process. Specifically, the results extend the work of Li et al. (2011) by showing that cooperation reinforces the positive effects of constructive conflict and mitigates the negative effects of destructive conflict on knowledge acquisition.

2. Theoretical background

2.1. Inter-firm cooperation in industrial clusters

Inter-firm cooperation is a powerful tool for promoting innovation, where firms engage in joint and reciprocal activities to develop new technologies and capabilities, leading to innovative products and processes (Xu et al., 2017). Industrial clusters, which are characterized by geographical proximity, highly related industries, and multiple actors, offer an ideal context for effective cooperation on innovation (Porter, 1998; Letaifa & Rabeau, 2013; Biggiero & Sammarra, 2010). In particular, industrial clusters provide greater collaborative advantages due to multiple stakeholders in the region, including buyers, suppliers, complementors, and competitors. Availability of a greater pool of such stakeholders provides abundant opportunities for inter-firm cooperation, such as sharing expertise and complementary resources, accessing a wealth of innovative knowledge from other firms (Ramírez-López et al., 2021), and constantly improving innovation capability by reorganizing and utilizing the resources and knowledge gained from others (Luo, 2005).

Several studies have suggested that cooperation with neighboring firms in

industrial clusters contributes to achieving synergistic goals such as joint R&D, technology development (Arranz & Arroyabe, 2008; Ploetner & Ehret, 2006), and shared exploration of innovation capability and NPD (Eraydin & Armatli-Köroğlu, 2005). However, industrial clusters also pose unique challenges, particularly related to conflicts and disagreements among actors (Mueller & Jungwirth, 2016; Bengtsson & Raza-Ullah, 2016). Limited geographical concentration of firms in the same industry tends to stimulate and exacerbate conflicts arising from, for example, goal inconsistency and unfair value appropriation. Although inter-firm conflicts have been recognized to affect partnerships and joint innovation (De Clercq, 2009), little research has focused on how firms within the cluster achieve innovation and NPD goals amid multiple conflicts and perpetuating cooperation. Thus, there is a potential need to explore how inter-firm cooperation opportunities and challenges (related to multiple conflicts) influence the NPD performance within the industrial cluster.

2.2. Inter-firm conflicts in industrial clusters

Inter-firm conflicts—that is, intensity of disagreements among firms—arise due several factors such as strategic misalignment, opposing perspectives on operational routines, lack of trust, and asymmetric interdependence among firms. These conflicts can significantly influence firm product innovation, but the effects vary depending on the type of conflict (De Clercq et al., 2009; Hung & Lin, 2013; Puck & Pregelvig, 2014). Generally categorized as constructive and destructive, inter-firm conflicts significantly differ in their intensity, consequences, and management techniques. Constructive conflict refers to such disagreements between firms that can be resolved through constructive debates and accommodating different perspectives (Tjosvold & Su, 2007). For example, firms may hold different opinions on how to distribute the co-created value and find compatible solutions for resource allocation. When firms engage in constructive conflict, they come together face to face to discuss, debate, or negotiate their disagreements, with the goal of finding a win-win solution (Tjosvold & Su, 2007).

This type of conflict tends to strengthen relationships, increase trust and reciprocity (Deutsch, 1994), and bring people from different firms together.

Conversely, destructive conflict refers to a highly intense disputes that can severely damage relationships and are often accompanied by suspicion, resistance, and even violent behavior (Obul et al., 2021). In industrial clusters, this type of conflict is typically driven by zero-sum games over lucrative new markets or innovative programs with significant financial gains (Li et al., 2011). Firms engaged in destructive conflict prioritize their own interests, often at the expense of other parties, and may even deliberately appropriate and claim benefits that belong to others. Such conflict can lead to alienation between firms, damage relationships, and hinder communication and further transactions (Chen et al., 2019). Thus, differences between the two types of conflict can have varying impact on innovation outcomes.

Research on the role of inter-firm conflicts in relationship management and firm innovation has made some progress. However, much of the focus has been on the negative effects of conflicts and the need to avoid them (De Dreu, 2006; Jehn & Bendersky, 2003). While some studies have found that conflicts can have positive impacts on firm innovation performance (Song et al., 2006; Chai et al., 2020), research in this area is not yet fully explored. For example, Li et al. (2011) explored the different effects of constructive and destructive conflicts on firm knowledge acquisition separately. In the context of industrial clusters, where firms have high industry relatedness, geographical concentration, and high target market overlap, cooperation and conflicts often emerge simultaneously. However, research on inter-firm conflicts in industrial clusters have primarily focused on exploring their effects on firm relationships and innovation processes, while largely failing to consider the potential interaction between conflicts and cooperation.

2.3. NPD performance

NPD performance is critical for firms to succeed in regional and global markets,

as it involves the process of developing products that meet the market's needs through product design, manufacturing, and production (Rindfleisch & Moorman, 2001). This process not only includes the development of completely new products but also the improvement and renewal of existing products through technological improvements. We refer to NPD performance as the extent to which a firm is successful both in terms of its speedy development of products and the degree of product innovativeness (Fang, 2008). Rapid and innovative NPD is essential for clustered firms to gain pricing advantages and market share by leading the way with more advanced and consumer-driven products (Felzensztein et al., 2014).

Previous research has identified various factors that influence successful NPD, including firm capability (e.g., innovation capability) (Awwad & Akroush, 2016; Mauerhoefer et al., 2017), innovation strategy (Cooper, 2019; Mu et al., 2017; Hsu, 2016), cross-functional integration (Daniel et al., 2005), and organizational learning (Li et al., 2010). Research further shows that cooperation is also an essential factor, as it provides firms with information on industry trends, as well as expertise and necessary resources (Bouncken et al., 2018), which can positively impact NPD performance (Rothaermel, 2001; Lu & Yang, 2004). However, studies have also found that conflicts can also impact innovation outcomes at the firm level (Wang et al., 2020; De Clercq, 2009), especially in new product and technology development (Coles et al., 2003; Bstieler, 2006), as conflicts are related to the sustainability of inter-firm relationships and the exchange of resources (tangible and intangible). Conflicts within industrial clusters can arise due to the competition over limited public resources in the region, and as clusters mature, firms tend to incline more towards individual, self-interested behavior (Felzensztein et al., 2018). Despite the influence that cooperation and conflicts show in influencing innovation in clustered firm, the existing research informs us little about how cooperation and conflicts jointly impact NPD performance. The dynamics and complexities inherent in the wider interaction networks and clusters that embed multifaceted and complex relationships pose conflicts alongside cooperation

(Bengtsson & Raza-Ullah, 2016), and thus need to be explored.

2.4. Innovation capability

Innovation capability refers to a firm's ability to [effectively](#) integrate, reconfigure, reinforce, and transform acquired resources and knowledge into new products (Subramaniam & Youndt, 2005), and [is widely considered to include incremental and radical innovation capability](#). Incremental innovation capability is the capability to enhance products based on existing knowledge and resources (Shi et al., 2020). Radical innovation capability is the capability to produce entire new products through the transformation of existing knowledge and resources (Yang, 2020). Both types of innovation capability are related closely to adequate knowledge, technology and innovation resources (Albort-Morant et al., 2018; Quintane et al., 2011; Lai et al., 2014).

