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The complexity of collaboration in supply chain networks

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Table 1: Collaborative relationship categories

Case name	Case general information	Relationship category	Relationship closeness	Driver of collaboration	Facilitator of collaboration	Interviewees
EC1-S4	EC1 is an international joint venture founded by a European party in the 1990s. EC1 has several thousand employees. S4 is an affiliation to large national vehicle manufacturers. S4 is specifically engaged in automotive exhaust system production. All technologies are introduced from international party, thereby meeting strict requirements of high standards for clients and products on quality.	Type 2 Collaboration	**	The financial competence of S4 is a moderate driver of the collaboration.	Guanxi (prior collaborative history with the Chinese party in IJV) provides a trustful environment that facilitates collaborative activities.	1 top (EC1) 8 middle (4 EC1, 4S4)
EC2-S2	EC2's first joint venture of EC2's international party was established in the 1990s and terminated at the end of the 2000s. EC2's international party joined another company in the 2010s, with China and the European international party setting up the 50:50 joint venture shares. EC2 has several thousand employees. S2 is an international supplier associated with IJVs, producing one-way clutch, friction plate/dual disc and clutch components. S2 adheres to the fundamental principle of 'quality first and product manufacturing for winning client trust'.	Type 3 Collaboration	***	The technology competence of S2 is a strong driver of the collaboration.	Guanxi (prior collaborative history with the Chinese party in IJV) provides a trustful environment that facilitates collaborative activities.	1 top (EC2) 7 middle (3 EC2, 4S2)
JC-S2	JC was established in the 2000s with an international vehicle manufacturer's party. JC's automotive productivity ranks first. JC has twenty thousand employees. S2 (refer to previous description)	Type 3 Collaboration	***	The technology competence of S2 is a strong driver of the collaboration.	Guanxi (prior collaborative history with the Chinese party in IJV) provides a trustful environment that facilitates collaborative activities.	1 top (JC) 4 middle (JC) (and 4 S2)

UC-S1	UC's international party is one of the world's largest automakers and traces its roots back to the 1900s. UC has several thousand employees in China. S1 present small domestic supplier competing on prices. S1 main products include automotive seat belts and airbags. The products are mainly used by famous automotive manufacturers. S1 always regards product quality and service quality as the priority in production and operation.	Type 1 Collaboration	*	*[The absence of a typical driver restricts the closeness of the collaboration.]*	Guanxi (prior collaborative history with the Chinese party in IJV) provides a trustful environment that facilitates collaborative activities.	1 top (UC) 8 middle (4UC, 4S1)
UC-S3	UC is the same above. S3 is leading domestic supplier who is technology-competitive internationally. S3 is the best transmission technology product and service supplier in the world.	Type 2 Collaboration	**	The technology competence of S3 is a strong driver of the collaboration	*[Given limited Guanxi enabled trust, the relationship distance is moderate.]*	3 middle (S3) (and 5UC)

Table 2: Dynamic collaborative partnering relationships in supply chain networks

2nd-order code Supply chain collaborative activities	3rd-order code Cooperation	3rd-order code Cultural Conflict	3rd-order code Competition
Information sharing	Get agreement with Chinese party to share customer demand (Type 2) Sharing advanced management experiences, manufacturer provided a trainer free of charge, who brought innovation and challenging supplier traditional management (Type 1)	Suppliers should seek continuous improvement instead of over-relying on their partner's support (Type 1)	Discrepancy on the extents of sharing between suppliers and manufacturers (Type 1) Information sharing only happens if there are mutual benefits for both partners (Type 2)

Goal congruence	Goal congruence relies on an understanding of the partner's needs, capabilities, and common objectives (Type 2)	Partners do not always aim for the same goals due to organizational or cultural differences (Type 2) The leadership shifts between two parties, resulting in inconsistent business strategies (Type 3) Managing the partnering relationship due to national and organisational culture differences (Type 3) Chinese culture and international culture are mutually inclusive and compatible (Type 3)	Manufacturers value strong suppliers' short-term compromise for long-term supply chain benefits (Type 3)
Incentive alignment	Incentive alignment is realized through long-standing relationships with mutual advantages, such as strengthens loyalty and trust (Type 3) Benefits are preferred over costs and risks (Type 1)	A balanced incentive is easier to establish with strong Guanxi (Type 2)	The risk of working with suppliers who offer the lowest prices is that you have to take the responsibilities when problems arise such as quality issues (Type 3)
Joint knowledge creation	Strong partnering relationships and collaborative clusters nourish joint knowledge creation (Type 2)	The lack of intellectual property protection is concerning (Type 3)	Individual organizations need to develop their own competence (Type 3)
Collaborative communication	Communication about advantageous technology facilitates supply chain partners to accomplish supply chain objectives (Type 3) Engage suppliers through supplier management committee, which is not only useful for discussing emerging issues but also facilitates multi-level communications (Type 3)	The content and frequency of communication depends on the closeness of collaboration (Type 2)	Manufacturers tend to promote communication between suppliers to encourage competition (Type 2) The fear of losing a dominant position is a barrier (Type 2)
Resources-sharing	Advanced technology facilities sharing increase the supplier's competitive and encourage (Type 3)	IJVs and strategic partnering relationship stimulate sharing (Type 2) Strong Guanxi can be used advantageously (Type 3)	Resources-sharing is constrained by monopolistic competition (Type 3)

Decision synchronization	Manufacturers favor decision synchronization that supports product development (Type 2)	Decisions are defended from different cultural backgrounds and cooperation mechanisms (Type 2) The Chinese party tends to develop Guanxi before making sourcing decisions, while foreign parties typically focus on maintaining the relationship only after a supplier is selected (Type 2)	High level competitive of supplier involvement facilitates healthy partnering relationships (Type 2)

The complexity of collaboration in supply chain networks
An exploratory study of the Chinese automotive sector

Abstract

Purpose: To investigate the complexity of collaborations in supply chain networks, particularly, the influence of horizontal collaborations (e.g., international joint ventures) on vertical collaborations (e.g., supplier-manufacturer partnering relationships).

Design/methodology/approach: A multiple case study including four horizontal collaborations and five vertical collaborations within a supply chain network is presented in the context of the Chinese automotive industry. Data interpretation from interviews is structured by key collaborative activities and collaborative behaviors.

Findings: The analysis highlights a variety of collaborative behaviors under different types of collaboration and their interaction. The complexity of collaboration is revealed in a range of dimensions including culture diversity-, drivers/facilitators, competitive/collaborative advantages and the engagement of all. Collaboration evolves as the structure of the supply chain changes; the key is to appreciate the existence of cooperation, competition, and culture conflicts and to manage the trade-offs.

Research limitations/implications: A window of opportunity is presented for future research to investigate the complexity of supply chain collaboration in a wider industrial or geographical context, including statistical validation and comparative analysis.

Practical implications: A contingent view on supply chain collaboration is promoted to practitioners (e.g., international supply chain managers), where collaborative activities should be aligned with the motive and type of business relationships which may change as collaboration develops.

Originality/value: A rare empirical study captures the complexity of supply chain collaboration including the interaction between different forms. A dynamic collaboration approach recognizes the changing process, varying cooperation behaviors as well as characteristics of partners which have not been sufficiently reflected in the literature.

