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Towards a Theory of Network Facilitation: A Microfoundations Perspective on the Antecedents, Practices and Outcomes of Network Facilitation

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Firms cooperate in inter-firm networks to foster their competitiveness and improve their innovation outcomes. In many cases, network facilitators who are either embedded in a lead firm or a third-party organization manage the cooperation among the network firms. This qualitative study adopts a microfoundations perspective to investigate the behavioural antecedents of the network facilitators, their facilitation practices and the related network-level outcomes. Results show that lead-firm facilitators more strongly invest in trust-building measures since they are considered deficient in benevolence and integrity. Without these investments, they run the risk that conflicts of interest hinder the stimulation of positive network-level outcomes. Third-party facilitators, by contrast, enjoy certain credits of trust and focus on balancing firm interests from the network's activation, but need to invest in enhancing their competencies and skills with regard to the industry the firms operate in. The findings contribute to developing a theory of network facilitation by providing a nuanced understanding of how network-level outcomes can be reduced to individual-level factors.

Introduction

Firms coordinate activities across organizations to successfully cope with the challenges of today's business environments, such as rapid technological changes, demand uncertainty and product obsolescence (Cravens, Piercy and Shipp, 1996; Lim, Mak and Shen, 2017; Yusuf *et al*., 2014). Provan, Sydow and Podsakoff (2017, p. 155) address this phenomenon and state that '[m]anaging and working across organizations in a multi-organizational network context has become a common practice'. In recent years, the network metaphor has also gained significant importance in research on cooperation and competition between firms (Shipilov and Gawer, 2020). Networks are defined as 'a group of three or more organizations connected in ways that facilitate achievement of a common goal' (Provan, Fish and Sydow, 2007, p. 482). Earlier research agrees that firms cooperate but also compete within networks to benefit from network externalities, such as technological innovation, low transaction costs and access to complementary resources or high-skilled employees (Gnyawali and Park, 2011; Lavie, 2006; Powell, Koput and Smith-Doerr, 1996; Ritala, 2012). Due to complex knowledge exchange processes among network firms (e.g. Easterby-Smith, Lyles and Tsang, 2008), inter-firm networks are equipped with a network facilitator, who is in charge of setting up network structures, orchestrating network activities and coordinating knowledge transfer (e.g. Dagnino, Levanti and Li Destri, 2016; Dhanaraj and Parkhe, 2006; Mesquita, 2007; Paquin and Howard-Grenville, 2013). The purpose of this study is to advance our understanding of *how* these network facilitators

actually manage inter-firm networks, with a particular emphasis on investigating their abilities and motivations, their facilitation practices and the associated network-level outcomes.

It is well established that network facilitators are embedded either in a lead firm of the network or in a third-party organization (Bell, Tracey and Heide, 2009; Human and Provan, 2000; Provan and Kenis, 2008). In a network governed by a lead firm, the lead firm usually sets the agenda concerning relevant markets and technologies and dominates the network's strategy (Dhanaraj and Parkhe, 2006; Jarillo, 1988; Provan and Kenis, 2008; Sanou, Le Roy and Gnyawali, 2016). For example, the automotive company Daimler is the lead firm of the automotive network near Stuttgart in southern Germany. For many years, the responsible managers at Daimler, the lead-firm network facilitators, have assembled the main suppliers, complementors and research institutions in their network and dominated the further development of the network, enabling them to influence not only the lead firm's but also the other network firms' strategic alignment. In a network governed by a third party, which can be an institution like a governmental agency or a business association, the network facilitators employed by the third party help to bring transaction partners together and provide supportive network services, such as consultancy services or legitimacy-building activities (Howells, 2006; Human and Provan, 2000; Kirkels and Duysters, 2010; Mesquita, 2007; Moretti and Zirpoli, 2016). For example, the Pacific Northwest Aerospace Alliance, located in Redmond, WA, is a third-party organization whose employees, the network facilitators, promote the growth of the aerospace industry in the northwest region of the United States. To accomplish this goal, they provide networking opportunities, conduct educational seminars and inform firms about business opportunities in emerging markets.

While prior research has created profound insights into networks as an organizational form (e.g. Cravens, Piercy and Shipp, 1996; Dyer, 1996; Williamson, 1991), we lack knowledge of how network externalities can be further reduced to individual-level, behavioural antecedents of the network facilitators and social interactions within the network (Ahuja, Soda and Zaheer, 2012; Müller-Seitz, 2012; Paquin and Howard-Grenville, 2013). Thus, we are 'left with an understanding of why networks may be a superior mode of governance but not of how they are themselves governed' (Provan, Fish and Sydow, 2007, p. 504). However, understanding *how* networks are managed (i.e. understanding the abilities and motivations of network facilitators and the practices that aggregate individual actions into network-level outcomes) is important for establishing effective networks that foster positive externalities, and for efficiently allocating public network subsidies (e.g. Kenis and Provan, 2009; Wincent, Thorgren and Anokhin, 2013).

To fill this void, this paper adopts a microfoundations perspective to develop a theory of network facilitation that explains how network-level outcomes can be understood in terms of the behavioural antecedents of different types of network facilitators, the perceptions of trust that are built upon these antecedents and the related practices of the facilitators. The microfoundations lens provides a powerful analytical basis for this investigation, since it promotes our understanding of how macro-outcomes, in this case network-level outcomes, relate to the characteristics, actions and interactions of micro-level entities, in this case network facilitators (e.g. Contractor *et al.*, 2019; Felin, Foss and Ployhart, 2015). Drawing on arguments from agency and network theory and on the analysis of 85 qualitative interviews with network facilitators in five countries, I carve out the behavioural antecedents for both the lead-firm and the third-party network facilitators, the associated facilitation practices and the network-level outcomes, and develop propositions aimed at condensing the findings to a theoretical model of network facilitation.