Existing studies have investigated the impact of several factors, such as knowledge management (Rajapathirana & Hui, 2018; Lin, 2007), relationship management (Lin et al., 2010), technology and resource management (Lawson & Samson, 2001; Aryanto et al., 2015), [organizational](#) structure (Lawson & Samson, 2001), and trust (Kulangara et al., 2016) on innovation capability due to the wealth of knowledge and resources these factors provide to the firm (Shehzad et al., 2022; Wang & Dass, 2017). Moreover, several studies point out the impact of cooperation (Shafi, 2020; Chen et al., 2010) and [conflict](#) (Reinhardt et al., 2018) on innovation capability. [Cooperation and conflicts](#) serve as external sources of knowledge and resources for firm capabilities ([Tang et al., 2017](#)), as they allow the exchange of resources and knowledge through open channels (Felzensztein et al. 2018; Zhang et al. 2020; Navío-Marco et al. 2019). Thus, they help firms update the existing knowledge and resources, eliminate the [obsolete](#) products and processes, and introduce completely new products, thereby providing the basis for the construction of incremental capability and radical innovation capability (Yang, 2020).

Furthermore, innovation capability is critical to firm performance, as it ensures a flexible response to changing market demands and thus helps firms gain a competitive

advantage (Slater et al., 2014). Existing studies have investigated the influence of innovation capability on various types of performance, such as financial performance (Donkor et al., 2018; Chaudhry et al., 2019), operational performance (Iranmanesh et al., 2021; Saunila, 2014), and innovation performance—such as business model innovation and technological innovation (Janssen & Hertog, 2016; Choi, 2015). Moreover, studies have shown that innovation capability built on either the renewal of existing knowledge or completely new knowledge facilitates product innovation by screening, [integrating](#), and transforming the knowledge to develop new products to meet market demand in a timely manner (Slater et al., 2014; Yeşil et al., 2013).

Research has also [recognized](#) the mediating role of innovation capability between resources and firm performance, as innovation capability is built on knowledge and resources and plays an important role in enhancing firm performance. ALTaweel and Al-Hawary (2021) explore the mediating role of innovation capability between strategic agility and [organizational](#) performance because agility helps firms enhance innovation capability through resource [reorganization](#) in harmony with environmental conditions. Similarly, entrepreneurial competitiveness stimulates innovation capability, enhancing competitive advantage (Hwang et al., 2020). In addition, the mediating role of innovation capability between factors such as alliance coordination (Kauppila, 2015), knowledge sharing (Pranowo et al., 2021), firm social capital (Liu et al., 2019), market orientation (Zehir et al., 2015; Huhtala et al., 2014) and firm performance has been empirically examined, as these factors provide the knowledge and resources required for innovation capability and help to influence performance through innovation capability.

[Based on the above discussion, we present a conceptual model \(Figure 1\) that explains the relationship between cooperation, constructive and destructive conflict, innovation capability and NPD performance within industrial clusters. In this model, we propose that cooperation, constructive conflict, and destructive conflict are sources of knowledge and resources that can influence NPD performance. However, the](#)

proposed relationship is not direct, as innovation capability mediates the impact of inter-firm cooperation and conflicts on NPD performance. Innovation capability builds on existing knowledge and resources and contributes to the renewal and thorough development of new products that meet customer needs.

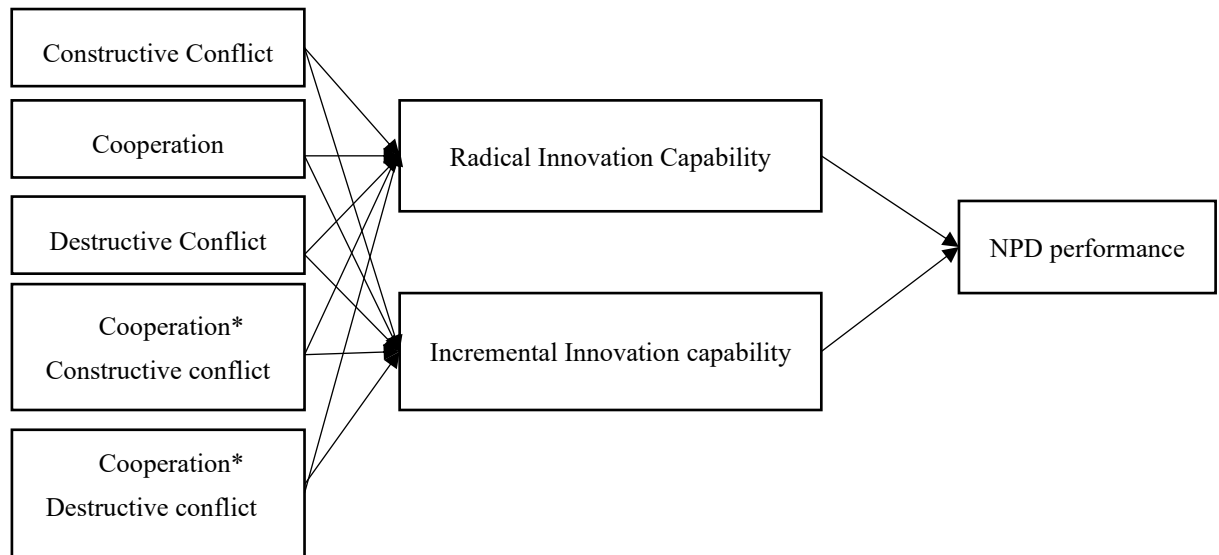


Figure 1. Theoretical model.

3. Hypotheses development

3.1. Inter-firm Cooperation and NPD performance

Cooperation is a critical element in the process of innovation and is widely considered as the main method for pursuing NPD (Daniluk, 2019; Van Beers & Zand, 2014). We suggest that cooperation positively affects NPD performance for two main reasons. First, cooperation within the industrial cluster increases the interaction opportunities among firms. By communicating face-to-face, partners can resolve problems in a formal and efficient manner, thereby facilitating the sharing of knowledge (both explicit and tacit), improving the introduction of equipment and materials, and enhancing cross-firm team cohesion and creativity (Kamaşak & Bulutlar, 2010; Panteli & Sockalingam, 2005). For example, it is easier to promote innovation efficiency in

R&D programs by partnering with firms engaged in the same industry because knowledge and resources are transferred and absorbed more easily among highly connected firms (De Faria et al., 2010). Second, cooperation with firms in industrial clusters facilitates mutual learning, which leads to creative ideas. Specifically, in the industrial cluster environment, *mutual trust and reciprocity enable* learning *to* proceed smoothly, thereby making *a greater* contribution to knowledge dissemination and technology sharing (Geldes et al., 2015; Oprime et al., 2011). The accelerated flow of information, creation and dissemination of knowledge, and exchange of innovation resources are undoubtedly key drivers of faster and more innovativeness NPD. Therefore, we hypothesize that:

H1. Inter-firm cooperation within industrial clusters positively affects firm NPD performance.