Key words:
Complexity of collaboration, Supplier-manufacturer relationship, International joint venture, Chinese automotive industry

Introduction

Supply chain collaboration has been increasingly used as a contemporary and generic expression of mutually supportive business-to-business relationships such as partnerships, alliances, supplier-manufacturer/buyer relationships, integration, joint ventures, and networks (Holweg et al., 2005; de Leeuw and Fransoo, 2009; Scholten and Schilder, 2015; Soosay and Hyland, 2015; Zhang and Cao, 2018). These relationships share a common feature of companies working together to create some benefits that one cannot achieve (or achieve as much) on their own, unifying collaborations in varying forms, scales, and context. Much of the literature has been devoted to the question of how to develop long-term, close collaboration, which is commonly recognized as an effective business strategy that helps organizations and their supply chains achieve sustainable competitive advantage and superior performance by sharing goals, information, resources, and risks (e.g., Barratt, 2004; de Leeuw and Fransoo, 2009; Johnston and Staughton, 2009; Cao and Zhang, 2011; Blome *et al.*, 2014). Supply chain integration extends the scale of collaboration from dyad to the entire value chain, including multiple interrelated, dyadic relationships. All supply chain members – such as suppliers, manufacturers, and customers – aim to function as one integrated entity (Flynn *et al.* 2010; Prajogo and Olhager, 2012). Supply chain networks describe the most complicated supply chain configuration and contain inter-connected supply chains (Wever et al., 2012; Lockamy, 2008), where collaborations involve webs of

relationships that all have their own history (Johnston and Staughton, 2009). The complexity of collaborations in a network context, particularly the interactions between relationships, does not seem to have been sufficiently revealed in the literature.

While long-term relationships are widely embraced for enhancing supply chain performance owing to improved communication, cooperation, and coordination between organizations over time (Dyer, 1997; Evans and Berman, 2001; Sleuwaegen *et al.*, 2003; Johnston *et al.*, 2004), the balance can easily be lost as the structure of the supply chain alters. For instance, joint ventures (JVs) are one form of collaborations that trigger "ripples" along their supply chains horizontally and vertically. JVs may involve organizations paying to create new and independent affiliates that they own together (Gill and Butler, 2003). As two or more organizations combine their resources to exploit new opportunities through a contract (Doz and Hamel, 1998), the supply chain of both organizations may undergo significant changes (Flynn *et al.*, 2010). The "ripples" can be even more radical when JVs are conducted across international boundaries, known as international joint ventures (IJVs), where cultural differences are considered as one of the most influential factors affecting the performance of the network (Pothukuchi *et al.*, 2002). The term "culture" in an international collaboration context broadly covers national, corporate, and social dimensions (Brett, 2007; Cao *et al.*, 2015; Liu and Almor 2016). The national and corporate discrepancies are self-explanatory, given the involvement of multiple countries and organizations in the network. The social context of individual partners, which are referred as organizational social capital – a particular form of inter-organizational relationship within a social collective – has increasingly been discussed in the supply chain collaboration literature (e.g. Krause *et al.*, 2007; Zhao *et al.*, 2008; Villena *et al.*, 2011; Handoko *et al.*, 2018). However, its influence on the development of collaborative relationships in a network context is scarcely discussed.

As supply chains are internationalized, collaboration between supply chain members are more likely to take a network form, where vertical collaborations (e.g., supplier-manufacturer partnerships) may be affected by horizontal collaborations (e.g., IJVs) or vice versa. Both suppliers and manufacturers have to deal with new relationships, which might not be their first choice but form part of the partners' history (Lockström *et al.*, 2010). This is particularly notable in the Chinese automotive industry, due to the Chinese government's policy of encouraging international investment since the 1990s: IJVs occupy 90 percent of the automotive industry in China (Richards and Yang, 2007; Holweg *et al.*, 2008). Chinese manufacturers have engaged extensively with Germany, the United States, Japan, Korea, France, Italy, and other major automotive powers through IJVs (Holweg and Oliver, 2016). In the meantime, revenues generated in the Chinese market have made significant contributions to the development of the global automotive industry. However, not all collaborations are successful (Han *et al.,* 2018); one of the biggest challenges has been to manage varying relationships between suppliers and manufacturers in an IJV context. Chinese suppliers are increasingly seeking high-value activities (e.g., technology innovation) that contribute to the upgrading of their capabilities in collaborations (Kim and Chai, 2017), while IJV manufacturers, particularly foreign parties, mainly take collaborations (e.g., alliances and partnerships) as a means to approach cost innovation, which is difficult for them to achieve without working with domestic firms (Thun, 2018). Although a collaborative relationship is obviously needed in order for both parties to obtain benefits, an adversarial element is inevitably embedded in the collaboration due to the tendency of protecting individual competitive advantages (e.g., core capabilities, cost advantages). Such a conflicting element of collaboration between suppliers and manufacturers has been reported as a typical feature of the automotive industry (Kim and Michell, 1999), yet remains to be well investigated (Veludo *et al.,* 2004).

Against the above backdrop, this paper seeks to understand the complexity of supply chain collaboration, using the Chinese automotive industry as the context of study. More specifically, the influence of horizontal collaborations, e.g., IJVs, on vertical collaborations, e.g., supplier-manufacturer partnerships, will be explored. The study asks:

How can collaborations be influenced by complex supply chain settings such as international supply chain networks?

In addressing the research question, the contribution of the paper is threefold. First, in response to the lack of understanding of collaboration in a network form, the study provides rare empirical evidence of varying types of collaborations within a complex supply chain network setting, which paints a rich picture of the interactions between these relationships, including cooperation, competition, and cultural conflicts. Second, despite the importance that developing close relationships has for superior performance, the study offers a unique insight into the extent of collaboration in reflection of its inherent conflicting element – "not too close, not too far". Last, the findings outline how the collaborative features and activities typically described in the literature can be dynamically illustrated in different forms of collaboration as well as by their interconnections.

The remainder of the paper is organized as follows. Section 2 reviews theoretical literature of relevance to supplier-manufacturer collaborations, collaborative dynamics, and the context of the Chinese automotive industry. Section 3 describes a multiple-case-study approach and its suitability for addressing the identified research question. Findings supported by empirical evidence are then provided in Section 4, followed by a discussion in Section 5. Section 6 concludes the study and includes implications for practice and suggestions for future research.

Literature review

This section begins with a discussion of the supplier-manufacturer type of collaboration, followed by an elaboration on the dynamics of such a collaboration. The Chinese automotive industry offers a rich and unique practical context for studying the complexity of collaboration in an international supply chain network setting, which entails the interaction between different types of collaborative relationships and the inherent cultural influences. The identified gap shows that collaboration in practice is characterized by a changing rather than a static nature – the phenomenon needs to be understood by more empirical evidence and supported by more contingent collaboration theories.

Supplier-manufacturer collaboration

Due to competitive pressures and the resulting need to plan activities more accurately (Boddy *et al.*, 2000) and integrate cross-functional processes (Crane *et al.*, 1999), collaborations with key suppliers have become a critical business process that provides a structure for the development and maintenance of supply chain relationships (Lambert and Schwieterman, 2012). In recognition of the greater benefits (e.g., product innovation, technological advances, market access) provided by competitive suppliers, more and more manufacturers prefer working closely with their suppliers (Goffin *et al.*, 2006). A closer relationship between suppliers and manufacturers helps to share risks, access complementary resources, reduce transaction costs, and enhance productivity, profit performance, and supply chain resilience over time (Cao and Zhang, 2011; Blome *et al.*, 2014; Scholten and Schilder, 2015; Formentini and Romano, 2016). Many scholars, such as Goffin *et al.* (2006), suggest that companies must always focus on building close and friendly connections with their suppliers. Others argue that companies should ascertain exactly when and for which types of products special relationships are necessary (Brennan, 1997). For instance, Ziropli and Caputo (2002) indicate that automotive companies should base their relationships with suppliers on factors such as their role in innovation, the type of goods they supply and their relevance to overall car performance, and how long it takes them to deliver. The former view stresses the importance of developing close business relationships, whereas the latter indicates the existence and relevance of heterogeneous relationships, with different types of partners.