This study contributes to research on network facilitation in several ways. First, it uses the current body of knowledge on the complexity of knowledge transfer processes within networks (e.g. Easterby-Smith, Lyles and Tsang, 2008) as a motivation to shift the focus on those actors that initiate, coordinate and support such complex processes: the network facilitators. The results foster a more comprehensive and at the same time more nuanced understanding of the microfoundations underlying the network facilitators' practices to stimulate the creation of positive network-level outcomes in inter-firm networks. Using the microfoundations perspective (e.g. Contractor *et al.*, 2019; Felin, Foss and Ployhart, 2015), this investigation of the network facilitators' practices answers a call for a more elaborated

understanding of the dynamics between individual-level, behavioural factors and macro-outcomes that unfold in inter-firm networks (e.g. Bell, Tracey and Heide, 2009; Dagnino, Levanti and Li Destri, 2016; Paquin and Howard-Grenville, 2013; Provan, Fish and Sydow, 2007). Specifically, this study follows the call of Peng, Yen and Bourne (2018, p. 352), who suggest that in the context of simultaneous cooperation and competition between firms, 'examining the *how* question as to the stream of *process, interaction and dynamics* is probably the most challenging theme'. The results of this study reveal important nuances in the lead-firm and the third-party facilitators' abilities and motivations, which influence perceptions of trust and social interactions between the facilitators and network firms. Whereas lead-firm facilitators are trusted to be competent but deficient in benevolence and integrity, third-party facilitators appear more honest and benevolent but less competent. Unequal levels of conflict of interest result based on these different perceptions, which therefore require different facilitation practices to nurture positive network-level outcomes – practices which I investigate and discuss in depth in this paper.

Second, this study adds to the body of literature on trust dynamics in interorganizational relationships. In a recent meta-analysis, Connelly *et al*. (2018) find that different dimensions of trust (i.e. trust based on partner's competence and trust based on partner's integrity) have asymmetric effects on the transaction costs, with integrity-based trust being more potent for reducing these costs. I build on this multi-dimensional view of trust and emphasize, in the context of the relationships between network facilitators and network firms, how the firms build perceptions of trust with regard to the facilitator's competence, benevolence and integrity. I argue that both lead-firm and third-party facilitators are able to effectively stimulate positive network-level outcomes – albeit at different levels of agency costs.

Theoretical context

Network facilitation is understood as a form of network governance that 'is necessary to ensure that participants engage in collective and mutually supportive action, that conflict is addressed, and that network resources are acquired and utilized efficiently and effectively' (Provan and Kenis, 2008, p. 3). The literature on network facilitation agrees that the process of network facilitation is complex, as network facilitators face 'an evolving set of dilemmas' (Paquin and Howard-Grenville, 2013, p. 1623), need to deal with the 'multiplex nature of relationships' in networks (Mesquita, 2007, p. 75) and 'balance the tension between organizational and network interests' (Wincent, Thorgren and Anokhin, 2013, p. 481). Prior research has shown that individual characteristics of the network facilitator influence the processes and outcomes of network facilitation (e.g. Gardet and Fraiha, 2012; Paquin and Howard-Grenville, 2013). For example, Paquin and Howard-Grenville (2013) highlight how the facilitators use their individual knowledge (i.e. accumulated resources and expertise) in developing networks over time. However, a microfoundations perspective that brings into focus individual-level antecedents anchored in the behaviours and motivations of the facilitators can further promote our understanding of network facilitation. Specifically, a microfoundations approach allows investigating how these individual-level characteristics of the network facilitators, their actions and interactions with network firms are aggregated into macro-outcomes such as network-level externalities (Felin, Foss and Ployhart, 2015).

Behavioural antecedents

The microfoundations literature emphasizes that macro-outcomes shall be decomposed in terms of individual-level, behavioural antecedents (Contractor *et al*., 2019). Mesquita (2007) highlights two sets of abilities and motivations as important individual-level antecedents that are necessary for network facilitators to effectively support firms in their cooperation activities. First, the facilitators need entrepreneurial skills to be able to identify opportunities, evaluate benefits and risks, and support new ventures (Hitt *et al*., 2001; Mesquita, 2007). Facilitators who possess a strong entrepreneurial spirit or motivation, profound market knowledge and a thorough understanding of market dynamics are better able to facilitate superior knowledge-sharing processes within the network and support the firms in strengthening their competitive position and productivity advantages (Dyer and Nobeoka, 2000). Second, network facilitators should be motivated to mediate conflicts and arbitrate between network

firms. Since they occupy an intermediary position between the firms, they have to be able to assist the firms in achieving voluntary agreements on project plans or appropriation regulations (Conlon, Carnevale and Murnigham, 1994; Mesquita, 2007). Mediation and arbitration abilities are necessary not only to solve conflicts between the firms in the network, but also to mediate negotiations or shares of investments for joint projects, such as a joint research laboratory (Mesquita, 2007). Mediators or arbitrators are usually not biased towards certain firms and are thus perceived as being neutral (Mueller, 2012).

Network facilitation practices

The abilities and motivations of network facilitators influence what kind of practices they adopt to strengthen cooperation between firms. In addition, based on the facilitators' abilities and motivations, firms develop a certain level of trust in the facilitators, and form expectations regarding the facilitators' actions that influence social interactions between the network facilitators and the firms. Jarillo (1988) argues that trust is a key mechanism for achieving the goal of creating a network that is both effective and efficient and has a positive impact on the firms. Mesquita (2007) emphasizes the role of trust by reasoning that network facilitators primarily are trust facilitators that work towards (re)constructing trust among firms and support them in collaborating with each other, even in gridlocked relationships.

Initially, the network facilitators' reputation of trust provides credible information that firms process to assess the facilitators' motivations and make assumptions with regard to their trustworthiness. Firms interpret the reputation but also the institutional embedding of the facilitators as signals of their competence, benevolence and integrity, and form trusting beliefs in these respects (Mayer, Davis and Schoorman, 1995; Powell, 1996; Sako, 1992). The trusting beliefs in the facilitators' competence, benevolence and integrity are also influenced by the assumptions that the firms make about the facilitators' motivations and abilities. Competence refers to the extent to which network actors believe the facilitator possesses the specific skills and competencies, experiences and reliability of performance that are necessary to fulfil the tasks (Connelly *et al*., 2018; Mayer, Davis and Schoorman, 1995; Mesquita, 2007). Benevolence refers to the extent to which the network facilitator is perceived as wanting 'to do good' (Mayer, Davis and Schoorman, 1995, p. 718; Mesquita, 2007), even if he or she is not rewarded by extrinsic rewards. The network facilitator's integrity refers to the consistency with which patterns of action are regarded as fair, morally reliable and guided by acceptable principles (Dasgupta, 1988; Mayer, Davis and Schoorman, 1995).

Prior research has shown, for interorganizational relationships, that the partners' multifaceted perceptions of trust have separate effects on reducing transaction costs (e.g. Connelly *et al*., 2018). In this line of thought, this study argues that depending on the strength of the firms' trusting beliefs in the network facilitators' competence, benevolence and integrity, conflicts of interest may occur between the facilitators and the network firms and inhibit the stimulation of positive network-level outcomes. Using an agency theory lens, these conflicts of interest become apparent in three major fields of practice in which network facilitators carry out activities: the selection of network firms, the implementation of the network strategy and the coordination of specific investments (e.g. Harland, 1996; Harland *et al*., 2004; Meuleman *et al*., 2010; Mueller, 2012; Paquin and Howard-Grenville, 2013).

