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ORIGINAL RESEARCH

Tie heterogeneity in networks of interlocking directorates: a cost–benefit approach to firms' tie choice

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Abstract This conceptual paper investigates the creation of interlocking directorate ties focusing on firms' choice between sent, received, and undirected board interlocks. Drawing on a framework on the benefits of board interlocks stemming from resource dependence theory, we synthesize prior research on the consequences of interlocks and demonstrate that each type of interlock goes along with unique knowledge-based, social influence-related, and institutional benefits and costs. We frame tie choice as a strategic decision based on a cost–benefit analysis and suggest that the tie-specific benefits and costs lead to the three types of ties not being equal alternatives. Appealing to specific motives for tie creation, these benefits and costs influence firms' choice between the three types of interlocks. Our synthesis and cost–benefit analysis contribute to prior research by shedding light on the role of tie heterogeneity as a driver of tie creation as opposed to a factor causing firm-level outcomes. By focusing on content of ties, we extend the typically purely structural research on interlocking directorate networks. We suggest directions for future research and discuss possibilities to empirically validate our propositions on how tie-specific opportunities and constraints will affect tie choice.

Keywords Interlocking directorates · Tie creation · Tie content · Resource dependence theory · Cost–benefit analysis

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1 Introduction

Over the last few decades, scholars have discussed several motives for the creation of interlocking directorate ties resulting from directors' memberships on more than one company's board (for a review see Mizruchi 1996; for a more recent overview, see David and Westerhuis 2014). By now, researchers by and large agree that board interlock ties should be seen as inter-organizational "pipes" (Podolny 2001) or channels for communication (e.g., Hillman and Dalziel 2003; Mintz and Schwartz 1985) used to exert influence and transfer resources among firms. Empirical research supports this view showing that organizational practices and strategic knowledge spread through the board network (e.g., Beckman and Haunschild 2002; Davis 1991; Sanders and Tuschke 2007) and interlocks function as instruments to exert corporate control (Mizruchi and Stearns 1988; Richardson 1987) and gain legitimacy (e.g., Fahlenbrach et al. 2010).

However, past research on the motives for interlock creation has largely treated all board interlocks the same. That is, while studies have demonstrated that interlocks created by executive directors compared to interlocks created by outside directors cause different outcomes at the corporate level (e.g., Geletkanycz and Boyd 2011; Tuschke et al. 2014), research on the determinants of interlock creation has ignored this difference so far. For instance, despite acknowledging that executive as well as outside directors are equally involved in creating interlocks, Mizruchi (1996) does not elaborate on the implications of this distinction in his seminal analysis of the motives for interlocking directorates. Given the evidence that different types of interlocks matter differently for firm actions and outcomes, neglecting tie heterogeneity in interlocking directorates seems to be a major shortcoming for research on the motives for their creation. It is unrealistic to assume that boards will not consider the differences between interlocks established by executive or outside directors when creating inter-board ties. Thus, any attempt to understand the formation of interlocking directorate networks will remain incomplete if it does not adequately account for tie heterogeneity. To eliminate this shortcoming, we analyze the differences between interlocks established by executive directors and interlocks created by outside directors[1] focusing on the distinct motives of firms to create them. The aim of the paper is to shed light on firms' choice between different types of interlocks by providing an overview of the tie-specific benefits and costs and classifying them according to different motives that they appeal to.

Our endeavor is in line with efforts to shed light on the drivers of tie creation in inter-organizational networks (Baum et al. 2005, 2010; Beckman et al. 2004; Kim

[1] Our analysis is thought to be generalizable across different corporate governance systems, such as the US-American one-tier system or the German two-tier system. We use the terms "executive" and "outside" directors throughout the paper as representative for comparable terms such as "inside", "managing" or "supervisory" director that may be more commonly used in connection with specific systems of corporate governance.

et al. 2016; Yue 2012). Consistent with these studies, we take the firms' perspective to examine tie choice as an equally important component of network formation. However, while existing research concentrates on partner selection and de-selection, examining for instance the role of organizational needs (Beckman et al. 2004) or contextual factors (Yue 2012), we focus on tie content. By synthesizing and classifying existing studies on the consequences of interlocking directorates, we highlight that different types of board interlocks bring about unique benefits and costs, which address specific motives for tie creation and lead to the different types not being equivalent alternatives for a firm. Apart from providing a structured overview of the literature on tie heterogeneity in interlocking directorates, our paper contributes to research on interlocking directorates and on the origins of networks by emphasizing the importance of tie content and heterogeneity. In contrast to previous studies that have exclusively focused on tie heterogeneity as an antecedent for firm-level outcomes, we investigate how and why companies choose different types of interlocks in the first place and thereby lay the foundation for their embeddedness in the interlocking directorate network. Linking the creation of different interlocks to specific benefits that firms try to reap, we take on calls by several scholars (e.g., Geletkanycz and Boyd 2011; Uzzi and Lancaster 2003) to approach firms' network embeddedness from a strategic standpoint and disentangle the motives behind tie creation. In addition, not only research on board interlocks but research on social networks in general is biased towards analyzing network properties to predict outcomes and neglects the question of how and why specific network ties are created in the first place (Brass et al. 2004; Nebus 2006). Understanding tie choice as a building block of network formation is an important goal of strategy research that helps identifying why and how certain features of a network offer distinctive benefits or constraints to firms (Kim et al. 2016). Knowledge of how networks, such as interlocking directorates, emerge allows to derive recommendations for firms and policy makers on how to strategically influence network configurations (Stuart and Sorenson 2007). By focusing on the content of the ties rather than on the actors, we provide a unique contribution to understanding the formation of interlocking directorates.

In the remainder of this paper, we first explain tie heterogeneity, frame tie choice as a strategic decision, and present a cost–benefit approach to tie choice that integrates assumptions from resource dependence and social exchange theory. We then compare and contrast the unique benefits and costs of the different types of interlocks based on a synthesis of prior research on their consequences and derive propositions on how these benefits and costs will influence firms' tie choice. Based on our cost–benefit analysis, we suggest directions for future research and discuss possibilities to empirically validate our propositions on the influence of tie heterogeneity on firms' tie choice behavior.

2 Board interlock ties

2.1 Tie heterogeneity of board interlocks

Tie heterogeneity originates from the fact that executives as well as outside directors create board interlocks. From the perspective of a focal firm, it makes a difference whether (a) one of its executive directors serves on the board of another firm, (b) another firm's executive director serves on the focal firm's board, or (c) one of the firm's outside directors serves on another board. These different types of board interlock ties are heterogeneous because they fulfill different functions (e.g., Haunschild and Beckman 1998; Sanders and Tuschke 2007) and firms are likely to associate different purposes with their creation.