Johnston and Staughton (2009) explain the differences between various types of collaboration such as contracts, partnerships, strategic alliances, partnering, joint ventures, and networks, all of which can exist within or across supply chains. For example, contracts and strategic alliances tend to involve

asymmetric relationships, where the stronger side (e.g., the purchasing partner) usually possesses greater power (Stafford, 1994). While partnerships stress mutually derived goals and benefits, they can last for a short or a long term (Mohr and Spekman, 1994). Partnering is appropriate when long-term commitment, trust, and openness between partners are desired (Black *et al.*, 2000). JVs are a type of collaboration that involves companies paying to create new and independent affiliates that they co-own via formal agreements (Stafford, 1994; Doz and Hamel, 1998). Networks represent the interconnections between different types of collaborations (e.g., partnerships, alliances, JVs) in related contexts such as supply chains (Goold and Campbell, 2003). Despite a considerable amount of literature on supply chain collaboration, the relationship focus has mainly stayed at dyadic levels (Soosay and Hyland, 2015). The complex nature of collaboration in the supply chain context needs to be investigated beyond the dyad, where the interdependency between varying relationships is an interesting but already widely researched perspective. Additionally, business relationships are sensitive to environmental changes and cultural differences (Ribbink and Grimm, 2014) and thus may evolve from one form to another as collaboration develops or the structure of the supply chain alters.

While supply chain managers face many challenges, as Johnston *et al.* (2004) note, one of the hardest problems to overcome is how to establish and maintain effective collaborative relationships. Standards on supply chain relationships could be perceived, interpreted, and executed differently by internal and external members of the value chains to a great extent, where an effective governance process often requires engagement between the vertical and horizonal channels (Tallontire *et al*., 2011). Despite the importance of comprehensive, stringent, and consistent institutions to the realization and sustainability of collaborative advantage from a transaction cost perspective (Banterle and Stranieri, 2013), organizations tend to prefer simple and flexible solutions in practice due to diverse transaction characteristics (Stranieri *et al*., 2017). Although manufacturers and suppliers can be tied to one another in collaborations, both sides may not always be willing to make an effort when problems occur (Van de Vijver *et al.*, 2011). Instead of striving to maintain the relationship, it can be more appealing to source new partners, which could avoid conflicts and potentially bring additional benefits. The concept of collaborative advantage has been compared with competitive advantage to stress the value of joint value creation through collaboration, where organizations naturally focus on developing the latter for their own benefits (Lavie, 2006). Although the development of collaborative advantage is argued to be of importance to effective collaboration (Cao and Zhang, 2010), it is unclear how firms shift their focus from individual competitive advantage to a collaborative view of benefits. The effort of making such changes – which might involve compromises on individual benefits – should not be overlooked, which explains why many collaborative initiatives turn out to be not as ideal in practice as in their theoretical forms (McCutcheon and Stuart, 2000). Lambert *et al.* (1996) argue that both strong drivers (e.g., cost efficiency, market advantage) and supportive corporate environments (e.g., corporate compatibility, symmetry), namely facilitators, are essential prerequisites for successful collaboration. However, the perfect match and symmetry between partners – such as Coca-Cola and McDonald's, referred to as an example of ultimate collaboration – is rare in reality; organizations often have to constantly strive for balance in a less perfect partnership due to the fear of losing their drivers in fast-changing corporate and supply chain environments (Fynes *et al.*, 2005). Additionally, supplier-manufacturer collaboration entails a complicated social process, where the current phase can be strongly influenced by the history of the relationship (Van de Vijver *et al.*, 2011). Environmental factors such as "prior history," mentioned in Lambert *et al.* (1996), can become overwhelming in forming or maintaining the collaboration without a substantial driver.

Collaborative dynamics

Despite many studies stating that companies in collaboration should expect a long-term relationship, develop complementary capabilities, share more information, and engage in more joint planning than is customary (e.g. Ellram, 1991; Lambert *et al.*, 1996; Macbeth, 1998), in practice not all collaborations are undertaken according to these principles. The term "collaboration" is often broadly used to describe inter-organization relationships of all kinds, where supply chain partners attempt to work

with each other to attain certain benefits (Soosay and Hyland, 2015). Partnership has been particularly popular in describing collaborations between suppliers and manufacturers, but this does not imply that they have the same legal basis as a formal partnership structure of the type previously popular in consulting firms (Goffin *et al.*, 2006). In fact, partnerships exist in varying forms depending on the closeness between partners and the contextual factors of the collaboration; close relationships are not always desirable or suitable (McCutcheon and Stuart, 2000; Johnston *et al.*, 2004; Goffin *et al.*, 2006). There is a rich body of knowledge capturing the many aspects of partnerships; however, little distinction is made between transactional and strategic relationships (Johnston and Staughton, 2009). The former is often referred to as "distant" or "arm-length" relationships (Henderson, 1990; Petroni and Panciroli, 2002), which contrasts with the traditional view on partnerships (Ellram, 1991; Lambert *et al.*, 1996; Macbeth, 1998). The latter stresses long-term, strong, and close relationships, which can only be formed after a process of getting to know one another, exploration, expansion, and commitment (Henderson, 1990; Claycomb and Frankwick, 2005; Giunipero *et al.*, 2006; Goffin *et al.*, 2006). The extant literature has mainly focused on developing long-term strategic, close relationships, assuming their generic relevance. In practice, collaborations between suppliers and manufacturers are often context-dependent, contractual, and may evolve over time (Harrison *et al.*, 2014). There can be confusion between long-term and strategic relationships, inconsistency between the aimed and acted relationships, and a differing interpretation of the relationship between partners (Johnston and Staughton, 2009).

A collaborative relationship starts to develop when two organizations (e.g., a supplier and a manufacturer) intend to work closely together. Neither tangible benefits nor practical challenges of relevance to the collaborations are crystal clear at the outset of the collaboration (Boddy *et al.*, 2000). A detailed cooperative strategy may only emerge as organizations learn more about how they work together and start to realize the problems related to collaboration. Organizations often aim to develop strategic relationships that reach the full potential of collaboration with their partners, but many of their collaborations take transactional forms in practice, which rely on rules and litigation (Henderson and Kim, 1990). Supplier-manufacturer relationships are likely to act as one of those transitional collaborations, where one party has more power and benefits, depending on their competitive position (e.g., a technological advantage) in the relationship (Goffin *et al.*, 2006). The asymmetry sooner or later becomes a source of conflicts, which can intensify as the structure of the supply chain becomes complex. The literature on supplier-manufacturer relationships focuses largely on developing long-term strategic partnerships. Little attention has been paid to managing imbalance, which is a commonly occurring element in relationships. Macbeth (2018) argues that identifying and forming agreements with preferred partners is just the beginning of the challenge; the life after requires significant effort to continuously provide a win on both sides throughout the partnership journey, which should not be overlooked. The question is how is the term "win" is interpreted in relationships of different types and varying statuses.

The Chinese automotive industry

The automotive industry sector has been a popular setting to study complex supply chain collaborations, where IJVs play a major role in expanding the scale and range of inter-organizational connections in their supply chains (Hayes and Pisano, 1996; Veludo *et al*. 2004; Lockström *et al.*, 2010). Despite significant growth in total global auto sales, particularly in developing economies such as China, aggregate global productive capacity has tended to outstrip demand (Holweg and Oliver, 2016). In order to access the potentially huge market in China, international automotive manufacturers establish IJVs with Chinese car makers, facilitating technology transfer to local manufacturers (Holweg and Oliver, 2016). The IJVs involve different cultures and nationalities that belong to three major areas and three classic supply chain systems: Europe, the United States, and Japan. China's automotive industry was once highly decentralized, with over 100 manufacturers, more than 700 refitting and specialist manufacturers, and nearly 2000 suppliers (Veloso and Rajiv, 2002). IJVs started in a turbulent and fast-changing environment, where chaos in the marketplace then caused IJVs to restructure

themselves. In many cases, the restructuring has led to the development of organizations working in a supply chain network. The emergence of these "webs of firms" (Möller and Halinen-Kaila, 1999) creates major challenges for managing interconnected relationships (Campbell and Wilson, 1998). However, relatively little is written about the complex international interactions that are increasingly prominent in global supply chains.