First, selecting or recruiting new firms secures the viability of the network and thus constitutes an important activity in network facilitation (Harland, 1996; Harland *et al*., 2004). Facilitators use their industry knowledge and experience to assemble the portfolio of network firms with regard to the number and quality of network actors and the fields the network is active in (Demirkan and Demirkan, 2012; Harland *et al*., 2004). By equilibrated selection procedures, they can contribute to creating a transparent and trustworthy atmosphere (Mesquita, 2007). However, agency conflicts originating from conflicts of interest may occur if the facilitators address their knowledge to select firms that best fit their own projects and not necessarily those of other network actors. Owing to these agency risks, network firms may feel uncertain with regard to the real qualities and efforts of the facilitators in the selection process (Holmström, 1979). Mistrust can emerge and bring the whole network to a halt (Adobor, 2006).

Second, network facilitators are responsible for implementing the network strategy by organizing

network events, installing an information and communication system, or initiating cooperation projects. They are expected to process information, coordinate social interaction and configure demand-oriented measures that best advance the network (Harland *et al.*, 2004). However, conflicts of interest and thus agency conflicts can emerge if a facilitator is driven by a 'hidden agenda' of self-interest and implements self-interested measures, resulting in the risk of harm to other network firms (Ahuja, Soda and Zaheer, 2012; Sanou, Le Roy and Gnyawali, 2016; Yang, 2008).

Third, Bell, Tracey and Heide (2009) emphasize the relevance of specific investments as an important set of activities in the context of network governance. They argue that the more network firms specifically invest and the greater the degree of potential lock-in, the more network transactions require hierarchical coordination via a network facilitator. By coordinating specific investments and allocating or integrating network resources, network facilitators support firms in benefitting from knowledge spillovers and innovation activities (Harland *et al.*, 2004). An example for specific investments in an inter-firm network is a joint research laboratory, where the firms' resources are pooled and where they specifically invest by providing human capital. Granting interested firms access to the laboratory could be a coordination task of the network facilitator. Conflicts of interest will arise if the facilitators use the specific investments of the network firms to their own advantage (Ahuja, Soda and Zaheer, 2012). Anticipating the resulting hold-up situation, the remaining network firms might underinvest, and the joint laboratory might not generate the expected positive network externalities.

Network-level outcomes

According to the microfoundations perspective, the interplay of behavioural antecedents of the network facilitators, the associated perceptions of trust and the facilitation practices produces network-level outcomes such as positive network externalities. The network facilitators aim to stimulate positive network externalities, such as reduced transaction costs, a higher productivity, enhanced knowledge creation, or superior innovation outcomes (Arikan, 2009; Dhanaraj and Parkhe, 2006; Porter, 2000). To this end, they manage complementarities between the firms, their suppliers, customers, complementors and even competitors (Combs and Ketchen, 1999; Jarillo, 1988; Peng *et al.*, 2012; Silverman and Baum, 2002). By initiating cooperation among the firms, network facilitators help them gain access to resources and advance in technological innovation, which improves the firms' competitive position (Gnyawali and Park, 2011; Lavie, 2006). Firms are likely to get involved with a network if they believe that it is orchestrated in a way that brings a return (i.e. by developing superior technologies; Dhanaraj and Parkhe, 2006), but not if they fear losing their competitive advantage (i.e. by partnering with a dishonest partner who behaves opportunistically; Connelly *et al.*, 2018).

Methods

Research context

A qualitative study was designed to study how network-level outcomes can be reduced to individual-level factors, such as the network facilitators' behavioural antecedents, their actions and social interactions with network firms. A qualitative research design was chosen to take account of the specific contexts of the investigated networks (cf. Eisenhardt, 1989; see also Bansal and Corley, 2012; Jack, 2010; Miles, Huberman and Saldaña, 2014; Siggelkow, 2007). This approach allows for a rich and coherent analysis of the network facilitators' abilities and motivations, and the recognition of differences between effective and ineffective networks with reference to the facilitators' incentives and behaviours. The study's sample aims to capture these differences in a process-oriented manner and allows for the study of networks with heterogeneous facilitators and outcomes.

Data collection and sample

Semi-structured interviews. Together with a team of research assistants, I conducted semi-structured, guideline-based interviews with 85 network facilitators. Network facilitators are key informants for the research question, since they can report on their experiences, motivations and activities as well as their perceptions of challenging issues, and can provide valuable information on the context of the network. Interviewees were selected by conceptually driven sequential

sampling that is consistent with the idea of 'theoretical sampling' (Eisenhardt and Graebner, 2007, p. 27). A theoretical sampling approach allowed adjustment and expansion of the sample throughout the data collection and analysis process (Corbin and Strauss, 2008; Glaser, 1978).

To get towards a theory of network facilitation, and to elaborate the conditions under which such theory operates (Miles, Huberman and Saldaña, 2014), I needed to see different instances of it, with different people, in different places and in different industries, as prior research has shown that these characteristics influence network functioning (e.g. Eisingerich *et al*., 2012). With this rationale in mind, data collection began with interviewing lead-firm and third-party facilitators of publicly initiated networks of different industries in Germanic European countries (Austria, Germany, Switzerland). Publicly initiated networks were easy to identify as they present themselves in detail on their webpages. After an initial round of coding, facilitators from privately initiated networks in the same area were surveyed in order to enrich and contrast the gained insights with findings from networks that have emerged in a bottom-up process. Data collection was then extended to both publicly and privately initiated networks in Anglo-American countries. Networks in these countries are often glorified as best-practice examples. By extending the sample to Anglo-American networks, I wanted to see whether insights into network facilitation in these networks contribute to clarifying the main patterns that have been identified in networks in the Germanic European countries. Thanks to the high number of cases, a continuous comparison of patterns was possible throughout the entire process of data collection.

The interview guideline emerged from a thorough review of the relevant literature on network facilitation and other documents, such as network evaluation reports. The guideline comprises 22 questions, which are divided into five thematic sections: (1) general questions about the network (e.g. financing, resources); (2) questions about management and governance processes and practices; (3) questions about how network firms are selected; (4) questions about the success factors or success stories of the network; and (5) questions about how the network facilitators personally evaluate the network and its development. Since the interviews were conducted in English or German, the interview guideline was translated from English to German and vice versa, following translation and back-translation procedures (Brislin, 1980). The average interview length was approximately 60 minutes and ranged from 32 to 120 minutes. Interviews were audio-recorded and transcribed verbatim.