3.2 Conflict and NPD performance

Inter-firm constructive conflict within the same industrial cluster is likely to positively affect firm NPD performance *due to* at least two reasons. First, constructive conflict *can* inspire the generation and dissemination of more creative ideas, leading to the formation of new knowledge and technology. Although firms may have disagreements on how to avail cooperation opportunities in the industrial cluster, for example from the local high-quality R&D institutions, *labor* or favorable support from the government, constructive conflict can facilitate win-win solutions through friendly and open, face-to-face communication. Vigorous and open discussion can increase the possibility of inter-firm interaction, thereby contributing to *the selection of* decisions that *benefit* both firms (Tjosvold & Su, 2007). Second, through constructive conflict, different firms can develop a deeper understanding of each other's positions, capabilities, and objectives, thus further ensuring a more reliable exchange of information and resources. Constructive conflict not only contributes to the unity among firms, but also mutual understanding and trust, thus promoting the acquisition

of more knowledge and resources (Song et al., 2006). Abundant market information, industry knowledge, and innovation resources are the key to the success of NPD. Therefore, we hypothesize that:

H2a. Inter-firm constructive conflict within industrial clusters is positively related to NPD performance.

Inter-firm destructive conflict, however, is likely to have a negative impact on NPD performance for at least two reasons. First, destructive conflict deteriorates inter-firm relations and reduce learning opportunities and willingness to share. For example, destructive conflict may cause firms to lose original partners, increasing the cost and risk of finding new partners, and interrupting firm intelligence and knowledge accumulation (Massey & Dawes, 2007; Ndubisi, 2011). Second, destructive conflict may harm NPD by bringing in poor quality resources or even distorted information. When destructive conflict occurs among firms within industrial cluster, the proximity of geographical location will intensify its destructiveness, making the concealment and distortion of information easier and more inevitable (Callois, 2008; Geldes et al., 2015). After obtaining such distorted information and low-quality resources, firms may delay innovation opportunities, which, in turn leads to product development that deviates from market demand. Thus, we hypothesize the following:

H2b. Inter-firm destructive conflict within industrial clusters negatively affects NPD performance.

3.3. Cooperation and innovation capability

Cooperation is expected to improve information dissemination and facilitate mutual learning and resource sharing. When inter-firm cooperation exists, this connection may be stronger because good partnerships and contractual guarantees increase mutual trust and strengthen communication (Chai et al., 2020). Therefore, cooperation contributes to the accumulation of market information, knowledge and

technology, and R&D resources, thereby securing opportunities to enhance and transform existing knowledge and resources, which serve as the basis for incremental and radical innovation capability. We therefore hypothesize that:

H3a. Inter-firm cooperation within industrial clusters positively affects incremental innovation capability.

H3b. Inter-firm cooperation within industrial clusters positively affects radical innovation capability.

3.4. Conflict and innovation capability

Based on our earlier conversation, we propose that constructive conflict positively affect innovation capability for the following reasons. First, constructive conflict provides interactive opportunities for information and resource sharing among firms, that is, it enriches the main channels to obtain scarce resources (Noorderhaven & Harzing, 2009). These interactions make it easier for firms to introduce new resources and generate creative knowledge and skills through the collision of ideas (Liao et al., 2007). Second, constructive conflict promotes the subversion of old knowledge and resource allocation schemes, and the questioning of universal norms. This questioning and subversion not only coincide with the requirement of radical innovation capability to transform knowledge and resources but also is consistent with the demand of incremental innovation capability to strengthen knowledge and resources (Agarwal & Selen, 2009). Thus, we hypothesize the following:

H4a. Inter-firm constructive conflict within industrial clusters positively affects incremental innovation capability.

H4b. Inter-firm constructive conflict within industrial clusters positively affects radical innovation capability.

Furthermore, destructive conflict decreases a firm's innovation capability for two reasons. First, the reduction of communication and interaction caused by destructive

conflict makes it more difficult to learn and share knowledge across firms (Sankowska, 2013), and impossible to share R&D costs and risks by building alliances and collaborative teams. Second, malicious knowledge distortion, deliberate knowledge concealment, and invalid or even low-quality resource dissemination may also occur, which will destroy the use effect of database or patented technology when solving problems or matching with stored knowledge and resources (De Clercq et al., 2009). Therefore, we expect destructive conflict to be detrimental to the reinforcement and transformation of existing knowledge and resources, thereby affecting incremental and radical innovation capability. Therefore, we hypothesize that:

H5a. Inter-firm destructive conflict within industrial clusters negatively affect incremental innovation capability.

H5b. Inter-firm destructive conflict within industrial clusters negatively affect radical innovation capability.

3.5. Interaction between cooperation and conflicts

Earlier work has mainly conceptualized conflict as the other end of a cooperation continuum (Pearson & Monoky, 1976). However, numerous scholars suggest that conflict is not simply the absence of cooperation (Morgan & Hunt, 1994). Based on this, we view cooperation and conflicts as two separate dimensions of relations rather than opposite ends of the same dimension (Kaufmann & Stern, 1992). We argue that cooperation and conflicts interact with each other to affect innovation capability in distinct ways. We first explain the interactive effect of cooperation and constructive conflict followed by a discussion on the interactive effect of cooperation and destructive conflict.

Cooperation and constructive conflict have a substitution effect on innovation capability due to the overlap of knowledge and resources that they bring to firms. Specifically, close cooperation allows inter-firm interaction through the construction of cross-firm teams, the sharing of equipment, and participation in synergistic projects

(Olson et al., 2001; Combs & Ketchen, 1999). Constructive conflict encourages firms to resolve disagreements in a friendly and open manner through discussions, debates, and brainstorming (Li et al., 2011; Das & Teng, 2000). Both cooperation and constructive conflict enhance information dissemination, knowledge sharing, and exchange of resources between firms, thus increasing the possibility of overlapping knowledge and resources between firms (Eisingerich & Bell, 2008; Figueiredo, 2003). The exchange and accumulation of overlapping knowledge and resources leads to a rise in inter-firm knowledge and resource convergence and a decline in differentiation (Cui et al., 2020), which is detrimental to the renewal and elimination of existing knowledge. Renewal knowledge is the basis for building incremental innovation capability, while eliminating existing knowledge and using completely new knowledge is the basis for building radical innovation capability (Subramaniam & Youndt, 2005). Thus, inter-firm interactions within clusters, characterized by both high cooperation and constructive conflict, lead to the overlap of knowledge and resources, triggering a decline in differentiation, which is detrimental to innovation capability. Thus, we hypothesize the following:

H6a. Cooperation and constructive conflict have a negative interactive effect on incremental innovation capability.

H6b. Cooperation and constructive conflict have a negative interactive effect on radical innovation capability.

Regarding cooperation and destructive conflict, we propose a positive interactive effect on innovation capability for two reasons. First, destructive conflict stimulates firms to value and utilise the knowledge and resources gained from cooperation. Destructive conflict, accompanied by distrust and the essential characteristic of pursuing only self-interest, stimulates firms to become more efficient at exploiting the knowledge and resources required to outperform others in the network (Obul et al., 2021). Destructive conflict motivates firms to be competitive and innovative (Ellingsen

et al., 2021) and to assimilate and utilise the knowledge and resources gained from cooperation as effectively as possible in order to maximize the appreciation of common interest (Liao et al., 2007; Tallman et al., 2004; Arikan, 2009). Efficient acquisition, absorption, and utilisation of knowledge and resources drive the renewal and elimination of one's own knowledge and resource base.