The automotive industry in China is in transition. Although designs are still being imported, the amount of locally sourced content has been growing over time, with a range of contracts awarded to Chinese suppliers only or to IJV arrangements between international and Chinese suppliers (Holweg and Oliver, 2016). Given the continuous growth of the Chinese automotive domestic market, IJVs have to focus on improving the efficiency of manufacturing production facilities by localizing their supply chains for the long run. Establishing research and design in China could support localization efforts and enable manufacturers to respond to the Chinese market more effectively (Thun, 2018). However, cultural differences are a common barrier in international collaborations (Stiglitz, 2002). These can be exacerbated by IJVs in China, where Western individualism and Eastern collectivism show distinct perceptions of inter-organizational relationships and thus of their collaborative behaviors and activities (Liu and Almor, 2016). Although Japan and China both share a typical context-oriented Eastern culture, the former pursues rigor in process and decision-making through institutional collectivism, while the latter embraces general, top-down decision-making which is supported by social collectivism (Martinsons and Davison, 2007). These national cultures are then represented by the culture that prevails within an organization – commonly referred as organizational culture – which in turn influences the formation of organizational behavioral standards for their business partners (Hofstede *et al.*, 1991). The influence of organizational social capital on collaborative relationships has both a "bright side" of promoting cooperative behaviors and a "dark side" of losing objectivity (Villena *et al*., 2011; Lawson *et al*., 2008; Locke, 1999). The specifically Chinese form of social capital, namely "Guanxi" (Chen *et al*., 2013; Chua *et al*., 2009), mirrors the Eastern cultures of collectivism, particularly the extension of family norms to social and business relationships. In fact, Guanxi shares a similar paradox with social capital, but with the distinctive feature of being a popular collaboration facilitator that actually triggers the formulation of the relationship in the Chinese context. Does the phenomenon fall on the bright side of gaining trust, which can never be truly realized in the Western culture of individualism, or belong to the dark side by opening up to potential bias and opportunistic behaviors?

Research gap: the complexity

Although there is a growing body of literature on supply chain collaboration as evidenced in the previous discussion, collaboration has been mostly portrayed as an ultimate business relationship status that embraces the long term, closeness, sharing, and integration for collaborative advantages that one cannot achieve on one's own. While the heterogeneous feature of collaboration has been acknowledged, the focus on collaboration does not sufficiently recognise that there are different forms from close and long term to more transactional, which itself is questionable for its practical extent. Given the inevitable gap between individual competitive advantage and collaborative advantage, competitions and conflicts naturally go hand-in-hand with cooperation. The extant literature tends to quickly jump into the characteristics of the conflicts without paying sufficient attention to the features of the competitions Additionally, a relationship does not live on its own; it influences and is influenced by other relationships within its social collective. There is a need to develop a wider view on collaboration in terms of appreciating the relevance of other types of collaboration – in addition to the "favorite" long-term, strategic type – and investigating the interconnectedness between the relationships. As a result, the complexity of collaboration needs to be understood in an increasingly growing context of global supply chain networks that entail a diversity of organizational, social, and international cultures. The fast-changing business environment adds another layer to the complexity of supply chain collaboration, where a contingent view is needed to interpret its effectiveness.

Elements for a successful collaboration have been widely discussed in the literature. For example, scholars such as Lambert *et al.* (1996) and Wong *et al.* (1999) argue that a sufficient understanding of the elements that constitute effective collaboration can help organizations define specific actions that can be taken in collaboration with their partners to improve the shared business processes that benefit all members involved in the collaboration. Good collaborations are based on a range of elements, including the use of contracts to boost confidence, knowledge distribution, and the use of methods such as target costing (Ziropli and Caputo, 2002). Collaborations have to be motivated by the mutuality of intent, goal congruence, and benefit sharing (Wong *et al.*, 1999; Tuten and Urban, 2001). Cao and Zhang (2010) offer a comprehensive overview of effective supply chain collaboration activities, including information sharing, goal congruence, joint decision-making, resources-sharing, incentive alignment, collaborative communication, and joint knowledge creation. However, the previously identified collaborative complexity has yet to be reflected in these studies. Most organizational structures, functions, and cultures are not built for supporting collaborations (Barratt, 2004). Additionally, collaborative activities such as trust, mutuality, information exchange, openness, and communication are strongly influenced by cultural differences, which could turn these elements into barriers to successful collaboration. Thus, this study employs the conceptual framework of supply chain collaboration activities provided by Cao and Zhang (2010) to investigate the complexity of collaboration through analyzing a typical supply chain network in the Chinese automotive industry. According to the conceptual framework, this study will redefine the collaboration type according to the complexity of relationships, from both the manufacturers' and the suppliers' sides, to explore the initiatives involved in collaborative activities and study how the multicultural business environment influences and shapes the partnership.

Methodology

Justification of multiple-case-study method

Despite the extensive literature on organizational and supply chain collaborations, there has been a limited engagement with collaborative supply chain networks, with little empirical evidence. This paper adopts a multiple-case-study approach to investigate the complexity of the phenomenon in a real-life context, where rich empirical evidence is obtained through a number of representative cases to enhance external validity (e.g. Voss *et al.*, 2002; Eisenhardt and Graebner, 2007). The research question focuses on the Chinese automotive industry as the context of study. Case studies allow for a detailed description of certain occurrences, including problem-solving and behavior experiences (Ketokivi and Choi, 2014). Building on existing supply chain collaboration theories (e.g. Cao and Zhang, 2011; and Lambert, 1996), this study provides a comprehensive understanding of the phenomenon, applying the theories discussed. It thus enhances the dynamism and applicability of the theories by providing rare insights into varying types of collaboration and their interactions within a supply chain network.

Case selection

In choosing the case study companies, the Chinese market remained the focal industry, with many companies having their head offices in this country. All the companies examined in this study have more than ten years of full production experience in the industry, and are considered market leaders in China. Automotive manufacturers and suppliers in China generally use the management style of the international party of the IJV and maintain a manufacturing system in line with these properties. This paper examines four IJVs consisting of differing cultures and nationalities, three standard supply chain systems – Europe, the United States (US), and Japan (Szwejczewski *et al.*, 2005; Kaufmann and Carter, 2006; Naor *et al.*, 2010; Kim *et al.*, 2011) – and four typical suppliers (Howleg and Oliver, 2008), representing a variety of collaborative relationships (Sousa and Voss, 2009).

A case can be about a group or an organization (Gehman *et al.*, 2018). There are five cases (e.g., groups – pairs of supplier and manufacture) as the subject of investigation in the study; the cases are referred to as UC-S1, UC-S3, JC-S3, EC2-S2, and EC1-S4 in Table 1. Four manufacturers (UC, JC, EC2, and EC1) and four suppliers (S1, S2, S3, and S4) are involved in the cases, where some has more than one partners. All four manufacturers are IJVs (US-Chinese, Japanese-Chinese, European-Chinese, and European-Chinese); each represents the component of horizontal collaboration (e.g., IJV) in their case in addition to vertical collaboration (e.g., supplier-manufacturer partnership). Suppliers in the Chinese automotive industry are typically categorized into four groups: 1) small domestic suppliers competing on prices; 2) international suppliers associated with IJVs; 3) leading domestic suppliers that are technology-competitive internationally; and 4) those with affiliations to large, national vehicle manufacturers (Howleg *et al.*, 2008). As indicated in Table 1, each group is reflected by one of the suppliers in the selected cases.