Interlocks involving executive directors can be seen as directed ties because an executive primarily associated with one firm serves as outside director on another firm's board. By contrast, interlocks established by outside directors are undirected as the director creating the tie is not primarily affiliated with either company (Mintz and Schwartz 1985; Palmer et al. 1986, 1993). Typically, executives and outside directors are equally involved in a firm's boundary-spanning activities (Mizruchi 1996)—yet the ties they create have a unique content. For directed interlocks, tie content depends on whether the focal firm's executive serves on another firm's board or another firm's executive serves on the focal firm's board. Ties created by executive directors of the focal firm serving as an outside director on another firm's board are termed *sent interlocks*. Researchers and practitioners largely agree that firms benefit from their executives' external ties (e.g., Connelly and van Slyke 2012; Geletkanycz and Hambrick 1997). Firms even reward the added value of sent interlocks by granting higher levels of compensation to their boundary-spanning executives (Geletkanycz et al. 2001). At the same time, sent interlocks involve costs, such as time constraints, that focal firms need to consider (e.g., Geletkanycz and Boyd 2011). As their counterpart, *received interlocks* are ties created by executives of another firm serving as outside directors on the focal firm's board (e.g., Haunschild and Beckman 1998; Palmer et al. 1995). In their role as outside directors, these individuals fulfill a monitoring function typically explained by agency theory as well as a resource provision function typically explained by resource dependency theory (Hillman and Dalziel 2003). However, they do not have direct managerial responsibility. Directed interlocks are sometimes characterized as strong ties that offer a higher intensity of exchange between connected firms (e.g., Palmer et al. 1995) and may for instance facilitate the transfer of complex, tacit knowledge (Hansen 1999). Because the tie-creating individuals are closely committed to one of the two firms they connect, they are said to be more highly motivated and better able to represent their firm's interests (e.g., Mintz and Schwartz 1985; Mizruchi and Bunting 1981; Palmer et al. 1995). In terms of Simmel's (1955: p.138) concepts of primary and secondary affiliations, "one group appears as the original focus of an individual's affiliation, from which he then turns toward affiliation with other, quite different groups on the basis of his special qualities, which distinguish him from other members of his primary group" (see also Breiger 1974).

Undirected interlocks between firms are created by individuals serving as outside directors on the focal firm's as well as on at least one more firm's board without having management responsibility at either firm (e.g., Tuschke et al. 2014). Frequently, they are retired executives or other important societal actors such as politicians, lawyers, or academics (Bearden and Mintz 1987; Hillman et al. 2000; Johnson et al. 1996). In addition to fulfilling an important boundary-spanning function, directors establishing undirected interlocks are responsible for monitoring and advising the focal firm's management (Hillman and Dalziel 2003). Opposed to directed interlocks, undirected interlocks are commonly seen as weak ties (e.g., Palmer et al. 1995) that offer specific benefits such as access to non-redundant

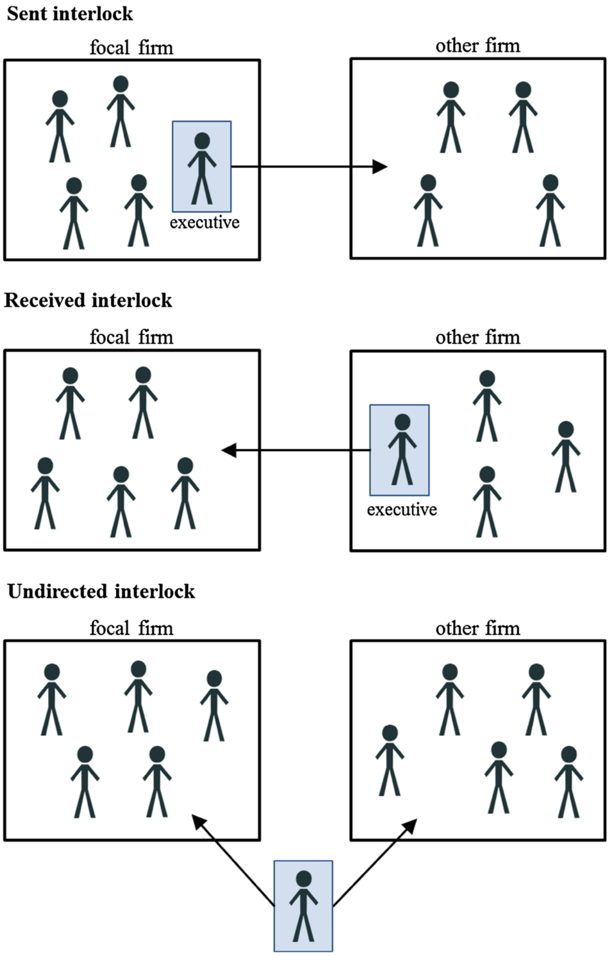

Fig. 1 Sent, received and undirected interlocks

information (Granovetter 1973). Figure 1 illustrates the distinction between sent, received and undirected interlocks.[2]

2.2 Creating interlocks as a strategic choice process

Prior research has shown that companies consciously and actively manage their boundary-spanning relations to realize opportunities and reduce constraints according to their needs. Just like its directors' experiences are tailored to a firm's strategic and environmental requirements (e.g., Hillman et al. 2000), so are the networks the firm is embedded in (Carpenter and Westphal 2001; Geletkanycz and Boyd 2011). Concerning interlocking directorate networks in particular, research has demonstrated that firms optimize their relational embeddedness, considering the costs and benefits of being interlocked (Rank 2006). Building on these findings, we treat firms' use of board interlocks as the outcome of a strategic choice process aimed at realizing specific tie-inherent benefits and opportunities.

Strategic choices can be defined as important, infrequent decisions made by a firm's upper echelon that tie up resources and may critically affect the company's future (Eisenhardt and Zbaracki 1992; Mintzberg et al. 1976). Interlocking directorates are formally initiated and sparsely employed instruments used to create relatively enduring inter-organizational relations. They are established by key individuals of a firm and bring about benefits but also go along with costs. Moreover, companies increasingly need to justify the composition of their boards and particularly connections to other companies to their stakeholders. Hence, it seems reasonable to assume that companies strategize on their use of board interlocks.