Second, cooperation mitigates the deterioration of relationships through destructive conflict, overcoming the hindrance of inter-firm exchanges by destructive conflict. Cooperation mitigates the disruption of resource exchange caused by destructive conflict by maintaining the necessary interactions (Sonmez & Apostolopoulos, 2000). Destructive conflict triggers distrust and deteriorates relationships (Li et al., 2011; Jayathilaka & Menike, 2021), impeding the dissemination of information about markets, industry technological developments, and innovation-related resources (Obul et al., 2021). To pursue common interests and continue to operate in the cluster, cooperation motivates firms to maintain the communication needed to avoid a complete breakdown of the relationship (Humphrey & Schmitz, 2002; Asheim & Coenen, 2005). Therefore, the deterioration of the relationship and communication barriers caused by destructive conflict can be diminished through cooperation, facilitating the renewal and elimination of existing knowledge and resources, which is the basis for the development of incremental and radical innovation capability. Thus, we propose the following:

H7a. Cooperation and destructive conflict have a positive interaction effect on incremental innovation capability.

H7b. Cooperation and destructive conflict have a positive interaction effect on radical innovation capability.

3.6. Mediating role of innovation capability

Firm **innovation** capability is the key to achieving and sustaining superior performance and the link between inter-firm interaction **behavior** and performance

(Aljanabi, 2020; Liu & Jiang, 2016). In particular, NPD performance, which is closely related to industry and market changes, requires strong firm innovation capability. Inter-firm interaction behavior is a critical means of building innovation capability, as it reduces uncertainty by providing access to information, knowledge, and innovation resources. In the specific case of inter-organizational interaction behavior, studies have found that innovation capability (both incremental and radical) can improve the utilization of knowledge and resources obtained through inter-firm interactions, which helps predict and respond to market demand (Bouncken et al., 2018; Shi et al., 2020). Subramaniam and Youndt (2005) also explore this relationship and report that inter-firm interaction affects firm innovation performance through innovation capability.

Taking the above points together, i.e., that inter-firm cooperation and conflicts affect NPD performance, that inter-firm cooperation and conflicts are closely related to innovation capability, and that both types of innovation capability promote NPD performance, we argue that innovation capability plays a mediating role in the relationship between inter-firm cooperation (and conflicts) and NPD performance. As cooperation and conflicts affect the information dissemination, knowledge transfer and exchange of innovation resources among participating firms, which are the basis for firm innovation capability (Devece et al., 2019; Klimas & Czakon, 2018). Innovation capability is the forerunner of firm innovation activities, which improves NPD performance by screening, strengthening, and transforming information, knowledge, and resources.

Specifically, inter-firm cooperation ensures effective knowledge sharing and absorption through formal interaction and the support talent and technology resources in R&D projects, laying the foundation for innovation capability (Shafi, 2020). Constructive conflict can promote the beneficial collision of ideas through face-to-face interactions, task-specific constructive discussions, and the generation and dissemination of creative thinking. This can lead to the updating of old ideas while creating new knowledge, thereby improving innovation capability (Wan et al., 2021;

Xie et al., 2014). However, destructive conflict can have the opposite effect, deteriorating inter-firm relationships, impeding effective information dissemination, misdirecting innovation, and blocking further communication and sharing (Desivilya et al., 2010). Therefore, inter-firm cooperation and conflicts affect NPD performance through innovation capability, and we hypothesize the following:

H8a. Incremental and radical innovation capability mediate the relationship between cooperation and NPD performance.

H8b. Incremental and radical innovation capability mediate the relationship between constructive conflict and NPD performance.

H8c. Incremental and radical innovation capability mediate the relationship between destructive conflict and NPD performance.

4. Methodology

4.1. Data and samples

Our study focused on investigating the NPD performance of firms in the context of industrial clusters, which are a specific type of network. To conduct our research, we collaborated with the local Commissions of Economy and Information Technology, and randomly selected 4000 industrial cluster firms in eastern China as our sample for hypothesis testing in 2017. We specifically chose industrial cluster firms as our sample due to several reasons. First, China is currently experiencing a rapid boom in industrial clusters, with firm innovation driving the prosperity of the entire cluster and even the regional economy. Therefore, continuous product development is an important reason for industrial cluster firms to maintain their vitality. Second, as the largest developing country, China plays an important role in the global economy, making research on cooperation, conflicts, and innovation of firms in Chinese industrial clusters relevant to other countries and regions worldwide.

We took measures to reduce common method variance by selecting multiple senior managers to respond to the online questionnaire. Specifically, we chose three senior

executives from each firm to answer questions on different variables. These variables included inter-firm cooperation and conflicts, which were answered by CEOs, while production managers responded to questions about innovation capability and NPD performance. Administrative managers provided data on the MV-marker variable (EP). The questionnaire survey was conducted with senior managers from 767 firms, and we obtained valid questionnaires filled out by three senior managers of 181 firms. This resulted in an effective response rate of 23.6%. Table 1 provides an overview of the basic descriptive statistical characteristics of the valid sample firms.

Table 1. Sample demographic (N=181).

	N	Percentage (%)
Firm age		
<5	32	17.68
5-9	52	28.73
10-20	84	46.41
>20	13	7.18
Firm size		
<50	75	41.44
50-99	59	32.60
100-149	17	9.39
150-200	7	3.86
>200	23	12.71
Industry		
Consumer products	85	46.97
Petroleum and chemical	22	12.15
Machinery	23	12.71
Electronics	29	16.02
Mineral	22	12.15

4.2. Control variables

We controlled for the firm size, firm age, firm type, industry, environmental munificence, and environmental dynamism, all of which may influence innovation capability and NPD performance. We used the number of employees registered at the time of the survey (i.e., 2017) to measure the firm size. Firm age refers to the operating

years of a firm from its establishment to 2017. We used state-owned or private firms to measure the firm type. We took petroleum and chemicals as a baseline group and control the industry over four dummy variables: consumer products, machinery, electronics, and mineral. Finally, we regressed annual sales for the industry over a 5-year period and used the coefficients and standard errors to measure environmental munificence and environmental dynamism, respectively.

4.3. Measures of constructs

All measurement items were adopted from existing research and measured on a five-point Likert scale that ranged from "strongly disagree" to "strongly agree". All items were answered by the senior managers according to the actual situation of the firm. The measurement items for the main variables are shown in Table 2.

Table 2. Survey items and confirmatory factor analysis results.

Construct and items	Standardized loading
Inter-firm Cooperation (Cronbach's $\alpha=0.94$; CR=0.96; AVE=0.85)	
<i>With other firms within the cluster, your firm would</i>	
1. Bring in the equipment or facilities from the partners during our business dealings.	0.82
2. Build close personnel ties with people in other firms.	0.87
3. Set up cross-firm teams with other firms.	0.84
4. Send the technical and managerial personnel to help the partners.	0.87
Constructive conflict (Cronbach's $\alpha=0.81$; CR=0.89; AVE=0.74)	
<i>In case of conflict with companies in the cluster, your firm would</i>	
1. Deal with the conflicts encountered friendly.	0.87
2. Resolve conflicts of opinion as part of its business.	0.87
3. Believe that conflicts between opinions can inspire us to find effective solutions.	0.83
Destructive conflict (Cronbach's $\alpha=0.94$; CR=0.96; AVE=0.90)	
<i>In case of conflict with companies in the cluster, your firm would</i>	
1. Find it difficult to do business with other firms because of the serious conflict.	0.95
2. Believe the conflict obstructs it from pursuing its interests.	0.97
3. Have personal conflict between your employees and other firms' employees.	0.93
Incremental innovation capability (Cronbach's $\alpha=0.96$; CR=0.98; AVE=0.93)	
<i>Compared to its competitors, over the past five years your firm has excelled in the following areas.</i>	
1. Innovation capabilities that reinforce your prevailing product/service lines.	0.97
2. Innovation capabilities that reinforce your existing expertise in prevailing products/services.	0.98
3. Innovation capabilities that reinforce how you currently compete.	0.95
Radical innovation capability (Cronbach's $\alpha=0.93$; CR=0.96; AVE=0.88)	

Compared to its competitors, over the past five years your firm has excelled in the following areas.