Each case plays a unique role and is likely to represent a typical form of manufacturer-supplier relationships. The five cases are categorized into three types of collaboration, based on the closeness of the relationship (as shown in Table 1). The mechanism of categorization is adapted from Lambert's (1996) partnership model, where the drivers of collaboration are focused on financial competence and technology competence and the facilitator of collaboration is Guanxi (prior collaborative history with the Chinese partner). A Type 1 collaboration (e.g., UC-S1) represents a light level of collaborative relationship initiated by a facilitator (e.g., Guanxi) without a strong driver. A Type 2 collaboration (e.g., EC1-S4, UC-S3) describes a medium level of closeness that is either supported by a promising driver or is the combination of a moderate driver and a facilitator. EC2-S2 and JC-S2 are examples of Type 3 collaborations, where the existence of both a strong driver and facilitator indicates close relationships.

< Table 1 here>

Data collection

The research conducted on the case studies covered a time frame of approximately two years, particularly taking into account the structure of supplier-manufacturer partnerships in China. Semi-structured interviews were conducted with 34 managers, including top management commenting on collaborative issues on a strategic level, and middle management covering the functional or operational perspective of collaborations, from different regions (e.g., Chinese and international) across the supply chain network. A native speaker (the researcher) translated the interview question into Chinese. The first step for cases covering different automotive IJV manufacturers involved four or five in-depth interviews, conducted with managers representing various levels and processes. The second step involved interviewing three or four managers from the tier-one suppliers (which were introduced by manufacturers, considered a classic relationship) of the case study manufacturers. Depending on the five case studies, these suppliers could provide different products for different manufacturers and become their supply chain partner. Content analysis of the interviews was facilitated through the categorization of the different questions as they were asked and responses were given. The interview questions were similar but changed to reflect the situation of being in the first-tier supplier position rather than as a manufacturer at the top of a supply chain. In particular, the supplier may deal with more than one of the case manufacturers and were asked about the different practices as seen from the supplier side of the relationship. The interview protocol covered a company's business environment, IJV relationship, international supplier-manufacturer partnership, management and alignment of collaboration – such as how to deal with partnership conflicts – resolution to capture the progression and the dynamics of the collaborative relationships, and their interaction within the supply chain network. Interviewees were requested to qualify the past years of their relationships in order to limit bias from strange occurrences (Mesquita *et al.*, 2008) and provide

details on the collaborative elements that were commonly involved. Follow-up telephone calls, emails, visits and informal discussions with participants served to help improve responsiveness, interaction and rate of cooperation, and help reduce attrition.

Analysis methods

Mitigating factors in partnerships, as well as discussions, problems and activities of parties, were revealed through the interviews, reinforced by further expanding contacts in the company. Conversation transcripts, historical data and frameworks were utilized and combined in accordance with Yin (1981) to develop the case study approach. Queries and actions that should be altered in the analysis process, the theoretical framework, highlighting the case study areas and their incorporation, were all assisted through a meticulous and accurate recording of observations, which helped the writing process. As Yin (2003) advocated, in order to produce a complete picture and linkages of the data, a databank for the case studies was produced and the information collection process was assisted with data analysis worksheets.

The steps followed in the data analysis were data reduction, data display, and conclusion (Miles and Huberman, 1944; Scholten and Schilder, 2015). Beginning with a reduction of data to quotes, sentences, or paragraphs that had the greatest relevance to answering the research questions allowed us to select first-order codes, toward effective collaborative activities (second-order code) deduced from the literature as indicated in Table 2. Namely interview data was then analyzed against the collaborative behaviors toward cooperation, cultural conflict and competition (third-order code) to be further discussed for concluding remarks in the discussion section. The elements involved were linked with the paper's research questions. In turn, these were related to the case companies' contexts, relationships, and driver, to see how these were with multicultural collaborators into supply chain networks, in order to generate reliable findings and provide theory development.

Following this, a cross-case analysis was used, first for cases in the companies under study independently, and then for different types of collaborative relationships, as indicated in Table 2, resulting in the clarification of theoretical relationships (Barrett *et al.*, 2011). The most important findings were used as key reference points or headings for cross-case study analyses, and are underlined as direct quotes, descriptions, and reviews, in order to enhance understanding and make the research flow more smoothly (Scholten and Schilder, 2015**)**. Alongside supply chain collaboration theories, the process approach facilitates an analysis of the way in which collaboration culture is involved in the supplier-manufacturer relationship in supply chain networks in the context of the Chinese automotive industry. Areas of activity here are objectives and objects, subjects, tools, policies, delegation, community impacts, interactions, and collaboration culture at individual, project, and organizational levels (Miles and Huberman, 1994; Bloomberg and Volpe, 2012). The results can be widely applied, and so the data analysis section uses a combined approach to gather all data sources and insights, presenting an in-depth and all-encompassing analysis.

<Table 2 here>

Data analysis

This section presents evidence from the interviews obtained through cross-case analysis, structured by the key collaborative activities including information sharing, goal congruence, joint decision-making, resources-sharing, incentive alignment, collaborative communication, and joint knowledge creation in the supply chain collaboration framework (Cao and Zhang, 2010). For each activity, quotes are discussed according to collaborative activities, which reflects the complexity of collaboration in a

supply chain networks context. It also reveals the opportunities presented by developing a collaboration as a proactive strategy toward effective supply chain collaboration. A summary of the findings is presented in Table 2.

Information sharing

Information sharing is a key component of supply chain management and has been identified as one of the five building blocks of a strong supply chain relationship (Sahin and Robinson, 2002). The pooling of data allows for information to be shared and accessed with regards to planning and building information and knowledge exchange systems, as well as establishing supply chain visibility (Vanpoucke *et al.*, 2014). A key target of the dynamic supplier-manufacturer relationship is to limit relationship conflicts through the sharing of information in a transparent way (Holweg *et al.*, 2005). As evidenced in our empirical data, small domestic suppliers tend to rely on information and technology updates from their manufacturers, instead of striving for innovation themselves. Such an over-dependent relationship minimizes the range of collaborative activities, which will eventually create a gap between the expectations of the two parties. The partnership turns into a transactional format when one side (e.g. suppliers) is pushed into a weak position (Stafford, 1994). As stated by a small domestic supplier, a discrepancy between understandings of the extent to which information is shared could result in relationship conflicts between supply chain partners:

> "*The foreign party of the manufacturer introduced their advanced management principles and technologies to us at the beginning of the relationship. However, such support in terms of knowledge sharing and technology sharing was not provided on a continuous basis throughout the partnership period. As a result, our knowledge and technology have not been sufficiently updated for us to be capable of developing new products together with the manufacturer. This has put us in a weak position in terms of competing with other suppliers who are advanced in technology, which means we have to lower our price for existing products to in order to survive."* (S1-UC)

One of the manufacturers explained the opportunities that the resolution of collaboration offers: "*we are often willing to share but expect suppliers to develop their own innovative culture eventually for continuous technology improvement"* (UC-S1). Suppliers who fail to do so end up competing on price, which is not an inimitable advantage that ensures a long-term relationship. Information is more likely shared when benefits are anticipated, as explained by the manager of EC1 from the international party side:

> "*We [the foreign party] believe customer requests are better met if we share their detailed requirements directly with our suppliers, whose expertise is essential for the development of solutions. We hope the Chinese party agrees with us on this*." (EC1-S4)

Information sharing requires mutual engagement between suppliers and manufacturers, where both partners agree on the exchange of information and the reasons for sharing (Ribbink and Grimm, 2014). As confirmed by a leading domestic supplier, transparency of product and process information enables suppliers to get involved in manufacturing decisions and activities (e.g. developing production strategies, fulfilling new technology requirements) from an early production stage onwards; suppliers gain financial support for innovation and the competitive advantage of advanced technologies (S3-UC).