The final sample includes interviews with 85 network facilitators, of which 31 are from Germany, 23 from Austria, 20 from the USA, 10 from the UK and 1 from Switzerland. Of these 85 network facilitators, 15 are considered lead-firm facilitators and 70 third-party facilitators. Nine out of the 70 third-party facilitators have personal experience with lead-firm-governed networks. The mean age of the network facilitators is 43 years, with 64 males and 21 females. With regard to education, 56 of the network facilitators have a college/university degree and 24 hold a doctoral degree. The analysed networks cover several industries and organizational fields, ranging from low-tech (32%), mid-tech (29%) to high-tech industries (39%) (classified according to OECD, 2009). This sample seems to reflect the heterogeneity of inter-firm networks and represents the range of industries where networks can be found (Eisingerich *et al*., 2012). Appendix S1 gives an overview of the investigated networks.

Additional data sources. The transcripts of interviews with network facilitators are the main data source. However, I also drew upon other sources, such as multiple archival and public materials, to triangulate the findings and avoid retrospective bias (Golden, 1992). Archival materials enabled me to acquire more background information on the networks and the facilitators, as well as on the rules and procedures and the activities within a network. I used these materials in analysing the interview transcripts to verify whether my impressions are reflected in these secondary data. Importantly, I had access to network-level documents such as marketing materials, membership agreements, or newsletters, which allowed a better understanding of the context of the network facilitators' work. I also used materials supplied by the informants, such as press releases or mission statements, as well as industry reports or further academic publications (e.g. Falck, Heblich and Kipar, 2010; Fromhold-Eisebith and Eisebith, 2005; Sanou, Le Roy and Gnyawali, 2016).

Expert validation. Observations, informal talks and a close dialogue with network experts were

important to guarantee the validity of the research. I participated at various events and conventions within and across networks, where I presented the research and discussed the concepts and results with the interviewees, as well as with non-interviewed network experts. These on-site investigations allowed further validation of the findings and conclusions.

Data analysis

Data analysis combined inductive and deductive procedures (Miles, Huberman and Saldaña, 2014). In a process of step-by-step abstraction, I employed coding procedures such as categorizing raw data, linking first-order categories to second-order themes and aggregating themes into more abstract concepts (Corbin and Strauss, 2008; Miles, Huberman and Saldaña, 2014). These techniques are suitable for research projects in which researchers have prior knowledge of suitable theoretical concepts but are open-minded concerning novel insights (Miles, Huberman and Saldaña, 2014). I used MAXQDA, a computer-assisted qualitative data analysis software, to organize, structure and code all empirical data, such as the interview transcripts and the additional documents. MAXQDA has particular strengths in inductive analyses, as it supports the interrelationship among the data, codes and memos (Corbin and Strauss, 2008).

Data analysis was conducted in three phases. First, I analysed the transcripts line-by-line and labelled relevant words, sentences or paragraphs with codes developed on the basis of the theoretical considerations (deductive theoretical coding), or derived from the conversations with the interviewees (inductive open coding) (Corbin and Strauss, 2008). In remaining close to the data, I assigned descriptive codes to all text passages that referred to the broader context of network facilitation. The coding scheme comprised a total number of 71 codes, such as 'entrepreneur/businessman/businesswoman', 'dominance/
self-interest', 'conflict/dissent/tension', 'trust', 'non-disclosure agreements/monitoring boards', or 'joint innovation'. Code definitions, key examples and coding rules for each code determined under what circumstances a text passage could be labelled with a specific code.

Second, I began moving back and forth between data, literature and emerging theoretical insights to condense the codes to first-order categories and second-order themes. Again, definitions, key examples and coding rules for each first-order category and second-order theme were developed to enhance the transparency of data analysis. The resulting data structure has 16 first-order categories and 6 main second-order themes that I associated with three aggregate dimensions: 'behavioural antecedents', 'network facilitation practices' and 'network-level outcomes'. These dimensions reflect the general logic of the microfoundations perspective and encompass the different ways in which network facilitators are enabled, motivated and considered trustworthy to work towards the stimulation of positive economic outcomes for the network actors. Figure 1 presents the reduced, more abstract data structure that resulted from this step.

Third, once the data structure was defined, I compared all text passages associated with each first-order category and second-order theme to comprehend how and why they varied for a lead-firm or third-party facilitator. Written summaries and descriptions of observed patterns allowed me to discover interrelationships between the categories and themes, and to develop a theoretical model of network facilitation. Appendix S2 provides an overview of themes and categories, with representative data. These data are exemplars of typical ideas brought up by the interviewees and thus serve as a *pars pro toto*.

In addition to the reported measures, I followed the recommendations of Aguinis and Solarino (2019) and Gibbert, Ruigrok and Wicki (2008) to enhance the transparency and replicability of the study. Table 1 shows detailed procedures to ensure methodological rigour.

Findings and discussion

Presentation of the findings is structured along the behavioural antecedents of network facilitators, facilitation practices and network-level outcomes, specifically highlighting differences for lead-firm and third-party facilitators. This section discusses the identified patterns against the theoretical background introduced at the outset and develops propositions aimed at condensing the main findings to a theory of network facilitation.