From a focal firm's perspective, the strategic choice process of establishing an interlock involves three interrelated choices: First, choosing whether or not to create an interlock at all (choice to interlock), second choosing a partner to create the tie with (partner choice), and finally choosing a specific type of tie (tie choice). In this paper, we are concerned with the third choice. We argue that after having decided to rely on interlocks as "one of the most flexible and easiest to implement" forms of inter-organizational coordination (Pfeffer and Salancik 1978: p.161), and having selected a partner for tie creation, companies put additional effort into the decision which type of interlock to create. Just like partner choice can critically impact the utility of an interlock (Shropshire 2010), tie choice is proposed to influence the benefits that firms can reap from inter-organizational networks. Thus, we suggest that firms base their tie choice on the specific tie content, more precisely the benefits and costs going along with the different types of interlocks relative to the aspired goals that the firm pursues.

Of course, firms face a number of constraints in this choice process. Just as partner choice depends on the partners' willingness to form a tie, the focal firm's freedom in choosing the type of interlock varies. An important constraint results

[2] Alternative terms for the different types of interlocks used by research on the topic are "outgoing" instead of sent interlocks, "incoming" instead of received interlocks and "indirect", "neutral", or "non-directional" instead of undirected interlocks (see for instance, Palmer et al. 1995; Tuschke et al. 2014).

from the difference between sending an executive director to serve on another firm's board and inviting other firms' directors to the own board. It is easier for a focal firm to invite directors to serve on their board and, thus, create received and undirected interlocks than it is to place its executives on other firm's boards and establish sent interlocks (Tuschke et al. 2014). Thus, the three types of ties may not always represent equal alternatives. Received and undirected interlocks offer a larger scope for action as the focal firm can actively search and decide on whom to invite to the boardroom. By contrast, the possibilities to create sent interlocks ultimately depend on the accessibility of partner firms selecting its executive as outside director. Despite this constraint on the freedom of tie choice, we suggest that firms weigh the unique benefits and costs of all three types of interlocks to reach a decision of which tie to create for their purposes. The fact that sent interlocks are more difficult to create than received and undirected interlocks represents an additional cost factor that firms need to consider.

2.3 A cost–benefit approach to tie choice

To explain companies' tie choice behavior, we draw on a framework on the benefits of board interlocks originally stemming from resource dependence theory (Pfeffer and Salancik 1978). Moreover, we build on the assumptions of social exchange theory (Blau 1964; Cook 1977) to derive the cost–benefit approach that describes the process of tie choice.

Resource dependence theory (Pfeffer and Salancik 1978) is one of the most widely used theories applied to study inter-organizational networks (e.g., Barringer and Harrison 2000; Oliver 1990) and it guides our subsequent analysis. Particularly, we draw on it to derive broad categories of benefits that the different types of interlocks provide as a framework structuring our arguments. According to resource dependence scholars, firms create board interlocks to gain access to external resources, which are crucial to reduce uncertainty and secure organizational survival. Building on Pfeffer and Salancik (1978), we distinguish between (1) knowledge-based benefits, (2) benefits resulting from the exercise of social influence, and (3) institutional benefits as categories of resources that all types of interlocks provide. Knowledge-based benefits summarize the utility of interlocks for firms to learn from their partners and expand their knowledge (e.g., Beckman and Haunschild 2002; Useem 1984). Social influence benefits reflect companies' use of inter-board ties as an instrument to exert control and influence on other companies and their upper echelons and gain their support (e.g., D'Aveni 1990; Mizruchi and Bunting 1981). Finally, board interlocks bring about institutional benefits as they have the potential to enhance firms' legitimacy, status, and reputation (e.g., Sanders and Tuschke 2007; Westphal et al. 1997). As we will show, the different types of interlocks differ considerably regarding the specific benefits they provide within these three broad categories. In addition, they go along with unique costs for the firm, which can equally be classified into three categories.

To disentangle how firms evaluate the specific benefits and costs inherent in each type of interlock within the three categories, we build on social exchange theory (Blau 1964; Cook 1977). Social exchange theory seeks to explain how actors (in our case firms) establish, maintain, and dissolve network ties in a self-serving way to exploit the benefits and reduce the costs of their relationships (Monge and Contractor 2003). Having the choice between different types of interlocks to gain knowledge-based, social influence, and institutional benefits, firms select the type of tie that seemingly allows exploiting the desired benefits the best possible way. At the same time, they try to avoid or at least minimize all potential disadvantages or constraints resulting from the connection. Thus, when two types of ties offer comparable benefits in a given situation, the type of tie going along with the lesser costs will be chosen.

In the following, we build on this general cost–benefit logic and analyze the company-related advantages and constraints of sent, received, and undirected interlocks. For each of the three categories derived from the above resource dependence framework, we briefly mention the main theories that prior research has used to explain the firm-level outcomes (i.e., benefits and costs) of board interlocks. Furthermore, we propose that the focal company's strategic tie choice depends on the knowledge-based, social influence, and institutional benefits and costs that each type of tie offers, given the company's specific motives for tie creation. Table 1 foreshadows and summarizes the benefits and costs that are argued to drive firms' tie choice.

3 Knowledge-based benefits and costs of board interlocks

Prior research on the knowledge-based benefits of board interlocks (e.g., Beckman and Haunschild 2002; Westphal et al. 2001) has largely drawn on theories of organizational and individual learning (e.g., Argyris and Schön 1978; Huber 1991)[3] to investigate how interlocks enable firms to expand their knowledge base. In the following, we highlight that there are critical differences between sent, received, and undirected interlocks with respect to the knowledge-based benefits that firms can reap. In addition, there are tie-specific knowledge-based costs that that firms need to consider. At the end of each chapter, we derive propositions on how these different benefits and costs will affect the focal firm's tie choice.

3.1 Knowledge-based benefits and costs of sent interlocks

Sent interlocks open up a number of learning opportunities for the focal firm that translate into knowledge-based benefits. These opportunities are realized via the tie-creating executive. Serving on other firms' boards enables executives to scan the business environment, thereby broadening their firms' overall repertoire of strategies and practices (Useem 1982, 1984). In addition, sent interlocks serve to acquire specific knowledge and information about other companies' activities, which is especially useful when the focal firm pursues a particular learning goal (Burt 1983; Westphal et al. 2001).

[3] Theories of (organizational or individual) learning explain the process of learning focusing, among other things, on how firms or individuals create, transfer, absorb, and retain knowledge.