Goal congruence

Goal congruence stresses the conformity between the supply chain partners' goals, which should guide the partners' collaborative activities (Lejeune and Yakova, 2005; Cao and Zhang, 2010). Consensus across dyads means that there is a deeper comprehension and more effective evaluation of manufacturer and supplier relations and their mutual targets. Despite the relationship becomes better despite common and differing elements (Ribbink and Grimm, 2014). However, partners do not always act consistently or share the same opinions, due to organizational and cultural differences.

Individual competitive advantage (Lavie, 2006) can be the main source of goal conflict from an organizational perspective.

According to an interviewee from EC1, manufacturers could face a dilemma of having to choose between collaborative benefits from strong suppliers and losing a dominant position. Suppliers who are not technologically competitive are generally concerned about the price battle:

> "*The partnership doesn't guarantee us a long-term business as we are not involved in making decisions on a strategic level, thus, we could easily be replaced if not offering a competitive price."* (S1-UC)

> *"Lowering the price not only offers us little competitive advantage but also forces us into a very passive situation."* (S4-EC1)

Cultural disparity is especially observed between IJV partners. For example, conflicts emerge when it comes to sourcing decisions in the UC manufacturer: the Chinese party tends to develop organizational social capital, based on which their sourcing decisions are made, while the foreign party prefers developing the relationship only after a supplier is selected (UC-S1). The loss of corporate policy continuity due to an unclear power balance between IJV partners could be another source of goal conflict: "*The leadership shifts between two parties, resulting in inconsistent business strategies, especially in managing the relationship with suppliers. The supplier measurement and appraisal system are unable to continue"* (EC2-S2).

The collaboration facilitating goal congruence is based on a clearer understanding of the partnership firm's abilities, and allows for achieving mutual goals throughout the supply chain (Yan and Dooley, 2013). For example, in a competitive supply chain or partnership, not only should the manufacturers source globally in order to achieve the best performance, but suppliers should also actively seek continuous improvements through international platforms. The reality is that manufacturers value suppliers who are willing to sacrifice their own benefits for the short term, such as payment delay, to support recovery from internal conflicts between JV parties; the shared goal among all parties is the supply chain performance (EC1-S4). Affiliated suppliers tend to believe that IJVs should provide them with a platform to fill domestic technology gaps (S4-EC1). Achieving the goal congruence appears challenging, unless greater transparency and cohesion in wider targets is realized and the outcomes of common objectives are anticipated (Nyaga *et al.*, 2010).

Decision synchronization

Planning decisions are necessary for finding the approach that makes the best use of a company's resources for reaching a particular target (Lockamy and McCormack, 2004). A synergy between the manufacturer and suppliers helps to ensure the best possible manufacturing processes, which allow for the production of tailor-made components. Supply chain management decisions are defended from different cultural backgrounds within IJVs, as discussed below:

> "*Decisions are supposed to be synchronized between our JV parties. However, conflicts are inevitable when diversity exists such as profit returns, cooperation mechanisms, and level of authority."* (EC1 internal)

Manufacturers tend to be more motived to synchronize decisions when such activity is anticipated to support product development:

> "*We share our sourcing requirements with a number of suppliers in order to boost a certain level of competition among these candidates; such competition often stimulates the development of state-of-the-art components."* (EC1-S4)

The conflict caused by cultural gaps between supplier and manufacturer (European-China) can be resolved through a shared understanding of strategic priorities of the supply chain and by encouraging partners to actively engage in strategic decisions:

> *"Suppliers should be involved from the start of our operational plans, which facilitates healthy partnerships."* (EC1-S4)

The Chinese party tends to be more conscious about the speed of a new product entering into the market, while the international party are usually more insistent on the quality of the product and the predefined procedure of the manufacturing process. The agreed-on solution after negotiation between the two parties was to simplify aspects of the manufacturing procedure, such as the approval process, without compromising on the quality standards. In this way, products could be released onto the market on time (EC1-S4). Conflicts between two parties do exist, but can be solved by mutual consultation.

Incentive alignment

Incentive alignment includes sharing costs, risks, and benefits between partners through clearly defined mechanisms (Simatupang and Sridharan, 2005). However, the sharing is not always equally distributed between partners. The following cases show asymmetric incentive alignment, where either the manufacturer or the supplier side shared more than the other side.

> "*The risk of working with suppliers who offer the lowest prices is that you have to take responsibility when problems arise, such as quality issues*." (JC-S2)

> *"The manufacturers' pressure to reduce prices will be transferred to the suppliers. However, we also face cost pressure as the prices of raw materials, resources, and the labor force are constantly increasing. Dual pressures make our profitability decline. The incentives of a partnership are jeopardized."* (S1-UC)

Once the risks or costs overtake the benefits, as mentioned in both cases, the incentive for collaboration can quickly vanish, and so can the relationship. Some manufacturers prefer working with a familiar supplier as a solution for maintaining a balanced incentive structure, which may have already been established as long as there is no serious disadvantage; they consider developing a new partnership as a risk that can break the balance (EC1-S4).

A collaborative initiative for incentive alignment supports long-standing relationships that are mutually advantageous to the parties involved. The alignment might be guided through informal social pressures to operate with certain common values and norms in mind (Heide and John, 1992). As evidenced in JC, "*a profit community is formed through interdependence with suppliers. Having shares with suppliers establishes and strengthens loyalty and trust. The benefits of such a relationship include opportunities of cost reduction"* (JC-S2). When loyalty is in place, resources are more readily shared, and learning activities are more commonly taken part in. Cultures that have a long-term view of things have a higher likelihood of trust, cooperation, and taking on common norms and values (Anderson and Weitz, 1992). This also impacts the extent to which the partners work toward the intended targets and to which they make sacrifices.

Resources-sharing

Resources shared between supply chain partners can be broadly defined as physical assets as well as more intangible capabilities of fulfilling demand (Sheu *et al.*, 2006; Cao and Zhang, 2011). Powered vehicles are still dominant, exhibiting a "technology lock-in" because of the dominant effects of prior investments in product designs, infrastructure, economies of scale, and modularity in product, process,

and value chain (Farrell and Klemperer, 2007; Christensen, 2011). As indicated by empirical data, resources-sharing can be constrained by monopolistic competition. Suppliers affiliated with the manufacturers before the construction of the supply chain network seem to be advantaged, due to the previously established Guanxi:

> "*If manufacturers wanted us (who compete on price) to lower the price without compromising the quality, they must equally distribute their resources and share technology among their suppliers. However, they often favor well-established supply partners, where the relationship can be developed before the JVs*." (S1-UC)

Japan-China JVs appear to be more open to sharing their financial resources, manufacturing facilities, and equipment, as well as responsibilities for order fulfillment, depending on the partnership strategies (JC internal). IJVs often encourage subsidiaries to embed themselves in local culture using additional value-added resources through cooperating with external network partners (Kim *et al.*, 2011). JC's Japanese domestic supplier partner is contracted for setting up the subsidiary in China and reduces the cost, thus confirming Kim *et al.* (2011)'s research:

> *"The joint venture enhanced our capabilities of sharing in terms of resources, technology, and assets, strengthening the entire supply chain for the long term."* (JC internal)

As one of JC's suppliers mentioned, they particularly appreciated the advanced technology and management experiences provided by the manufacturers, which bring new aspects to their business development (S2-JC). A collaborative initiative for resource-sharing is more likely to establish or maintain a strategic partnership or IJVs bound by formal contracts.