- | | |
|--|------|
| 1. Innovation capabilities that make your prevailing product/service lines obsolete. | 0.95 |
| 2. Innovation capabilities that fundamentally change your prevailing products/services. | 0.95 |
| 3. Innovation capabilities that make your existing expertise in prevailing products/services obsolete. | 0.92 |

NPD performance (Cronbach's $\alpha=0.95$; CR=0.96; AVE=0.74)

Regarding your firm's new product development:

- | | |
|---|------|
| 1. Generally speaking, the development speed of our new product projects is far ahead of our time goals. | 0.79 |
| 2. Generally speaking, the development speed of our new product projects is faster than the industry norm. | 0.87 |
| 3. Generally speaking, the development speed of our new product projects is much faster than we expected. | 0.89 |
| 4. The speed of new product development of our firm is much faster than our typical product development time. | 0.90 |
| 5. Our new products are novel for our industry. | 0.89 |
| 6. Our new products challenge existing ideas in our industry. | 0.83 |
| 7. Compared to our competitors, our new products are more innovative. | 0.85 |
| 8. Our new products often offer new ideas to our industry. | 0.85 |

Environmental practice^a (Cronbach's $\alpha=0.97$; CR=0.98; AVE=0.88)

In terms of environmental protection, your firm would

- | | |
|--|------|
| 1. Voluntarily exceed government-imposed environmental regulations. | 0.92 |
| 2. Incorporate environmental concerns in our business decisions. | 0.95 |
| 3. Incorporate environmental performance objectives in our organizational plans. | 0.95 |
| 4. Financially support environmental initiatives. | 0.96 |
| 5. Measure our organization's environmental performance. | 0.94 |
| 6. Minimize the environmental impact of all our organization's activities. | 0.90 |

^a Variables used as "MV-marker" variable for testing the common method bias.

Inter-firm cooperation and conflicts. We adopted the scale of Li et al. (2011) for measuring inter-firm cooperation (four items), constructive conflict (three items), and destructive conflict (three items). We had to drop one item from each conflict due to poor factor loading.

Incremental innovation capability and radical innovation capability. Following studies of Subramaniam & Youndt (2005), both incremental innovation capability and radical innovation capability were assessed using a three-item scale.

NPD performance. We measured NPD performance using an eight-item scale from the study by Sheng et al. (2013). Four of the items measure the speed of NPD and the other four items measure the innovativeness of new products.

5. Results

5.1. Reliability and validity

We examined constructs' reliability and validity. First, the results of both Cronbach's alpha and composite reliability (CR) calculations for the constructs exceeded the 0.7 threshold, indicating good reliability. Second, we examined construct validity by measuring factor loadings and AVE values. As shown in Table 2, all factor loadings were above 0.79, exceeding the 0.6 threshold. The AVE values ranged from 0.74 to 0.93 and were well above the 0.5 threshold. Table 3 shows that the square root of each construct's AVE is greater than its correlations with the other constructs. Therefore, constructs also show a good validity.

5.2. Common method bias

To mitigate the potential common method bias, remedial measures were taken during the study design phase and relevant statistical analyses were employed after the data collection phase. Specifically, during the data collection phase, we obtained

Table 3. Descriptive statistics and correlations.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Cooperation	0.92	0.71	0.21	0.46	0.53	0.49	-0.26	-0.14	-0.06	0.00	-0.04	-0.11	-0.02	0.08	0.07
2. Constructive conflict	0.71	0.86	0.24	0.49	0.54	0.48	-0.10	0.01	-0.11	-0.09	0.02	-0.13	0.02	0.07	0.10
3.Destructive conflict	0.22	0.25	0.95	-0.03	0.08	0.12	-0.12	0.00	0.02	0.03	-0.06	-0.04	0.05	0.00	-0.03
4. Incremental innovation capability	0.46	0.49	-0.02	0.96	0.87	0.70	-0.03	-0.06	-0.11	-0.04	-0.04	-0.20	0.10	0.21	0.05
5. Radical innovation capability	0.53	0.54	0.09	0.87	0.94	0.72	-0.04	-0.04	-0.12	0.00	0.00	-0.21	0.07	0.20	0.07
6. NPD performance	0.49	0.48	0.13	0.70	0.72	0.86	-0.15	-0.05	-0.09	-0.06	0.00	-0.19	0.05	0.20	0.09
7. Firm size	-0.25	-0.09	-0.11	-0.02	-0.03	-0.14	–	0.22	-0.10	-0.31	0.12	0.13	0.12	-0.04	-0.11
8. Firm age	-0.13	0.02	0.01	-0.05	-0.03	-0.04	0.23	–	-0.03	0.01	-0.09	0.07	0.03	-0.13	-0.10
9. Firm type	-0.05	-0.10	0.03	-0.10	-0.11	-0.08	-0.09	-0.02	–	0.04	-0.03	-0.09	-0.08	-0.04	-0.05
10. Industry 1 ^a	0.01	-0.08	0.04	-0.03	0.01	-0.05	-0.30	0.02	0.05	–	-0.37	-0.42	-0.27	0.03	0.03
11. Industry 2 ^a	-0.03	0.03	-0.05	-0.03	0.01	0.01	0.13	-0.08	-0.02	-0.36	–	-0.18	-0.12	-0.23	0.16
12. Industry 3 ^a	-0.10	-0.12	-0.03	-0.19	-0.20	-0.18	0.14	0.08	-0.08	-0.41	-0.17	–	-0.13	-0.19	0.24
13. Industry 4 ^a	-0.01	0.03	0.06	0.11	0.08	0.06	0.13	0.04	-0.07	-0.26	-0.11	-0.12	–	0.23	-0.10
14. Environmental munificence	0.09	0.08	0.01	0.22	0.21	0.21	-0.03	-0.12	-0.03	0.04	-0.22	-0.18	0.24	–	0.32
15. Environmental dynamism	0.08	0.11	-0.02	0.06	0.08	0.10	-0.10	-0.09	-0.04	0.04	0.17	-0.23	-0.09	0.33	–
16. Marker variable (EP)	0.49	0.49	-0.01	0.69	0.66	0.54	-0.07	-0.09	-0.08	0.05	0.05	-0.09	0.03	0.11	0.04
Mean	4.18	4.24	3.02	4.25	4.17	3.89	2.14	2.43	2.17	0.47	0.13	0.16	0.07	1.12	1.02
SD	0.75	0.73	1.18	0.76	0.79	0.72	1.34	0.86	0.71	0.50	0.33	0.37	0.26	0.08	0.16

Notes: Absolute values of the correlations above 0.12 indicate statistical significance at $p < 0.05$ (two-tailed tests).

Unadjusted correlations are below the diagonal; correlations adjusted for the common method are above the diagonal.

The diagonal elements (i.e., italic values) are the square roots of AVEs.