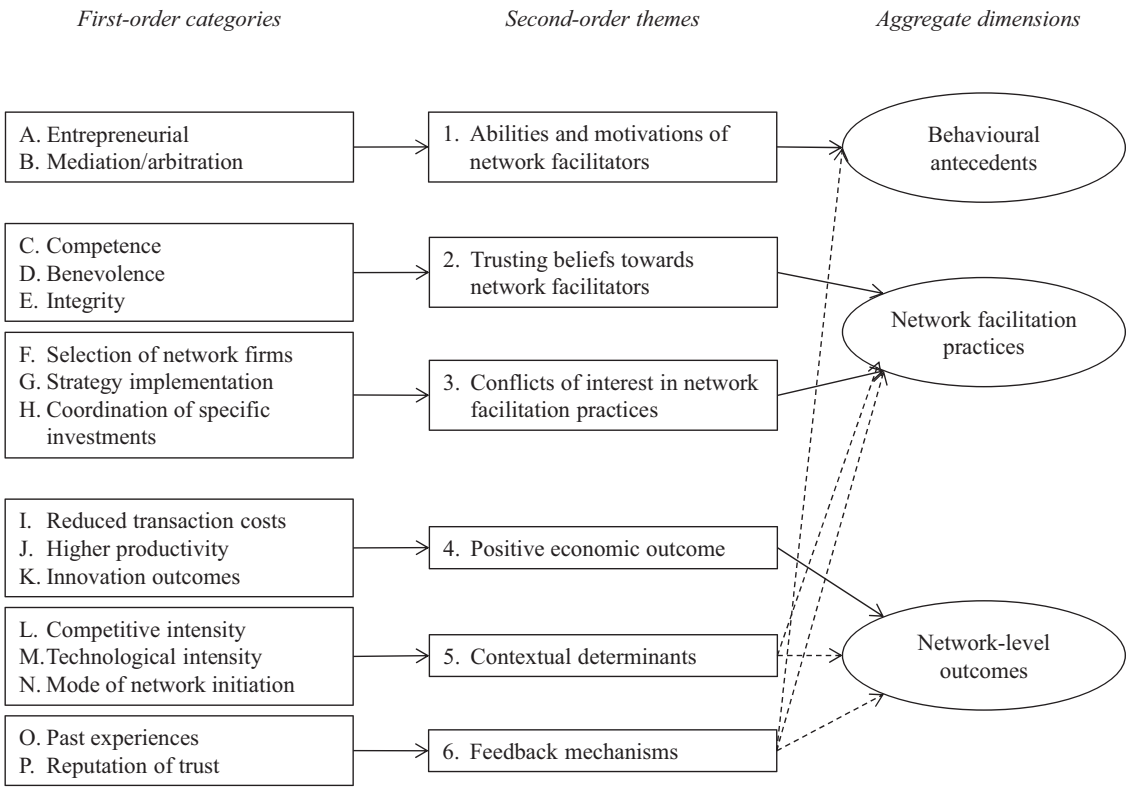

Figure 1. Data structure

Table 1. Methodological rigour: a summary of the implemented procedures as recommended by Aguinis and Solarino (2019) and Gibbert, Ruigrok and Wicki (2008)

Rigour criteria	Implementation of recommended procedures in the present study
Internal validity	Formulation of a clear research framework
	Triangulation of theories (i.e. using agency theory, network theory)
	Pattern matching (matching of the resulting patterns of network facilitation to those discussed in the literature)
	Adoption of multiple theoretical perspectives for interpretation
Construct validity	Pre-test of the interview guideline (with academics, network facilitators, other experts)
	Triangulation of interview data, secondary data, observational data
	Explanation of data coding and data analysis procedures
	Close dialogue with experts
External validity	Selection of typical networks while allowing for heterogeneity within these groups of networks
	Disclosure of sampling procedures
	Description of the research setting
Reliability	Careful documentation of data collection and data analysis
	Database containing interview transcripts, secondary data and key informant data
	Use of software package MAXQDA for data analysis
	Disclosure of raw material

Behavioural antecedents: Abilities and motivations of network facilitators

The interviews show differences in the behavioural antecedents of the two types of network facilitators, as they seldom have equal levels of entrepreneurial and mediation or arbitration abilities and motivations. Instead, there is a trade-off between these abilities and the associated incentives. These findings highlight different behavioural microfoundations of the network facilitators, extending the basic assumption that facilitators' goals

and interests matter for overall network effectiveness (Dyer and Nobeoka, 2000; Provan and Kenis, 2008).

On the one hand, the interviewees admit that lead-firm facilitators could 'drive the network to new heights' (Interview 61), as these in fact have a strong entrepreneurial interest and 'natural' incentives to positively influence the development of the network. However, lead-firm facilitators also have a strong motivation to maximize lead-firm performance because they receive incentive pay from the lead firm. Such incentive pay leads them to capitalize directly on a positive lead-firm performance, even if this performance results from exploiting the dominant network position to the detriment of other network actors. The interviewees interpret this self-interest as the 'natural responsibility' (Interview 32) of lead-firm facilitators. Thus, lead-firm facilitators are often considered to lack mediation or arbitration abilities and to prioritize lead-firm interests over network interests.

On the other hand, the interviewees emphasize that third-party facilitators are not driven by financial performance incentives. They are not directly paid by the network firms to which they deliver services and do not take equity in these firms (Interview 63). Nor are they offered performance-based pay by the third-party institutions where they are usually employed as civil servants. As they do not financially benefit from a positive network development, their impetus to maximize the network's performance is rather low. In addition, they lack an entrepreneurial mind-set and show limited 'natural' entrepreneurial endeavours:

> The firms need to design and organize their collaboration themselves. We only connect them, but it is contingent on *their* entrepreneurial capabilities to make the relationship profitable. (Interview 13)

However, third-party facilitators are embedded in an independent third-party organization, which the interviewees perceive as an effective signal of their motivation to act as a neutral broker (Interview 18).

P1: Lead-firm facilitators have stronger entrepreneurial abilities and motivations, whereas third-party facilitators show stronger mediation or arbitration abilities and motivations.

Network facilitation practices

Trusting beliefs towards network facilitators. Results suggest that different trusting beliefs regarding the network facilitators' competence, benevolence and integrity emerge from the network firms' assumptions about their abilities and motivations. Prior research has stated that firms trust in the network facilitators' competence and value their expert advice regarding new ventures and opportunities, for instance, if the facilitators have an entrepreneurial mind-set (Mesquita, 2007). On the contrary, if they show strong mediation and arbitration abilities, the firms trust in their integrity and rely on their experience to bring different collaboration partners together (Mesquita, 2007). By carving out differences in trusting beliefs with respect to lead-firm and third-party facilitators, this study generates novel knowledge of how these beliefs are formed.

The findings show that lead-firm facilitators are trusted to be competent since they show a strong entrepreneurial motivation, are industry experts, have superior market knowledge and know 'what makes the firms tick' (Interview 12). However, lead-firm facilitators are not considered to be benevolent or honest, since they supposedly follow the lead firm's interests, resulting in other firms' mistrust of them (Interview 6; Interview 32). They are presumed not to mediate conflicts but to try to push through their own interests and to neglect other firms' needs. Therefore, before being able to bring the network firms together in a trustful atmosphere, they make up-front investments to build integrity-based trust between the lead firm and the network firms. Through a sequential process of gaining reputation as an honest broker, lead-firm facilitators may improve their perceptions of integrity:

> I think it could work if you are able to create an atmosphere, a relationship of trust, so that everybody is convinced that he can benefit. (Interview 6)

By contrast, third-party managers seem to enjoy a certain credibility concerning benevolence and integrity, mainly owing to their institutional embedding signalling neutrality. Thus, they are able to concentrate on facilitating trust between the network firms right from the start to 'create the atmosphere for good things to happen' (Interview 67). Accordingly, they invest less effort in signalling their own trustworthiness. However, owing to their

weaker entrepreneurial motivations, they are not trusted to be as competent as lead-firm facilitators (Interview 50), and thus require additional investments in developing their know-how and industry knowledge.