Table 1 Focal firms' benefits and costs of sent, received, and undirected interlocks

Category	Sent interlock	Received interlock	Undirected interlock
Knowledge-based benefits and costs	+ Acquire general business scan + Have search advantages when looking for specific knowledge + Gain implementation advantages + Expand executive competencies + Improve executive decision-making capabilities	+ Gain first-hand strategic information from other firms + Enable vicarious learning from the experience of others + Have access to individual-level expertise of experienced managers + Get a specialized, management-related outsiders perspective	+ Have weak-tie advantages + Gain access to specialized expertise + Get reliable and impartial information + Have access to broad, general outsiders perspectives
	– Lose sole access to executives' knowledge – General costs: Experience time constraints – General costs: Invest effort in tie creation	– Receive potentially biased information or advice – Experience the loss of proprietary information	– Experience difficulties concerning the transferability and implementation of knowledge
Social influence benefits and costs	+ "Infiltrate" another firm and influence its strategy + Allow for contact to all board members of a firm + Secure resources, spread views	+ Secure commitment and support + Use co-optation as a form of indirect social influence	+ Gain access to and social influence on the corporate elite + Exert social influence on important external stakeholders
	– Get exposed to indirect outside influences via executives – General costs (see above)	– Get exposed to outside influences	+ Experience uncertainty about director loyalty
Institutional benefits and costs	+ Gain legitimacy, status, and reputation from prestigious partner-organizations + Advocate the legitimacy of employed practices by influencing tied-to others	+ Gain legitimacy, status, and reputation from prestigious firms + Gain legitimacy, status and reputation from appointing high-status individuals	+ Gain legitimacy, status, and reputation from appointing the individual
	– Have increased agency costs – General costs (see above)	– Experience reputation loss when appointing unknown directors from small firms	– Have busy directors

+ benefit, – cost

A number of studies provide empirical evidence that executives import the knowledge, practices, and behaviors witnessed elsewhere to their home companies (Haunschild 1993; Haunschild and Beckman 1998; Sanders and Tuschke 2007). In this connection, sent interlocks bring about at least one major advantage compared to received or undirected ties. The executives creating the interlock possess in-depth knowledge about their firm, its structure and its strategic needs. They are best able to gauge the usefulness, applicability, and transferability of complex, strategic knowledge and information received via outside directorships to their home company. In addition, within their company the executive directors are trusted decision makers and enjoy high credibility and discretion. Therefore, sent interlocks not only allow picking up relevant knowledge more easily, but they also offer advantages with respect to the subsequent knowledge implementation at the focal firm (Haunschild and Beckman 1998).

As a byproduct, sent interlocks result in socio-cognitive benefits for the tie-creating executives. First, boundary-spanning connections enable executives to make new experiences and, thus, to expand existing and gain new competencies. Serving as outside directors, they are exposed to a larger range of alternative viewpoints and strategic options, which is beneficial for their ability to identify and develop high-quality solutions and make strategic choices (e.g., Geletkanycz and Hambrick 1997; McDonald et al. 2008). Second, addressing conditions of bounded rationality and environmental uncertainty as ubiquitous constraints to managerial decision making (Cyert and March 1963), sent interlocks provide the opportunity for executives to make social comparisons (Festinger 1954). As outside directors on other companies' boards, executives are able to observe what comparable firms do and how they execute their decisions, which might reduce their decision-making uncertainty (Geletkanycz and Hambrick 1997). In the long run, these socio-cognitive benefits will not only be of value for the executives but will translate into knowledge-based benefits for the firm.

Regarding knowledge-based costs, the focal firm needs to consider that by establishing sent interlocks it places its executives at the disposal of another firm where they are expected to share their knowledge and experiences. Hence, the focal firm will no longer have the sole access to this knowledge-based resource. Similarly, board memberships demand the investment of time and effort in services that are primarily for other companies (Fich and Shivdasani 2006; Marrone et al. 2007). In this sense, sent interlocks can be seen as a distraction, directing the executives' attention away from their main tasks at their home company to another company (Ward 1997). More generally, costs also arise because sent ties are more difficult to create than received or undirected ties because they require an invitation extended by the partner firm (Tuschke et al. 2014).

The above arguments make clear that sent interlocks stand out due to the knowledge acquisition and implementation advantages as well as the socio-cognitive benefits that they offer. However, they also bring about large general costs for the focal firm. We suggest:

Proposition 1a: *With respect to knowledge-based benefits, firms aiming to implement complex knowledge in their own firm are more likely to create sent interlocks.*

3.2 Knowledge-based benefits and costs of received interlocks

Received interlocks offer access to firm-level and individual-level knowledge and information alike. The individuals creating the tie are able to provide first-hand insights into their companies. As executives at the tied-to company, they are directly involved in managerial decision making and can offer detailed and credible information on how their firms deal with specific issues. The high richness in details and credibility of the information results from the fact that these outside directors provide "vivid, case study type information" (Beckman and Haunschild 2002: 98) based on their own experiences instead of drawing on abstract textbook knowledge or someone else's experience. Due to these features, the information and knowledge provided via received interlocks are likely to be especially influential (Nisbett and Ross 1980). Accordingly, empirical evidence shows that received interlocks form the basis for the spread of organizational practices (e.g., Haunschild and Beckman 1998; Palmer et al. 1995) and for vicarious learning (Tuschke et al. 2014). In other words, by appointing other firms' executives as outside directors, the focal firm's top management has the opportunity to benefit from these firms' mistakes without having to make the experience itself.

Apart from this, the tie-creating executives also bring personal expertise, managerial skills, and specific individual-level areas of knowledge to the focal firm (e.g., Pfeffer and Salancik 1978). Their working knowledge of strategic leadership sets them apart from other outside directors without top-management experience. They are assumed to know the contemporary challenges companies and their top managers face and, thus, to be valuable advisors for the focal company's executives (Lorsch and MacIver 1989). From a socio-cognitive perspective, the services provided by outside directors are especially valuable as they present an external view to subjects currently on the agenda of the focal firm. Opposed to the focal firm's executives, executives establishing received interlocks have not been socialized within the focal firm. In other words, whereas executives of the focal firm might easily succumb the human tendency to reproduce stable behavior (Epstein 1979), outside directors might look at issues with a fresh pair of eyes and raise the attention to other strategic possibilities and perspectives. The empirical findings of Geletkanycz and Hambrick (1997) support this view on the benefits of received interlocks.

The latter point can, however, translate into a knowledge-based cost of received interlocks: as the individuals creating the ties are primarily affiliated with another firm, their beliefs and mind-sets about corporate strategy are shaped strongly by this company (Carpenter and Westphal 2001). Thus, the focal firm runs the risk that knowledge or advice provided via received ties is biased in this direction. Moreover, a general risk associated with inter-organizational ties is the leakage of proprietary information to tied-to companies (e.g., Gulati 1995; Hamel 1991). Transferred to received interlocks, the tie-creating executive might consciously or unconsciously reveal confidential information and knowledge gained via the outside directorship to his or her home company, which can have damaging consequences for the focal firm.