^a Dummy variable.

measurements of different variables from different sources (i.e., CEOs, production managers and administrative managers). Further, we placed the conceptually adjacent constructs in varying sections to reduce the respondents' consistency motivation during self-reporting (Podsakoff et al., 2003).

After data collection, the "MV-marker" method recommended by Lindell & Whitney (2001) was used to evaluate the potential impact of common method bias. We selected "environmental practice" (EP) as the "MV-marker" variable because it was theoretically unrelated to at least one variable in the analysis (Simmering et al., 2015; Podsakoff et al., 2003). EP refers to the extent to which a firm had adopted specific practices and how it dealt with environmental issues. We measured EP using a scale from Lindgreen et al. (2009), which consists of 6 items. The lowest positive correlation ($r = 0.01$; see Table 3) between this variable and one of the criterion variables (destructive conflict) was selected as the best evaluation of MV (Lindell & Whitney, 2001; Harrison et al., 1996), and the results of adjustment of the correlations are shown in Table 3. We compared the correlations between the upper and lower diagonals as shown in Table 3, indicating that common method bias is not a major problem affecting the results.

5.3. Inter-firm cooperation/conflicts and innovation capability

We tested our hypotheses using a hierarchical regression approach with SPSS 26.0, and the regression results are shown in Table 4. To prevent potential multi-collinearity between non-dependent variables, we mean-centered the variables before calculating the interaction terms. The variance inflation factors (VIF) of the regression models are all less than 3, indicating that there is no serious multi-collinearity problem among the constructs (Bendig et al., 2018).

Table 4. Regression results.

	Incremental innovation capability	Radical innovation capability
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	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Controls						
Firm size	-0.03	0.05	0.01	-0.04	0.08	0.06
Firm age	-0.01	-0.02	-0.02	0.01	0.01	0.01
Firm type	-0.12	-0.06	-0.05	-0.13+	-0.06	-0.08
Industry 1	-0.20+	-0.07	-0.09	-0.14	-0.01	-0.01
Industry 2	-0.10	-0.05	-0.08	-0.05	0.01	-0.01
Industry 3	-0.28**	-0.17*	-0.17*	-0.25**	-0.14+	-0.15+
Industry 4	-0.04	0.01	-0.12	-0.05	0.01	-0.01
Environmental munificence	0.17*	0.15*	0.16*	0.18*	0.16*	0.16*
Environmental dynamism	-0.05	-0.07	-0.07	-0.03	-0.06	-0.07
Direct effect variables						
Cooperation (Coo)		0.24*	0.25**		0.33***	0.34***
Constructive conflict (CC)		0.33***	0.30**		0.29**	0.22*
Destructive conflict (DC)		-0.16*	-0.25**		-0.05	-0.06
Interactions						
Coo × CC			-0.03			-0.13+
Coo × DC			0.23**			0.08
R^2	0.11	0.35	0.39	0.10	0.39	0.41
ΔR^2	0.11	0.24	0.04	0.10	0.29	0.02
F	2.25*	7.41***	7.46***	2.04*	8.87***	8.02***
ΔF	2.25*	20.57***	5.43**	2.04*	26.63***	2.14

Notes: + $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. N = 181.

We used regression models to test hypotheses. Table 4 shows the estimation results of testing H3 to H7. Model 1 and Model 4 contain only control variables. Model 2 adds independent variables to model 1 to test the effects of cooperation, constructive conflict, and destructive conflict on firm incremental innovation capability. Similarly, model 5 adds independent variables to model 4 to test the effects of independent variables on firm radical innovation capability. Model 3 and Model 6 include the interaction terms of cooperation and conflicts to measure the joint interaction effect of cooperation and conflicts on innovation capability.

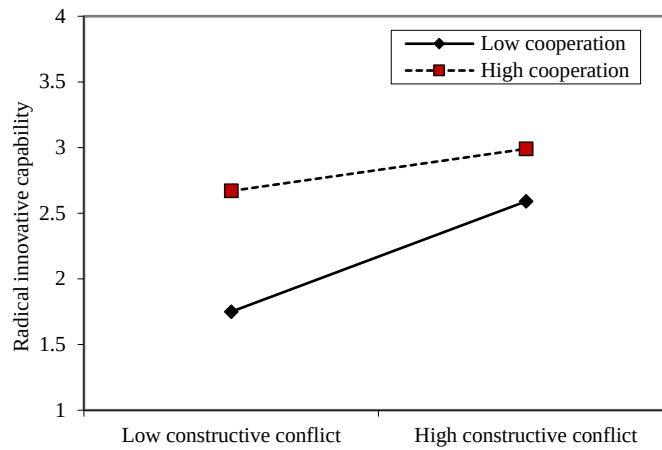


Figure 2. Constructive conflict, cooperation, and radical innovation capability

Model 2 shows a significant positive effect of cooperation on incremental innovation capability ($b = 0.24$, $p < 0.05$), which supports H3a. The results of Model 2 also present the negative and significant effect of destructive conflict on incremental innovation capability ($b = -0.16$, $p < 0.05$), and the positive and significant effect of constructive conflict on incremental innovation capability ($b = 0.33$, $p < 0.01$), thus supporting H4a and H5a. In addition, the results of Model 3 show that the positive and significant interaction of cooperation and destructive conflict on incremental innovation capability ($b = 0.23$, $p < 0.01$) supporting H7a, and the interaction result is shown in Figure 3. However, there is no significant interaction of cooperation and constructive conflict on incremental innovation capability ($b = -0.03$, $p > 0.1$), which rejects H6a, and the interaction result is shown in Figure 5.

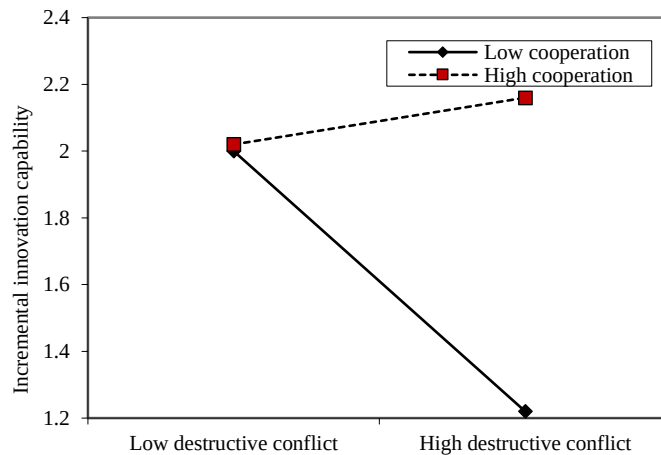


Figure 3. Destructive conflict, cooperation, and incremental innovation capability