> "*The partnership encourages us [manufacturer and suppliers] to exchange advanced technology and state-of-the-art industry reports."* (UC-S3)

Collaborative communication

Relationship conflicts are inevitable throughout collaboration in areas such as cost and profit, but can be resolved under the precondition that the manufacturer's rights are guaranteed. An appropriate solution is necessary to handle conflict, with contact and communication between manufacturers and suppliers facilitated in an appropriate manner (Jean *et al.*, 2010). Collaborative communication stresses the importance of the content (e.g. data, information) and the frequency of sharing between partners, which is essential for enhancing the performance of the supply chain or supply chain network (Goffin *et al.*, 2006; Cao and Zhang, 2011). The content or the frequency of sharing depends on the closeness of the collaboration.

The empirical data illustrated the differences in multicultural managers' communication flows. EC1-S4 focused on communicating with the aim of reaching a joint solution, and used persuasion, whereas EC2-S2 emphasized multi-level communication with their supply network, and communication on specific topics such as technical issues. The former communicates on a strategic level and the latter facilitates more frequent communication on a technical or operational level. Both are essential for open communication and joint problem-solving (Carr and Pearson, 1999; Naor *et al.*, 2010):

> *"Following the establishment of the partnership, manufacturers and suppliers should communicate on strategic decisions and on problems that arise and develop resolutions together."* (EC1-S4)

> "*We engage our suppliers frequently through a supplier management committee, which is not only useful for discussing emerging issues but also facilitates multi-level communications*." (EC2-S2)

When a relationship commitment has been in place for a longer time, then the tendency to leave will be lower (Zhao *et al.*, 2008). EC1-S4 and EC2-S2 saw regular communication about production and

production planning as the most significant success attributable to collaboration. Joint planning procedures quickly became institutionalized. Successful communication means that a common understanding of actions and relationships is achieved, whereas less effective communication means that there are barriers to action and relationships.

While frequent interactions and communication lead to a higher degree of trust and satisfaction, manufacturers sometimes face a dilemma of having to choose between a long-term, steady relationship and losing their dominant position when they collaborate with their suppliers:

> "*Strong suppliers can form monopolistic competition in the market. This may shift the power in managing the partnership from us to those suppliers who become stronger and stronger in the monopoly. Involving new suppliers may help to break the monopoly of existing suppliers by rebalancing the power in the partnership*." (EC1-S4)

Manufacturers seemed to encourage competition among suppliers to ensure their joint development. In the meantime, they promote communication with and between suppliers for greater behavioral transparency and less asymmetry in data, so that transaction costs fall, and transaction values rise (Zajac and Olsen, 1993; Dyer, 1997). Both Europe-China manufacturers in this case study required the formation of strategic alliances at the horizontal level. A successful international joint venture requires: an international party that is well integrated into Chinese culture, as well as a Chinese party that has experience with international collaborations; a perception by supply chain partners that their objectives are satisfied by accomplishing the supply chain objectives; communication about advantageous technology; and the sharing of reports with each other (UC internal).

Joint knowledge creation

By establishing partnership, joint learning supports cost reduction and innovation, which are key aspects involved in building a competitive advantage. Collaborative knowledge management practices in the supply chain are the actions taken by trading partners to establish, utilize, and share supply chain knowledge (Li *et al.*, 2012). These collective activities create trading knowledge barriers that are difficult to replicate, and it takes a while for competitors to develop similar expertise and talent. As a result, a supply chain can outperform its rivals (Wagner *et al.*, 2002). However, for suppliers who compete on technology there are concerns about joint knowledge creation and intellectual property conflict in the network:

> "*There is a lack of incentives for knowledge investment due to insufficient intellectual property protection. New ideas could easily be copied by other suppliers who compete on the same business. Besides, manufacturers tend to value low prices in fierce competitions, which worsens the practice of intellectual property protection…"* (S2-EC2)

Meanwhile, individual organizations need to develop their own competence, which enables them to be of high value during activities of joint knowledge creation or innovation with their partners:

> "*Outstanding suppliers are always a favorite choice of manufacturers, as they are more likely to create knowledge together with their partners given their competence."* (S4-EC1)

A collaborative initiative for joint knowledge creation is more likely to develop or exist in a formal partnership, or a less formal but socially affiliated relationship, since openness would be protected by the strong relationship:

> *"A strong partnership may enhance the brand image as advanced technologies and a breakthrough in R&D are more likely to be realized in close collaborations between suppliers and manufacturer."* (JC-S2)

> *"Partnerships can stimulate synchronized technology and product development between the manufacturer and us."* (S4-EC1)

Besides, supply chain networks are identified as a nourishing environment to cultivate collaborative initiatives, which has the potential of achieving high operational efficiency and knowledge creation:

> *"The network facilitates multi-level technical support between suppliers and manufacturer, where new technologies may be developed in such an engagement. A suppliers' association is another channel for suppliers to exchange, compete, and improve technology."* (JC-S2)

As supported by empirical evidence, knowledge management needs to involve cross-organizational teams to facilitate further learning from one organizational node to another. In this way, manufacturers and suppliers can use teams, tactics, and targets to bring benefit to all parties within the dyad (Mesquita *et al.*, 2008; Cheung *et al.*, 2011).

Discussion and research agenda

As observed in the data analysis, this study reveals the complexity of international supply chain collaboration using three perspectives that argue: (1) the competition element of collaboration should not be overlooked as it reflects the nature of individual competitive advantage, which is not always aligned with collaborative advantage; (2) the multicultural business environment makes it necessary to understand different perceptions of collaboration between partners; (3) cooperation, competition, and cultural conflict exist hand-in-hand with all types (e.g., ordered by degree of closeness) of collaboration. The rest of the section discusses each of these perspectives in detail, which then leads to a number of propositions that represent some new contributions to extant theories on collaborations.

First, the empirical evidence engages three types of collaboration in the supply chain network, looking into the drivers and facilitators of collaboration (Lambert, 1996). Not all collaborations are initiated by a strong driver (e.g., supplier competence); organizational social capital developed in prior business history (e.g., Guanxi in Chinese context) appears to be an important facilitator that offers a sense of trust, which is a hard-to-develop prerequisite of effective collaboration (Goffin *et al.*, 2006). While drivers provide motivation for collaboration, they do not necessarily enable organizations to achieve collaborative advantage (Lavie, 2006; Cao and Zhang, 2010). In fact, a strong competitive advantage can boost the desire for collaboration but may also become a barrier to the shift from an individual focus to a collaborative view (Lavie, 2006). As indicated by the competition element summarized in Table 2, a collaborative advantage is not always realized because of organizational focus. For example, manufacturers (EC1) deliberately lowered their sourcing price in order to stimulate competition among suppliers, such as S4, who aimed for technology advance and expected opportunities for improvement from IJVs; this broke the congruence of the goals. Additionally, manufacturers are generally willing to involve suppliers in early production as long as they contribute to design and innovation. This stresses the need for suppliers to constantly enhance their competitive capability and advantage in order to maintain a strategic position in their collaboration. As a result, the first proposition suggested by the study is:

> *Proposition 1. A strong driver (e.g., business competence) brings with it the desire for collaboration as well as competition, which indicates the importance of appreciating and balancing individual needs across different partners as well as different types of relationships in a supply chain network.*