P2: Owing to stronger entrepreneurial motivations and weaker mediation or arbitration motivations, lead-firm facilitators are trusted to be more competent but less honest and benevolent than third-party facilitators.

Conflicts of interest in network facilitation. Trust research has shown that the trusting beliefs of individuals affect their behaviours. For example, trust enables more intensive cooperation between partners (Gambetta, 1988), promotes the emergence of networks as adaptive organizational firms (Miles and Snow, 1992), or increases the likelihood that actors choose risk-taking initiatives (Mayer, Davis and Schoorman, 1995). In the same vein, the findings of this study show that, depending on the trusting beliefs in the network facilitators' competence, benevolence and integrity, the network firms expect the facilitators to manage the network in a specific way – one that entails conflicts of interest. These conflicts of interest may become apparent in major network facilitation practices, such as the selection of new firms, network strategy and coordination of specific investments.

When selecting new firms, the interviewees state that lead-firm facilitators will not select firms neutrally (Interview 14). They may use their superior knowledge and competence to watch out for firms that complement the lead firm's know-how or projects, but may not advocate for firms that push the entire network (Interview 79). Nevertheless, while lead-firm facilitators seem to have large discretionary freedom, they endeavour to signal that they are selecting new firms diligently to keep the network viable (Interview 28). This behaviour resonates with prior literature (e.g. Delfgaauw and Dur, 2007; Spence, 1973), which underlines the importance of proving credibility and, in the context of this study, of signalling the will to accept any firm that contributes to reaching network goals. However, since lead-firm facilitators cannot completely dispel the mistrust of the incumbent firms and cannot fully convince them that they are acting neutrally (Interview 16), monitoring mechanisms, such as careful documentation of all procedures or signing of official agreements, seem to play an important role (Interview 54).

By contrast, third-party facilitators are said to balance the portfolio of network firms and to consider the network with regard to factors such as size, interests and locations of the firms (Interview 6; Interview 77). Third-party facilitators seem to have the advantage of being perceived as neutral, which makes network firms confident that the facilitators' selection procedures are not biased and that they choose the optimal partner for the respective cooperation project:

> I have the big advantage of being neutral. Everybody can come to me, can give me their ideas and project proposals confidentially, and I will ideally acquire the best partner in our network. (Interview 3)

Nevertheless, third-party facilitators do not take a trustful atmosphere for granted and therefore emphasize signalling openness and sincerity (Interview 67), but to a smaller extent than lead-firm facilitators.

With regard to network strategy, the interviews indicate that lead-firm facilitators do not always balance their portfolio of strategic measures, but are tempted to pursue particular core themes that primarily fit the lead firm's interests (Interview 11). However, to counter possible reservations of the network firms, lead-firm facilitators invest in building integrity-based trust, which was found to be most effective in removing those concerns (Connelly *et al*., 2018). They try to signal that they do not exploit their discretionary freedom, for example, by continuously passing out information to the network firms, despite having some priority interests:

> When an idea or a proposal comes in to me, and my company is involved, I still must distribute it to my competitors. … So, integrity is really an important thing. If you do that just a couple of times, then people know that you pass out information even though you have a priority interest … They really appreciate it when you put it out to everybody. (Interview 61) (Correction added on February 11, 2021, after initial publication on January 25, 2021; the displayed quote in the section entitled "**Findings and discussion**" was initially omitted due to a production error and has been reinstated.)

Additionally, lead-firm facilitators install monitoring institutions, such as a management board (Interview 62), which helps ensure that network

interests are sufficiently reflected in the implemented strategy and that rents are not appropriated only by the lead firms.

By contrast, third-party facilitators are careful not to focus too much on single firms' interests when they moderate the process of strategy formulation and implementation (Interview 7). Some facilitators even report that they do not have to sign non-disclosure agreements when they support firms in starting innovation projects, because the firms trust in their integrity and do not expect them to exploit their information advantage or to distribute the ideas to competitors (Interview 12). However, institutions like general meetings, where third-party facilitators are asked to give an account to the network firms, are installed to control them (Interview 4).

Concerning the coordination of specific investments by lead-firm facilitators, the interviewees expect a high level of conflict, since the facilitators could try to pass the lead firms' internal costs along to the network and use network resources to enhance their own business (Interview 24). For example, they could exploit intellectual or financial resources that other firms contribute to an R&D project, which creates a certain hold-up potential, hindering firms from investing in joint R&D activities (Interview 22). The problems resulting from this hold-up potential can be solved by granting contractual securities with regard to the use of the pooled resources and the specific investments, or by setting sanctioning mechanisms (Dyer, 1996). The interviews underline that since underinvestment would lead to a non-optimal output, lead-firm facilitators seek to convince firms of the mutual benefits and agree upon certain review and approval procedures which sanction hold-up exploitation (Interview 6; Interview 59).

The interviewees assure that third-party facilitators are not competing with the network firms in any product or service markets. Hence, the firms do not expect the facilitators to exploit network resources to their detriment. Firms invest specifically and the resources are provided to an optimal extent. The network firms frankly discuss their ideas and projects with the facilitators, hoping to find support in exploiting the full potential of their ideas:

> Ideas are … contributed freely, because the people do not fear that we patent them immediately or exploit them for ourselves. I think … only the suspicion would be fatal. … And this is what we are here for: to tap the full potential. (Interview 18)

Overall, conflicts of interest are more evident in networks governed by lead firms than in third-party-governed networks. To prevent negative consequences from such conflicts, lead-firm facilitators invest more in trust-building measures and signalling activities and accept more intensive monitoring procedures than third-party facilitators, which leads to increased agency costs.

P3: Since lead-firm facilitators have stronger incentives not to select new firms neutrally, to adopt self-interested strategic measures and to exploit specific investments self-interestedly, conflicts of interest are stronger in networks with lead-firm facilitators as compared to networks with third-party facilitators. Therefore, agency costs are expected to be higher in networks with lead-firm facilitators.