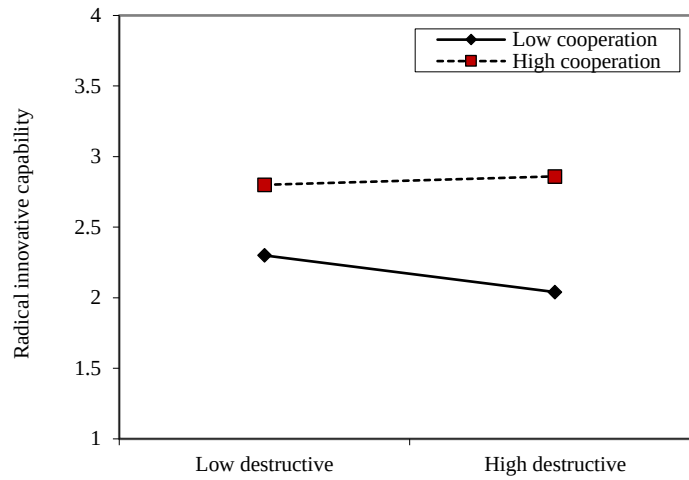


Figure 4. Destructive conflict, cooperation, and radical innovation capability

Model 5 indicates that cooperation and constructive conflict positively and significantly affect radical innovation capability ($b = 0.33$, $p < 0.001$; $b = 0.29$, $p < 0.05$), but the effect of destructive conflict on radical innovation capability is not significant ($b = -0.05$, $p > 0.1$), which support H3b and H4b, but reject H5b. In addition, the results of Model 6 show a negative and significant interaction of cooperation and constructive conflict on radical innovation capability ($b = -0.13$, $p < 0.1$), supporting H6b, and the interaction result is shown in Figure 2. However, there is no significant interaction between cooperation and destructive conflict on radical innovation capability ($b = 0.08$, $p > 0.1$), which rejects H7b, and the interaction result is shown in Figure 4.

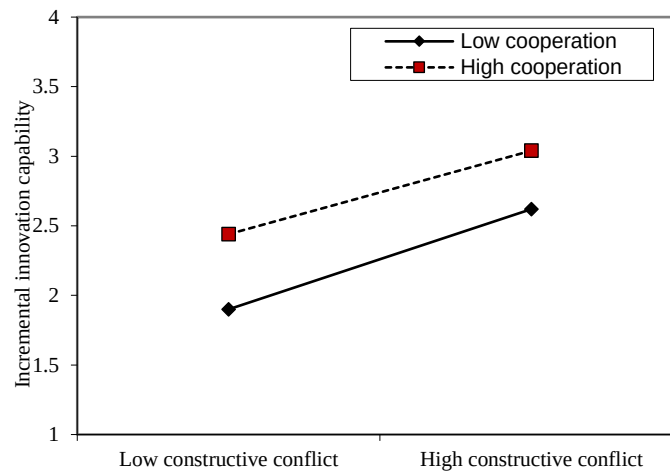


Figure 5. Constructive conflict, cooperation, and incremental innovation capability

5.4. Inter-firm cooperation, conflicts, Innovation capability and NPD performance

The regression results for the hypotheses that cooperation, conflicts, and innovation capability drive NPD performance are shown in Table 5. Model 1 contains only the control variables. Model 2 shows the positive and significant effects of cooperation and constructive conflict on NPD performance ($b = 0.27$, $p < 0.01$; $b=0.24$, $p<0.05$), hence supporting H1 and H2a. The results of Model 2 also show that destructive conflict have no significant effect on NPD performance ($b = 0.07$, $p > 0.1$), hence rejecting H2b. Meanwhile, Model 4 shows that incremental capability and radical innovation capability have positive and significant effects on NPD performance ($b = 0.33$, $p < 0.01$ and $b=36$, $p<0.01$ respectively). These results provide preliminary evidence of the mediating role of innovation capability.

Table 5. Regression results.

	NPD performance			
	Model 1	Model 2	Model 3	Model 4
Controls				
Firm size	-0.17*	-0.07	-0.08	-0.10+
Firm age	0.04	0.03	0.03	0.04
Firm type	-0.11	-0.05	-0.05	-0.01

Industry 1	-0.24*	-0.13	-0.14	-0.10
Industry 2	-0.06	-0.01	-0.02	0.01
Industry 3	-0.26**	-0.16+	-0.16+	-0.05
Industry 4	-0.07	-0.04	-0.04	-0.04
Environmental munificence	0.17*	0.16*	0.16*	0.05
Environmental dynamism	-0.02	-0.04	-0.04	0.01
Direct effect variables				
Cooperation (Coo)		0.27**	0.28**	0.07
Constructive conflict (CC)		0.24*	0.23*	0.05
Destructive conflict (DC)		0.07	-0.01	0.09
Incremental innovation capability (IIC)				0.33**
Radical innovation capability (RIC)				0.36**
Interactions				
Coo × CC			-0.02	0.04
Coo × DC			0.06	-0.05
R^2	0.12	0.32	0.33	0.58
ΔR^2	0.12	0.20	0.01	0.25
F	2.47*	6.63***	5.68***	14.38***
ΔF	2.47*	17.01***	0.32	51.26***

Notes: + $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. N = 181.

We then applied the bootstrapping method recommended by Preacher & Hayes (2008) to identify the mediating role of innovation capability. We set the number of sampling iterations to 1000 and the confidence interval to 95%. The results presented in Table 6 show that the confidence interval of the indirect effect of cooperation via incremental innovation capability and radical innovation capability on NPD performance, respectively, are (0.1624, 0.3444) and (0.2268, 0.4281), indicating significant mediating effects. Moreover, we found that the direct effect of cooperation on NPD performance became insignificant ($b=0.07$, $p > 0.1$) after the introduction of innovation capability, indicating a full mediation effect, thus supporting H8a.

Table 6. 95% confidence interval of bootstrap results for indirect effects (N=181).

Impact path	Effect	SE	LLCI	ULCI
Cooperation→IIC→NPD performance	0.2497	0.0468	0.1624	0.3444
Cooperation→RIC→NPD performance	0.3225	0.0513	0.2268	0.4281

Constructive conflict→IIC→NPD performance	0.2706	0.0488	0.1814	0.3714
Constructive conflict→RIC→NPD performance	0.3225	0.0527	0.2242	0.4323
Destructive conflict→IIC→NPD performance	-0.0119	0.0300	-0.0703	0.0463
Destructive conflict→RIC→NPD performance	0.0369	0.0310	-0.0235	0.0971

Moreover, the results show that the confidence interval of the indirect effect of constructive conflict via incremental innovation capability and radical innovation capability NPD performance, respectively, are (0.1814, 0.3714) and (0.2242, 0.4323), indicating significant mediating effects. We also found that the direct effect of constructive conflict on NPD performance became insignificant ($b=0.05$, $p > 0.1$) after the introduction of innovation capability, indicating a full mediation effect, thus supporting H8b. However, the confidence interval of the indirect effect of destructive conflict on NPD performance via incremental innovation capability and radical innovation capability, respectively, are (-0.0703, 0.0463) and (-0.0235, 0.0971), respectively, indicating an insignificant mediating effect, thus rejecting H8c.

6. Discussion

6.1. Summary of findings

The empirical findings first indicate that cooperation and constructive conflict improve NPD performance by expanding firms' sources of information and resources. Moreover, the mediating role of innovation capability between cooperation, constructive conflict and NPD performance indicate that friendly interactions can improve NPD performance by providing the resource base needed to strengthen innovation capability. Surprisingly, destructive conflict has no significant impact on NPD performance. The possible reason is that close firm relationships within the cluster increase the feasibility of switching to new partners (Letaifa & Rabeau, 2013; Sorenson, 2005). Thus, firms engaged in destructive conflict may very quickly obtain the knowledge, skills and resources needed for NPD through new partners and channels (Lei & Huang, 2014).