In sum, the value of received interlocks lies in the opportunities for vicarious learning that they offer. Due to the knowledge-based costs associated with received interlocks, their creation, however, requires considerable trust in the chosen partner. We propose:

Proposition 1b: *With respect to knowledge-based benefits, firms aiming to engage in vicarious learning are more likely to create received interlocks.*

3.3 Knowledge-based benefits and costs of undirected interlocks

Just like received interlocks, undirected interlocks allow access to firm-level and individual-level knowledge and information alike. However, the knowledge-based resources that the tie-creating individuals provide differ from what other companies' executives have to offer to a focal firm.

As mentioned above, undirected interlocks are sometimes described as weak ties (Palmer et al. 1995) characterized by limited investments of time and intimacy (Granovetter 1973; Ruef 2002). Weak ties are associated with specific advantages. Providing access to otherwise disconnected actors, they facilitate the search for new, non-redundant information (Hansen 1999) and firms employ them to expand their existing network (Granovetter 1973). Weak ties and thus undirected interlocks hence allow accessing and exploring a broader range of new knowledge. In line with this, directors establishing undirected interlocks often come from outside of the business world and provide specialized expertise to the focal firm. As lawyers, politicians, or academics, they assist with decision making in areas such as law, public relations, or insurance and function as support specialists on the board (Hillman et al. 2000). Moreover, because they often serve on three or more corporate boards, they have extensive committee experience and the information and knowledge they provide have been argued to be more reliable and impartial (Palmer et al. 1993). Finally, just like received interlocks, undirected interlocks an outsiders' perspectives to the focal firm.

As a downside, knowledge and information accessed via weak, undirected interlocks are often less specific and of a coarse-grained, second-hand nature (Tuschke et al. 2014). Companies might have difficulties internalizing such knowledge and using it to their benefits. For instance, Hansen (1999) highlights that while facilitating the search for new knowledge and information, weak ties impede the transfer and implementation of specific, especially complex, knowledge. Tuschke et al. (2014) demonstrate that firms need to have a baseline experience in an area in order to have the absorptive capacity (Cohen and Levinthal 1990) to employ knowledge retrieved via undirected interlocks. These factors may increase the knowledge-based costs of indirect interlocks or at least diminish the value of their benefits from the perspective of the focal firm. Based on the above arguments, we suggest:

Proposition 1c: *With respect to knowledge-based benefits, firms aiming to realize weak-tie advantages are more likely to create undirected interlocks.*

4 Social influence benefits and costs of board interlocks

Social influence benefits of board interlocks are typically explained by theories such as agency (Jensen and Meckling 1976), bank control (Mintz and Schwartz 1985), and inter-organizational co-optation (Allen 1974; Selznick 1949)[4] describing the mechanisms that firms employ to exert control and gain commitment and support from other firms. Again, we build on research applying these theories to highlight the differences between sent, received, and undirected interlocks with regard to the social influence benefits and costs they involve and derive propositions about firms' tie choice based on the specific motives they may have.

4.1 Social influence benefits and costs of sent interlocks

Focal firms can use sent interlocks to exert control or influence over tied-to partner companies. As Palmer et al. (1995: pp. 481) phrase it, they can be employed "as devices by which sending firms "infiltrate" receiving firms". Consistently, some scholars have argued that sent interlocks serve as a control instrument, mainly used by financial institutions. Drawing on a theories of bank control and agency, they have demonstrated that banks and other financial firms send their executives to other companies' boards to monitor and impose their home companies' interest (i.e., to secure their investments) or the interest of the whole finance industry (Kotz 1979; Mintz and Schwartz 1985). Others have pointed out that exercising control or influence on other firms is a strategic move not only pursued by financial firms (Bazerman and Schoorman 1983). Rather, sent interlocks can more generally be understood as instruments enabling access to other companies' upper echelons and opening up possibilities to influence their strategic decision making in ways beneficial for the focal firm. Empirical evidence underlines this view. Studies have demonstrated that sent interlocks serve to promote the focal firms' views and practices among tied-to firms (Geletkanycz and Hambrick 1997). In addition, they can be employed to secure other firms' support for the focal firm (Pfeffer and Salancik 1978) as the tie-creating executive can use the outside position to advocate his or her firm's interests.

Of course, influence is not a one-way street and costs of sent interlocks can result from the partner firm trying to influence the tie-creating executive and thereby indirectly the focal firm. Moreover, general costs of sent interlocks such as the

[4] Agency theory addresses conflicts of interest that arise between principals, such as shareholders, and agents, such as managers and discusses means to foster goal alignment (such as monitoring). Bank control theory "asserts that managerial autonomy is undermined by hierarchical relationships between financial and nonfinancial companies" (Mintz and Schwartz 1985: pp. 44) resulting from nonfinancial firms' ongoing need for capital. Finally, the theory of inter-organizational co-optation describes a tactic for winning over others by assimilating them into an established group.

higher efforts required for their creation and time constraints mentioned above may offset their social influence benefits.

The above synthesis of prior research on social influence benefits and costs highlights that sent interlocks are especially effective as means for affecting other firms as they allow contact with all of the other company's board members and, thus, offer much room to exert influence. Regarding their costs, influence attempts of a partner firm directed at the focal firm seem to be indirect at best and, thus, are unlikely to carry much weight. Thus, we suggest:

Proposition 2a: *With respect to social influence benefits, firms aiming to exert direct influence on another firm are more likely to create sent interlocks.*

4.2 Social influence benefits and costs of received interlocks

Social influence benefits of received interlocks can best be explained by the mechanism of inter-organizational co-optation (Allen 1974; Selznick 1949). According to Pfeffer and Salancik (1978: pp. 161), co-optation is the appointment of "significant external representatives to positions in the organization" for instance by inviting other firms' executives to serve on the focal firm's board. As outside directors, these executives are exposed to focal firm influences and are likely to develop commitment and support the focal firm's interests. Particularly, they are supposed to identify with the focal firm either because of the continuous exposure to and the involvement in the firm's challenges and needs, which might lead to affective commitment (Allen and Meyer 1990) or more superficially simply because of being publicly associated with the firm (Pfeffer and Salancik 1978). The tie-creating executive's individual identification in turn is thought to translate into his or her home company's identification with the focal firm. Thus, co-optation via the creation of received interlocks is an indirect influence attempt from the part of the focal firm. Providing empirical evidence for co-optation, Palmer et al. (1995) demonstrate that received interlocks increase the probability of a friendly acquisition via securing other companies' support in the search for suitors.