Network-level outcomes: A contingency-based analysis

The results extend prior research (e.g. Dhanaraj and Parkhe, 2006; Mesquita, 2007) by suggesting that both types of network facilitators are able to stimulate positive network-level outcomes, even though they have different abilities and motivations and utilize different facilitation practices. Lead-firm and third-party facilitators effectively foster network externalities, such as reduced transaction costs, higher productivity or superior innovation outcomes. For instance, the entire network can benefit from the lead firm's 'ties to the financial sector' (Interview 24) and the associated reduced transaction costs, or take advantage of the third-party facilitator's brokering activities that 'stimulate innovation and entrepreneurship' (Interview 67). However, the practices that induce these positive economic outcomes involve different levels of agency costs, as the preceding analysis has shown.

P4: Both lead-firm and third-party facilitators are able to stimulate positive network-level outcomes, albeit at different levels of agency costs.

The analysis further reveals three contextual determinants (i.e. the network's competitive

intensity, technological intensity and mode of initiation) that influence the network facilitators' effectiveness in stimulating positive outcomes. First, the findings suggest that lead-firm facilitators might be suitable for coordinating vertical networks with low competitive intensity that historically emerged from cooperation between firms, suppliers and customers:

> It can work if you set the network up along the value chain. Then, probably the largest player in the value chain will be the network facilitator. (Interview 6)

Although the lead-firm facilitators could still act self-interestedly and exploit their discretionary freedom (Interview 83), the network firms tend to accept their dependency, since they usually look back on a history of cooperation in which certain rules of conduct have emerged and trust has been built. This finding speaks to the importance of relationship duration and trust highlighted by the literature on vertical buyer–supplier relationships (Dyer, 1996; Squire, Cousins and Brown, 2009) and emphasizes that more mature networks require less monitoring efforts as network firms become more embedded over time (Wincent, Thorgren and Anokhin, 2013).

According to the interviewees, third-party facilitators are able to identify linkages between firms of different industries. This makes them see 'the larger picture' (Interview 42) in cross-industry, horizontal networks where competitors are involved. Since third-party facilitators act as neutral brokers, they are capable of moderating innovation projects, for example between competing original equipment manufacturers, which might not be successful if pushed by one of these players (Interview 2). Lead-firm facilitators are 'under the general suspicion of pursuing own interests', which 'does not serve the goal of fostering innovation and competitiveness within the network' (Interview 31). To counteract any negative consequences resulting from this suspicion, interviewees call for third-party facilitators when competitive intensity is high.

P5: The stimulation of positive network-level outcomes is enhanced if there is a fit between the network facilitator and the competitive intensity of the network (i.e. lead-firm facilitators lead less competitive, vertical networks and third-party facilitators lead more competitive, horizontal networks).

Second, the results suggest that lead-firm facilitators are effective in leading low-tech networks but are unable to stimulate positive economic outcomes for network members in high-tech networks. In high-tech networks, where joint knowledge creation is fundamental to gain a competitive advantage (Schilling and Phelps, 2007), firms are afraid of being exploited by lead-firm facilitators who, as the results of this study reveal, are under the suspicion of pursuing own interests. Thus, firms are reluctant to participate in collaborative innovation projects and eventually back out:

> If you have a lead-firm facilitator and you want to work on promising, high-tech innovations, how do you want to tell him what you are working on? I had this experience in the past. … Back then, the firms were instantly afraid. (Interview 12) (Correction added on February 11, 2021, after initial publication on January 25, 2021; the displayed quote in the section entitled "**Findings and discussion**" was initially omitted due to a production error and has been reinstated.)

However, to keep participation incentives high and to effectively stimulate positive outcomes in high-tech networks in spite of these reservations, lead-firm facilitators seek to signal trustworthiness and accept comprehensive monitoring procedures. In particular, lead-firm facilitators emphasized not being perceived as the dominant network leader but rather as the network coordinator who is responsible for integrating all firms' interests:

> In my role as network facilitator I consider myself not as a representative of my firm, the lead firm. … I am responsible for all network firms. (Interview 26)

Third-party facilitators, by contrast, are trusted to be honest and are considered appropriate to lead high-tech networks that strongly 'depend … on innovation and new technology' (Interview 53).

P6: The stimulation of positive network-level outcomes is enhanced if there is a fit between the network facilitator and the technological intensity of the network (i.e. lead-firm facilitators lead low-tech networks and third-party facilitators lead high-tech networks).

Third, the interviewees report that lead-firm facilitators are particularly suited to stimulate positive economic outcomes in privately initiated networks that have emerged in a bottom-up process

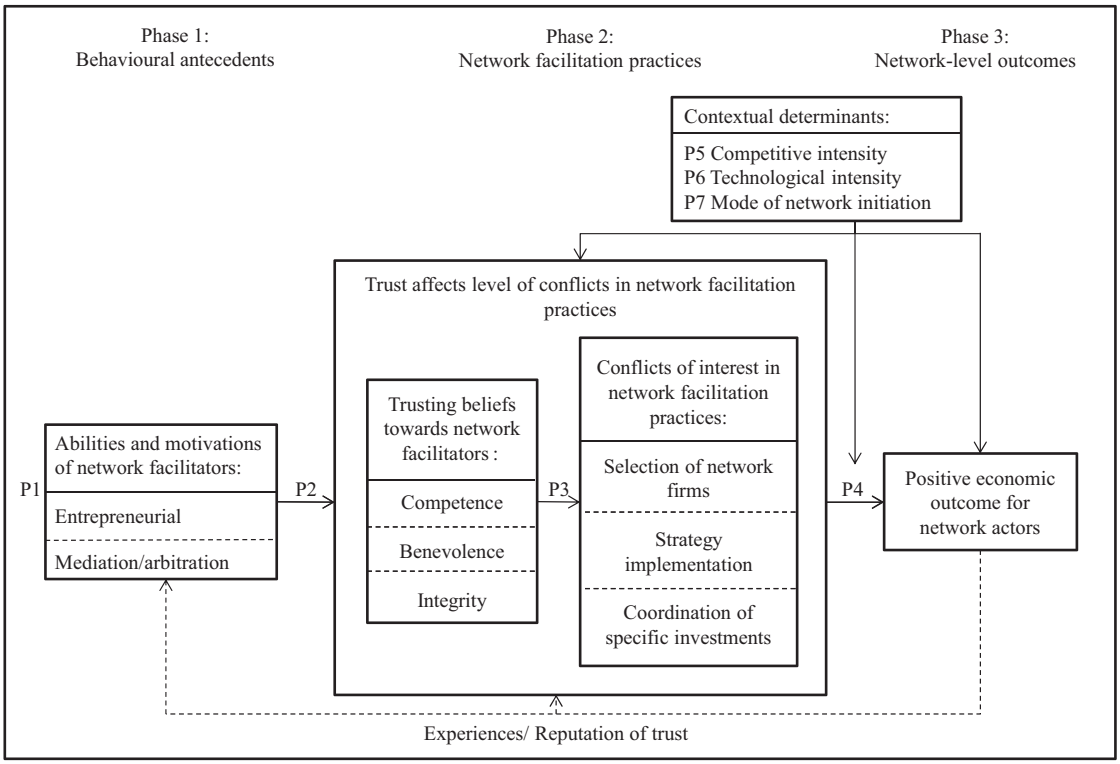

Figure 2. A theoretical model of network facilitation

led by the lead firm itself and other companies (Interview 40). Typically, lead-firm facilitators have in-depth industry knowledge and expertise, which are important qualities for leading privately initiated networks effectively (Dhanaraj and Parkhe, 2006).