Furthermore, cooperation and constructive conflict have a negative interaction (substitution) effect on radical innovation capability. The reason is that bringing in overlapping knowledge and resources is detrimental to the elimination of existing and the development of entirely new knowledge and resources, hindering radical innovation capability. However, we found no significant interaction effects of cooperation and constructive conflict on incremental innovation capability. The possible reason is that cooperation and constructive conflict have an irreplaceable advantage in promoting incremental innovation capability. Specifically, in industrial clusters, cooperation involves the routine transfer of information and resource that facilitate the improvement and renewal of existing products (Brenner, 2005). Constructive conflict triggers a clash of ideas (Benjamin, 2000), stimulating the innovative dynamism of firms. Thus, both cooperation and constructive conflict meet the requirement of incremental innovation capability based on updated existing knowledge and resources (Subramaniam & Youndt, 2005) and are not substitutes for each other.

In addition, the positive interaction effect of cooperation and destructive conflict on the incremental innovation capability validates the idea that destructive conflict stimulates firms to make effective use of knowledge and resources derived from cooperation. However, we found no significant interaction effect of cooperation and destructive conflict on radical innovation capability. A possible explanation is that suspicion and distrust (Deutsch et al., 2011) deepen firms' screening of knowledge and resources and do not allow direct use of knowledge and resources gained from cooperation. Thus, the proposition that radical innovation capability can be based on eliminating existing knowledge and adopting completely new knowledge is not validated by our results.

6.2. Theoretical contributions

This study makes three significant theoretical contributions to existing theoretical knowledge. First, it offers a more comprehensive understanding of what drives NPD

performance by examining the effects of inter-firm cooperation, conflicts, and innovation capability within industrial clusters, an area that has largely remained underexplored in previous research. Felzensztein et al. (2018) have noted that conflicts are inevitable as firms in industrial clusters mature, while maintaining cooperation. Moreover, their research has shown that conflicts can affect firm innovation outcomes by impacting the exchange of tangible and intangible resources across firms. This study builds on this insight and contributes by examining the joint effects of cooperation and conflicts within industrial clusters on NPD performance. By enriching existing research that has focused on various factors such as firm capability (Awwad & Akroush, 2016; Mauerhoefer et al., 2017), innovation strategy (Cooper, 2019; Mu et al., 2017; Hsu, 2016), cross-functional integration (Daniel et al., 2005), and organizational learning (Li et al., 2010), this study provides a more accurate and comprehensive picture of the reality of NPD performance in industrial clusters. This study explores the simultaneous effects of cooperation and conflicts on NPD performance, and thus provides a better understanding of the complex relationship between cooperation, conflicts, and NPD performance.

Second, this study makes a significant contribution by foregrounding the crucial, mediating role of innovation capability. By examining the distinct effects that cooperation, constructive conflict, and destructive conflict may have on innovation capability and how innovation capability, in turn, affects NPD performance, this study sheds light on the mechanism through which cooperation and conflicts impact NPD performance. Earlier research has only explored a few mediating factors between cooperation and NPD performance, such as heterogeneous knowledge acquisition (Zhang & Zhu, 2021), knowledge transfer process (Zhang & Min, 2021), organizational learning (Bendig et al., 2018), and innovation capability (Weber & Heidenreich, 2018). In contrast, this study offers evidence of mediating mechanisms by which conflicts affect NPD performance. Moreover, although existing research has recognized that factors such as voice behavior, learning from failure (Nguyen et al., 2017), and

compatibility (Mu et al., 2021), play a mediating role between conflicts and NPD performance, the mediating role of innovation capability has still not been explicitly verified. Furthermore, by showing the different impacts of cooperation and both types of conflict on innovation capability, this study lays the foundation for further research to explore the interactive effects of cooperation and conflicts on different innovation processes.

Third, this study contributes by examining the interaction effect between cooperation and both types of conflict on innovation capability, which extends the findings of Li et al. (2011). Their research found that for knowledge acquisition, cooperation not only reinforced the positive effects of constructive conflict, but also exacerbated the negative effects of destructive conflict. Our study reveals a seemingly divergent finding that cooperation substitutes for constructive conflict and weakens the negative effects of destructive conflict on innovation capability. This finding deepens our understanding of the interaction between cooperation and conflicts, as different innovation activities may have distinct interaction effects between cooperation and conflicts. Therefore, investigating the diverse interactions between cooperation and different types of conflict on innovation capability provides valuable insights for further understanding the impact of cooperation and conflicts on innovation capability.

6.3. Managerial implications

Although the context of this empirical study is Chinese industrial clusters, the findings may also be applicable to a wider range of countries and regions or similar emerging economies, as Chinese industrial clusters are representative of many emerging economies. Specifically, this study has several managerial implications, especially for managers of industrial cluster firms. First, we suggest that firm managers recognize the importance of inter-firm cooperation and conflicts within industrial clusters in achieving NPD performance. It is recommended that they accept and encourage the appropriate cooperative interactions to facilitate rapid and novel product

development. Furthermore, to obtain better benefits from [inter-firm interaction](#) within industrial clusters, managers should be aware of the advantages and challenges brought about by coexisting cooperation and different types of conflict. Industrial cluster firms' managers should deal with disagreements in transactions or collaborative projects through cooperation or constructive conflict and maintain stable communication and interaction channels. Meanwhile, cluster firm managers can seek a third party to resolve destructive conflict through formal and fair mediation to avoid hostile and impeding [behaviors](#).

Second, the mediating effect of innovation capability indicates that industrial cluster firm managers should strengthen innovation capability from appropriate actors within the cluster, as innovation capability is crucial in shaping the impact of cooperation and conflicts on NPD performance. In other words, innovation capability is a link, and the effect of cooperation and conflicts on NPD performance only work when innovation capability exists. Therefore, industrial cluster firms' managers may interact with their partners to cultivate and build innovation capability.

Third, this study provides recommendations to the government on how to improve the speed and innovativeness of firms in developing new products by maintaining inter-firm cooperation and conflicts within the cluster to promote the overall innovation efficiency of the region. Specifically, government officials should strengthen encouragement and support for cooperation and constructive conflict within industrial clusters, such as building formal interactive platforms to maintain appropriate cooperation and constructive conflict. Meanwhile, the government should strengthen the supervision of destructive conflict, including [popularizing](#) the harm of illegal conflicts, formulating better norms and guidelines, guiding correct firm [behavior](#), and issuing policies to crack down on extreme [behaviors](#) such as violence.

6.4. Limitations and future directions

This study also has several limitations that provide opportunities and directions

for future research. First, cross-sectional data limit the testing of the hypothesis of variable causality in theoretical models. The results show that innovation capability mediates the effects of [cooperation and constructive conflict](#) on NPD performance. However, data collected at one time are not enough to reveal how innovation capability plays out over time. Future research can track how [cooperation and conflicts](#) affects innovation capability and NPD performance over time through longitudinal studies.

Second, our study does not consider the possible influence of market and environmental factors since the relationship between [cooperation and conflicts](#) and innovation capability is complex and may depend on multiple attributes of the [organizations](#) and the markets (Iranmanesh et al., 2021; Kang & He, 2018; Zhang & Hartley, 2018). For example, as important external environmental factors, market volatility and industry competition intensity also affect the role of [cooperation and conflicts](#), but the possible effects of these factors were not considered (Devece et al., 2019). Therefore, the possible impact of such factors as industry competition intensity and market turbulence should be explored in future studies.

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