Second, the multicultural business environment could turn collaborative activities into barriers to partnerships if cultural conflicts are not effectively managed. As observed in the case evidence, Europe-China collaborations tend to emphasize Guanxi as well as business competitiveness in developing a collaborative supplier-manufacturing relationship. However, goal congruence and decision synchronization appeared challenging in the horizontal relationships between Europe-China IJV partners due to the shift of leadership and disparity in culture and management processes. Japan-China collaborations particularly stress close relationships with their suppliers, including incentive

alignment based on a profit community and suppliers' loyalty and trust. On the one hand, this encourages long-term strategic partners; on the other, it may expose them to risks of losing objectivity. US-China collaborations are mostly concerned with gains through context and communication such as personal history, relationships, norms and social standing, physical context, status, participant roles, and nonverbal communication. In the work of Dyer and Singh (1998), it is stated that US car manufacturer relations with their suppliers are not the same as those of their Japanese counterparts, as they have less collaboration and information sharing between the parties. To the bright side, in a multinational supply chain network, cross-cultural exchanges could be encuraged and established among all parties involved in the network. The communication backdrop built by these intercultural interactions establishes a mixture of communication protocols used concurrently in the context (Casrnir, 1999). The cultural complication in supply chain collaboration leads to a second proposition:

> *Proposition 2a. Cultural (national, corporate, and social) diversity in international supply chain networks may bring conflicts in terms of how collaborative relationships are perceived, established, and managed.*
>
> *Proposition 2b. Interactions between horizontal collaboration (e.g., IJV) partners offer opportunities to understand and leverage cultural differences in developing their vertical collaboration (e.g., supplier-manufacturer partnership).*

Third, not all collaborative initiatives reach the close partnership status, depending on whether a long-term or close relationship (i.e., strategic relationship) is desired by both partners in the first place and on how elements of cooperation, competition, and cultural conflict evolve throughout the collaboration process. A supply chain network contains members varying in levels and areas of competence, degree of willingness and motive to share, and history of social connections. As suggested by the empirical evidence (e.g., UC-S3), supplier's technology competence acts as a strong driver of collaboration but is also a result of strong interests in developing competitive advantage. Trust becomes a very sensitive and fragile component when technology is the focus of exchange in collaboration, thus, it may require a longer process than the life cycle of the collaboration itself. The context-oriented Eastern culture opens a door to the traditional collaboration theories, which argue that trust resulting from prior business history or organizational social connections (e.g., Guanxi) could well be leveraged as a trigger for (driver of) collaboration on condition that some mutual benefits are implied. As evidenced in the empirical data, Guanxi of individual partners plays an important role in shaping the new supplier-manufacturer partnership when supply chain restructuring, such as IJVs, occurs. The ultimate goal of a static, long-term close relationship is perhaps difficult to attain in today's fast-changing, highly competitive business environment, where the existence of competition and cultural conflict as side-by-side components in addition to cooperation in the dynamic collaboration process should be embraced. Hence, the third proposition resulting from the study is:

> *Proposition 3. The complex supply chain environment requires a contingent view on the effectiveness of collaboration, which calls for the importance of striving for a balance in the trade-offs between cooperation, competition, and conflict throughout the dynamic collaborating process.*

Conclusion and implications

This study examines the complexity of collaboration in the context of supply chain networks, which involve a wide range of business relationships that are interconnected and all have their own history. A number of theoretical lenses used to study collaboration – such as the diversity of inter-organizational relationships (e.g., Johnston and Staughton, 2009), debates on degree of closeness (e.g., McCutcheon and Stuart, 2000; Johnston *et al.*, 2004; Goffin *et al.*, 2006), the drivers-and-facilitators–in-partnership (supplier-manufacturer collaboration) model (e.g., Lambert *et al*., 1996), the importance and challenge of building trust in developing partnerships (e.g., Goffin *et al*., 2006), and effective supply chain collaboration activities and governance (e.g., Cao and Zhang, 2010; Tallontire *et al*., 2011) – have been used to understand, analyze, and interpret the collaborative behaviors

observed in the rich empirical evidence of a complex supply chain network in the Chinese automotive industry. An analysis of cross-cultural characteristics revealed an additional dimension of the complexity of collaboration in international supply chains. Western automotive manufacturers and suppliers in the Asian market involve a broken Chinese parochialism of Asian supply chain systems. While cultural disparity does cause confusion in perception and behavior of collaboration between partners, it also opens up opportunities for tackling the long-standing trust puzzle without losing objectivity by integrating the Western individualism and the Eastern collectivism. The study concludes that establishing effective supplier-manufacturer relationships is a dynamic process that requires a contingent view. First, effectiveness is not restricted in long-term strategic collaborations; short-term contractual relationships can be preferred when competition is high and organizational social capital is low. Second, supplier-manufacturer relationships evolve as the structure of the supply chain changes (e.g., IJVs); the key is to appreciate the existence of cooperation, competition, and cultural conflicts and to manage the trade-offs.

Theoretical contributions

To summarize, the study provides a contribution to the literature on supply chain collaboration by offering rare empirical evidence on the complexity of collaboration in the contemporary context of fast-changing global supply chain networks. It does so by promoting a contingent view on the development of collaborative relationships in dynamic supply chain environments, which contrasts with the conventional belief in studying the static status of long-term close collaboration. The contingent view stresses the importance of maintaining a balance between cooperation and the seemingly less-favored competition and conflict elements that are equally relevant in collaboration. Additionally, the interactions between different types of collaboration (e.g., levels of closeness, vertical collaboration, horizontal collaboration), including evidence from partners on both sides (e.g., supplier, manufacturer), have offered unique insight into the complexity of collaboration. Finally, the paper contributes to the cross-cultural collaboration literature by emphasizing the importance of embracing cultural differences and leveraging diversity to fill gaps (e.g., trust) in relationship development.

Managerial implications

The context of the Chinese automotive industry investigated in the study well represents the complexities of international supply chains and the associated collaborations. Thus, the research provides practical implications for international supply chain managers who are challenged by managing collaborative relationships that vary in business partners, collaboration motivations (e.g., drivers), cooperative environments (e.g., facilitators), cultures, and collaborative behaviors. Approaches to managing individual collaborative relationships should be adjusted according to their specific setting. Attention should also be paid to the influence of one partner on the other as relationships are not isolated, especially within a network. International managers should actively identify confusion and inconsistency caused by cultural differences and encourage communication to enhance mutual understanding, which may turn conflicts into collaborative advantages.

Limitations and future research

The specific context of the Chinese automotive industry might limit the generalizability of the conceptual framework to other geographical areas or industries. However, this study takes a critical step toward understanding the complexity of international collaborations due to the huge impact that relationships in this region (i.e. China) of the world have on the global economy. Although the automotive industry sector has been a typical context to study complex supply chain collaborative relationships particularly for sectors emphasizing incentives such as market access, knowledge transfer, and technology innovation, an investigation on other industry sectors (e.g., food) may add further insight into the complexity (e.g., traceability) of supply chain networks (see, for example, Banterle and Stranieri, 2013; Stranieri *et al*., 2017). The development of more industry- or region-

specific approaches in this research field will allow researchers to identify similarities and discrepancies that might be applicable in a wider industrial or geographical context. The empirical evidence of the study paints a complex picture of collaboration in supply chain network, which reveals the need to understand some practical phenomena that are not fully explained by existing collaboration principles (e.g., closeness of relationship). Key future research dimensions emerged from this study include: (1) the supply chain collaboration literature should be extended by including different forms of collaboration and their interactions, and developing appropriate collaborative strategies accordingly; (2) an effective strategy should advocate the evolutionary process of relationship development and address the challenges of progressing; (3) although this study employs a multiple-case approach including typical samples to enhance its validity and generality, evidence on the complexity of supply chain collaboration could be enhanced by a survey study covering a wider range of samples and industry sectors.

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