Paralleling the social influence-related costs of sent interlocks, the main danger resulting from received interlocks is the focal company's exposure to outside influences. Inviting other companies' executives to serve on the board means opening up to external parties and granting them access to the firm's upper echelon, where the most important firm decisions are made. Maintaining received interlocks thus goes along with a loss of autonomy and may even mean an alteration of the firm's strategy (Palmer and Barber 2001; Pfeffer and Salancik 1978). Moreover, outside directors may pursue a hidden agenda and offer advice that primarily benefits the outside director's home company (Palmer and Barber 2001). Finally, because of their high-status position at their home company, executives serving as outside directors are often powerful and authoritarian outside directors—especially if they are the CEOs of their companies. The average outside director might thus be inclined to accept their calling, which in the case of hidden agendas would be an additional threat.

In conclusion, the value of received interlocks lies in the potential to exert indirect influence via co-optation, which needs to be weighed against costs in terms of exposure to outside influences. Just like for knowledge-based benefits, trust seems to play an important role for establishing received ties in order to gain social influence benefits. Based on the above arguments, we state:

Proposition 2b: *With respect to social influence benefits, firms aiming to exert indirect influence on other firms by means of co-optation are more likely to create received interlocks.*

4.3 Social influence benefits and costs of undirected interlocks

Ostensibly, the possibility to influence other companies tied to the focal firm via undirected interlocks seems to be small (Haunschild and Beckman 1998). The individuals creating the tie are outsiders without direct managerial responsibilities. However, directors establishing undirected interlocks often have a particular position and reputation within the corporate elite. They are among the most experienced directors (Bearden and Mintz 1987; Johnson et al. 1996) and often are former CEOs of large firms. Because they maintain positions in multiple boards they are central in the interlocking directorate network and have broad "spheres of influence" (Levine 1972; Windolf 2002) that include not only business companies but often extend into the non-business environment. Hence, these directors are sometimes referred to as "éminences grises" or "big linkers" (e.g., Robins and Alexander 2004; Stokman et al. 1985) watching over the corporate elite and acting in the interest of the general business world (Palmer and Barber 2001). An empirical example by Palmer et al. (1995) serves to underline this reasoning. The authors demonstrate that undirected interlocks to commercial banks help preventing predatory takeovers. They explain their finding arguing that finance capitalists often establish these undirected interlocks. Since they are neither primarily affiliated to the potential target firm nor the possibly self-interested bank, they are free to act as representatives of the corporate elite considering broader interests. As the example shows, focal firms can passively benefit from its directors' embeddedness in—and thus their influence on—the overall interlocking directorates network. Conversely, they might also try and actively influence the corporate elite (as well as other important tied-to outside stakeholder) via its outside directors creating undirected interlocks.

A potential social influence-related cost of undirected interlocks results from uncertainty regarding the outside directors' loyalty. While for executive directors establishing sent and received interlocks, it is relatively clear that their loyalty resides with their home companies, and for directors establishing undirected interlocks this is more ambiguous. They might identify with an institution outside of the business world. Alternatively, as Palmer and Barber (2001) and Palmer et al. (1995) show, these directors might be inclined to act in the interests of the corporate elite as a whole protecting the general accepted status quo and thus avoid social sanctions by their fellow elite members (Westphal and Khanna 2003). Therefore, the focal firm needs to be alert with respect to these directors' loyalty and monitor whether their advice and actions are in the firm's best interests or not.

In sum, from the focal firm's perspective creating undirected interlocks is useful to establish a broad sphere of influence that includes the corporate elite as well as other external stakeholders such as governments. Formally stated:

Proposition 2c: *With respect to social influence benefits, firms aiming to establish a broad sphere of influence on external stakeholder are more likely to create undirected interlocks.*

5 Institutional benefits and costs of board interlocks

Past research has explained the institutional benefits—particularly legitimacy, status, and reputation—resulting from board interlocks drawing mainly on institutional theory (DiMaggio and Powell 1983) and signaling theory (Spence 1974).[5] Just like knowledge-based and social influence benefits and costs, institutional benefits and costs differ for sent, received, and undirected interlocks, which are likely to influence focal firms' tie choice.

5.1 Institutional benefits and costs of sent interlocks

Sent interlocks to other firms can result in major status and reputation gains for the focal firm. These gains accrue to the executives creating the ties, as being sought after to serve on other companies' boards indicates a high level of managerial quality (Fama and Jensen 1983; Spence 1974). Due to the tight interrelationship between managerial and organizational quality, gains from being associated with a prestigious firm are, however, equally beneficial for the focal firm (D'Aveni 1990; Podolny 1993, 1994). These gains can manifest in the form of an increased ability to attract potential partners for the exchange of resources (Podolny and Castellucci 1999) and even in terms of enhanced firm profitability (Geletkanycz and Boyd 2011; Rosenstein and Wyatt 1994). Increased legitimacy and status are thus an innate part resulting without further ado from sent interlocks to prestigious partner firm. In addition, firms can actively employ sent interlocks to increase legitimacy. Tightly related to the aforementioned social influence benefits of sent interlocks, executives outside positions can be used by early adopters to advocate the legitimacy of their employed practice by influencing tied-to companies to also adopt it (Sanders and Tuschke 2007).

However, sent interlocks also involve institutional costs. Tie-creating executives have been blamed to derive mainly personal advantages from outside directorships (e.g., Yermack 2004; Zajac 1988) and to use their boundary-spanning connections as means for managerial entrenchment (Davis 1991; Wade et al. 1990). By

[5] Institutional theory explains the processes and structures (such as board interlocks) through which organizations are influenced by and adapt to their environment. By contrast, signaling theory explains how firms use specific indicators or "signals" to convey information about themselves to and thus influence others in their environment.

consequence, sent interlocks impose agency costs to the focal firm necessary to avoid their misuse. These agency costs have been shown to be directly perceptible by negative market reactions to the announcement of executives' and especially CEOs' board appointments (Fich 2005; Perry and Peyer 2005; Rosenstein and Wyatt 1994). As the costs associated with sent interlocks stand out—particularly in comparison with the institutional benefits of received and undirected interlocks discussed in the following—we propose:

Proposition 3a: *With respect to institutional benefits, firms are generally unlikely to create sent interlocks.*