By contrast, the interviewees emphasize that in publicly initiated, so-called greenfield networks, where public money is invested but a cooperative atmosphere and a mutual history are lacking, third-party facilitators have the advantage of leveraging their integrity and motivation to promote the network as a whole (Interview 31). They are more likely to be trusted to act as 'honest brokers' and to support the emergence of positive network-level outcomes.

While these findings resonate with prior research highlighting the role of the network facilitators' embedding in a lead firm or a third-party institution for managing privately versus publicly initiated networks (Fromhold-Eisebith and Eisebith, 2005; Jungwirth and Müller, 2014), they provide additional microfoundational insights into why the motivations and behaviours of the facilitators matter in these regards.

P7: The stimulation of positive network-level outcomes is enhanced if there is a fit between the network facilitator and the network's mode of initiation (i.e. lead-firm facilitators lead privately initiated networks and third-party facilitators lead publicly initiated networks).

Figure 2 depicts the resulting theory of network facilitation, emphasizing the relationships between the behavioural antecedents of the network facilitators, facilitation practices and network-level outcomes.

Implications

This paper set out to develop a model that explains how the behavioural antecedents of different types of network facilitators are connected with their facilitation practices and positive network-level outcomes. The results of this study advance knowledge on network facilitation in various ways, first by using a microfoundations lens to offer a more comprehensive understanding of the abilities and motivations of different types of network facili-

tators and how these relate to the firms' trusting beliefs vis-à-vis the facilitators. Lead-firm facilitators are perceived as more competent than third-party facilitators, but have the reputation of being less honest and benevolent. For this reason, to succeed in stimulating positive economic outcomes they make greater investments in trust-building measures than third-party facilitators. By contrast, third-party facilitators can rely on certain credits of trust and on a positive perception of their arbitration and mediation abilities and motivations. Thus, they can focus on balancing firm interests from the beginning.

In all, the results emphasize that trust dynamics and trust-building practices in inter-firm networks differ depending on whether lead-firm or third-party facilitators manage the network. Whereas in a sequential process lead-firm facilitators, who are trusted to be competent but less honest and benevolent, have to invest up-front in building a perception of integrity-based trust before connecting the firms with each other, third-party facilitators, who are trusted to be honest and benevolent but less competent, can skip the first step. Hence, agency costs are expected to be lower in third-party-governed networks, which resonates with Connelly *et al.*'s (2018) finding that trust based on integrity is more powerful at reducing transaction costs in interorganizational relationships than competence-based trust. Also, firms' positive experiences with network facilitators' practices work as feedback mechanisms that contribute to network facilitators' reputation of trust. These feedback mechanisms are particularly important to networks governed by a lead firm, since they have the potential to lower the level of conflicts of interest between the facilitator and the firms and thus reduce the expected level of agency costs in the network. The study's findings in this regard are in line with network research, which suggests that informal control mechanisms such as trust and norms of reciprocity gain in importance as networks become more mature (e.g. Dyer and Nobeoka, 2000; Paquin and Howard-Grenville, 2013; Provan, Fish and Sydow, 2007; Squire, Cousins and Brown, 2009; Wincent, Thorgren and Anokhin, 2013).

In some ways, the findings from this study extend the basic propositions of agency and network theory. While the finding that lead-firm facilitators per se are perceived as more self-interested than third-party facilitators reflects the basic propositions as brought forward by agency theory (e.g. Holmström, 1979; Spence, 1973; Yang, 2008), it is striking that lead-firm facilitators are very aware of the risks associated with a lack of integrity-based trust and practices influenced by self-interest. Despite being both manager of the lead firm and network facilitator, they 'put emphasis on being a neutral network facilitator' (Interview 26), abstain from acting self-interestedly or exploiting differentials in bargaining power, and accept monitoring mechanisms in order to build a reputation of trust and to keep firms from leaving the network. Altogether, a hybrid type of network facilitator emerges that has not yet been discussed in the literature on network facilitation (e.g. Mesquita, 2007; Provan and Kenis, 2008): a lead-firm network facilitator acting on a third-party facilitator maxim. Such an interpretation of the results hopefully encourages researchers to further investigate this hybrid type of network facilitator – one that extends our current understanding of how an inter-firm network can be governed.

The results also hold practical implications. Lead-firm facilitators can use the results regarding the perceived shortcomings in benevolence and integrity to adapt their behaviour and avoid network failure. In particular, if the network was not built on trustful, long-term relationships, lead-firm facilitators know based on this study that to keep the network viable, investing in gaining trust with regard to benevolence and integrity is essential. In practice, lead-firm facilitators are encouraged to initiate collaboration projects outside the core competencies of the lead firm to signal the will to increase the success of not only the lead firm but also the entire network. By contrast, third-party facilitators are encouraged to invest in expanding their competencies and skills related to industry knowledge, trends and technologies – a finding that endorses Kirkels and Duysters' (2010) call for network facilitators to extend their industry knowledge in order to be able to steer the network effectively.

Conclusion

This study develops a theory of network facilitation that builds on the behavioural antecedents of different types of network facilitators as a starting point to provide insights into their practices and effectiveness in stimulating positive network-level

outcomes. Results reveal important nuances. Lead-firm facilitators invest in trust-building measures to build a stronger perception of integrity. Without these investments, they risk strong conflicts of interest that would hinder them in stimulating positive effects for the network firms. Also, to keep participation incentives high, they are careful not to dominate the network's goals and activities. By contrast, third-party facilitators focus on balancing firm interests from the outset, and make some up-front investments in enlarging their competencies and skills. Altogether, this study calls for further research that deepens our understanding of the microfoundations of network facilitation and how these relate to macro-level network outcomes.

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Supporting Information

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Appendix S1. Sample description[a]
Appendix S2. Dimensions, themes, categories and data[b]