5.2 Institutional benefits and costs of received interlocks

Firms can employ received interlocks—just like sent interlocks—to enhance their legitimacy and reputation in order to appear in compliance with prevailing social norms and expectations of the external environment. Institutional gains can result either from the appointment of a prestigious executive or from the connection to his or her firm. The director's appointment indicates to outside observers that the executives and/or their companies value the focal company highly enough to establish the connection. They are said to "certify" the focal firm (Fahlenbrach et al. 2010). These certification gains lead to higher legitimacy, which is directly observable by positive stock market reactions resulting especially from the appointment of other companies' CEOs as outside directors (Fahlenbrach et al. 2010; Fich 2005). A director interviewed by Mace (1986: 107) puts this effect to the point, calling CEOs appointed as outside directors "attractive ornaments on the corporate Christmas tree". The connection to another firm via a received interlock can enhance the focal firm's legitimacy in a similar way. As noted by Pfeffer and Salancik (1978: pp. 145), prestigious "organizations represented on the focal organization's board provide confirmation to the rest of the world of the value and worth of the organization". These arguments highlight that received interlocks are doubly beneficial regarding institutional gains; in addition, there seem to be little social influence-related costs associated with them. At the most, it may reflect negatively on a focal firm if it appoints unknown directors from small firms, thereby indicating that it is unable to attract more prestigious outside directors. Since received interlocks are doubly beneficial with respect to the institutional benefits that they offer, we derive the following two propositions:

Proposition 3b-1: *With respect to institutional benefits, firms aiming to associate with a prestigious partner firm are more likely to create received interlocks.*

Proposition 3b-2: *With respect to institutional benefits, firms aiming to associate with a prestigious executive are more likely to create received interlocks.*

5.3 Institutional benefits and costs of undirected interlocks

Establishing undirected interlocks, institutional benefits can theoretically accrue through both the appointment of a high-status director or the connection to a prestigious firm. However, as directors creating undirected interlocks are not primarily attached to the firms they connect, establishing a relationship to a specific firm via an undirected interlock is less controllable for the focal firm. It might, therefore, only be seen as a byproduct (Beckman et al. 2004; Mizruchi 1996). Thus, when it comes to institutional benefits of undirected interlocks, the tie-creating directors are likely to be the more valuable assets increasing the legitimacy of the focal firm. They usually bring high levels of experience to the board, which may function as a quality signal to outside stakeholders. As stated above, the tie-creating individuals are often former CEOs or directors who serve on a large number of boards and are thus more likely to belong to the inner circle of the corporate elite (Useem 1984). They have the potential to connect the focal firm to the upper echelons of the business world, which might additionally boost a firm's reputation and public perception—for instance since it is supposed to keep the focal firm from deviating from generally accepted business norms (Westphal et al. 1997; Westphal and Zajac 1997). Appointing such elite directors can thus be seen as a quality signal leading to a positive shareholder reaction (Ferris et al. 2003).

Institutional costs of undirected interlocks can result from the possible tight network embeddedness of the individuals creating the ties as discussed above. Due to their multiple board memberships, these directors run the risk of being "busy directors", i.e., they might be board members who simply do not have enough time to engage themselves sufficiently in the concerns of a single company (Core et al. 1999; Fich and Shivdasani 2006; Shivdasani and Yermack 1999). In sum, it becomes clear that compared to received interlocks, which offer potential institutional benefits accruing from a prestigious partner firm and its executives, the institutional benefits of undirected interlocks are most likely result from the appointed director. We suggest:

Proposition 3c: *With respect to institutional benefits, firms aiming to associate with a prestigious director are more likely to create undirected interlocks.*

6 Discussion

The main objective of this paper was to shed light on a gap in the literature on interlocking directorates, namely companies' choice between different types of board interlocks based on their heterogeneous content. Framing tie choice as the result of a strategic decision made by companies and their upper echelons and synthesizing theoretical arguments as well as empirical research on the benefits and costs of sent, received, and undirected interlocks, we undertake an important step to understand tie choice and the formation of interlocking directorate networks more thoroughly. Our comparison of the three different types of interlocks reveals that each type offers specific opportunities that we classify into knowledge-based, social influence-related, and institutional benefits. In addition, each type of tie goes along with unique costs and constraints. Following a cost–benefit logic derived from social exchange theory, we expect companies to weigh the unique benefits and costs of the different types of interlocks to reach a decision of which tie to create for their purposes. Particularly, firms are supposed to select the type of tie that presumably allows exploiting the desired benefits the best possible way while at the same time they try to minimize the costs that the creation of different types of inter-board ties brings about.

6.1 Contribution

Based on a structured overview of the literature on tie heterogeneity in interlocking directorates, our classification framework derived from resource dependence theory highlights the key differences between the three types of ties. Sent interlocks offer particularly knowledge-based and social influence benefits that firms cannot realize via received and undirected interlocks, but are in general costlier and more difficult to establish. By contrast, creating ties by appointing outside directors is potentially doubly beneficial for a firm; it permits access to the resources of another firm and the individual creating the tie provides human and social capital. However, the creation of received interlocks requires high levels of trust and can in this sense be costly for the focal firm. Likewise, the overall benefits of undirected interlocks are fuzzier and thus less predictable. In sum, our cost–benefit approach highlights that the three types of ties cannot be considered as equal alternatives—especially when comparing their function across the three categories of benefits and costs. Instead, the focal firm's needs have to be taken into account to fully understand tie choice.

Our paper contributes to prior research on interlocking directorates and on the origins of networks in multiple ways. While most research takes the (non-)existence of ties and the resulting structure as exogenously given, we disentangle firms' motives behind the creation of board interlocks by linking tie-inherent costs and benefits to tie choice as a strategic decision. In addition, we add to the knowledge on the role of tie heterogeneity for tie formation as an important goal of strategy research (Kim et al. 2016; Stuart and Sorenson 2007). Only by understanding the motives behind the creation of inter-organizational networks are we able to fully grasp network outcomes and, based on this, derive recommendations for firms and policy makers regarding strategies on how to influence the creation of an effective network (Ahuja et al. 2012; Stuart and Sorenson 2007).

Focusing on tie content as a driver of network formation, we add a relational dimension to the typically purely structural analysis of board interlocks. Following Nahapiet and Ghoshal (1998), we propose that not only the configuration of a focal firm's network—as reflected by partner choice—counts. Rather, firms strategize on the quality or content of ties they create leading to specific tie choices. In this connection, our paper highlights that the directionality of an interlock significantly influences tie content. Creating a directed (sent or received) as compared to an undirected interlock makes a crucial difference for the benefits that can be realized by the focal firm and thus for tie choice. For early research treating interlocks primarily as instruments for corporate control, the direction of an interlock was a logical result of the issue of who controls whom. Undirected interlocks were seen merely as a byproduct of outside directors' multiple engagements (Mintz and Schwartz 1985). Since interlocks have become an instrument used for a larger variety of purposes such as inter-organizational coordination and communication, companies can be supposed to consider carefully whether to create a directed interlock and reap strong tie benefits or instead rely on an undirected interlock that brings about the advantages and disadvantages of weak ties.

In sum, our paper can be seen as a step towards a deeper theoretical understanding of the motives behind firms creating different types of interlocks to span organizational boundaries and to position themselves advantageously in inter-organizational networks.

6.2 Limitations and directions for future research

Framing interlocking directorates as a strategic choice based on rational cost–benefit considerations, we make some delimiting assumptions that open up prospects for future research. First, the opportunities and constraints resulting from the three types of interlocks cannot easily be quantified. Conducting cost–benefit analyses, firms have to rely on perceived values. Hence, just like other strategic choices, tie choice merely represents what firms and their upper echelons believe, based on their strategic considerations, will make them successful. This does not mean that the reflected tie choice strategies result in firms actually achieving the aspired benefits. Second, we take an egocentric perspective focusing on the focal firm's decision to interlock. The creation of a specific type of interlock might always fail if the chosen partner (either the company or its directors or both, see Mizruchi 1996) refuses the offer to create a tie or insists on a specific type of tie. In terms of Ahuja (2000), collaboration opportunities need to be present. As we argue, this pertains to the creation of sent interlocks in particular, as they are not an equivalent alternative to received or undirected interlocks. As summarized by Oliver (1990: pp. 242), the strategic decision to enter an inter-organizational relationship is made "within the constraints of a variety of conditions that limit or influence" organizational choices. In other words, companies' tie creation decisions, like all strategic choices, are subject to a number of contingency factors that future research needs to clarify. These factors pertain to the individuals who make the decisions and create the ties (e.g., directors' mental models, human and social capital), to the firms involved in tie creation (e.g., perceived environmental uncertainty, the power structure of the board), as well as to the context (e.g., networks, institutional environment, national or cultural context). In the following, we exemplify some of these contingency factors and their potential influence on tie choice as avenues for future research.

Regarding individual-level factors, we point out above that tie choice depends on decision-makers' beliefs about what will make them successful. Future research should aim to uncover the cognitions, micro-processes, and interactions (Regnér 2003) determining these beliefs and thereby shed further light on our understanding of the process of tie choice as a strategic decision. For instance, mental models and cognitive tendencies influence board members' perceptions and strategic choices (Nisbett and Ross 1980; Simon 1976). These mental models are heavily influenced by past experiences (Simon 1976). A manager might have benefited strongly from outside directors' advice in the past and thus may prefer the creation of received or undirected interlocks to the establishment of sent ties. Based on this example, research on the process of tie choice may take into account biographical information on the decision makers. Similarly, observations or protocols of board meetings could enhance our understanding of how interactions and communication in the boardroom shape managerial sense making and thus the way managers approach the cost–benefit analysis.

At the firm level, the investigation of how firm-specific or market-specific uncertainty affects tie choice can further enhance our understanding of tie heterogeneity. Prior studies have demonstrated that uncertainty influences partner choice in network formation (Beckman et al. 2004; Podolny 1994); analogously, the benefits and costs of the different types of interlocks might be perceived differently depending on a firm's perceived levels of uncertainty. We may speculate that experiencing high levels of uncertainty, firms might aim to search for new knowledge or broaden their spheres of influence to achieve competitive advantages by establishing undirected interlocks. Alternatively, high levels of uncertainty may foster the creation of sent ties that, as we argue above, help executives to cope with change, and unpredictability, and increased demands for information processing.

Likewise, the power structure of the board may put the firm-level considerations on tie choice analyzed in this paper into perspective. Individual motives, such as power, status, and income considerations may bias a company's rational cost–benefit approach to tie choice (Bazerman and Schoorman 1983). They should lead directors to prefer creating sent interlocks as they go along with considerable personal benefits. Hence, if the directors' agency dominated their companies' agency, the creation of sent interlocks would be the main factor determining network formation. In this case, received and undirected interlocks would only result as a residual from the executives' attempts to optimize their number of outside board positions. While we assume that the choice to interlock is ultimately a firm decision—typically, boards need to agree to executives' outside positions and firms need to justify their interconnectedness with other companies to internal and external stakeholders—future research could more directly address conflicting firm-level and individual-level motives as determinants of tie choice. Incorporating power differences between the individual executive and the board as a whole into the study of interlock creation might be a starting point. A powerful executive should be better able to enforce his or her way and accept external board positions, even if this is not in the interest of the firm. Conversely, if the board is more powerful than the executive, rational cost–benefit considerations are more likely to dominate the decision-making process.

Regarding the context as a third area for future research, we emphasize that existing network structures act as both opportunities and constraints to the creation of new ties (Nebus 2006). For instance, firm's choice to create a specific type of interlock might depend on whether the firm already maintains a tie of this type, or even of a different type. Future studies should hence shed light on firms' considerations regarding interactions between the different types of interlocks. Taking this thought a step further, recent research has drawn attention to relational pluralism and network portfolios (Shipilov et al. 2014). Not only the existence of other interlocks might affect firms' tie choice, the presence or absence of strategic alliances (Beckman et al. 2014) or ownership ties (Rank 2006) might equally play a role that should be looked into. In sum, network-endogenous mechanisms can be assumed to influence companies' tie choice behavior as firms' current network embeddedness and the structural patterns of networks in general have been shown to influence tie formation (see for instance Brennecke et al. 2016; Gulati 1998). Moreover, tendencies towards specific network configurations are likely to emerge due to network-endogenous processes such as clustering (e.g., Ahuja et al. 2012). Future theorizing on tie choice thus needs to reflect on and empirical analyses need to statistically account for these influences.

Concerning future analyses to empirically validate the presented tie choice framework and test the derived propositions regarding the focal firm's tie choice behavior, a few concluding remarks shall serve as guidelines. Applying an egocentric perspective as done in this paper offers a specific methodological opportunity. It allows drawing on agent-based modeling techniques (Macy and Willer 2002) to understand the dynamics of tie choice and network formation (Nebus 2006), for instance by applying stochastic actor-oriented models (Snijders et al. 2010). Corresponding to our theoretical cost–benefit approach to tie choice, these models explicitly build on the assumption that actors strive towards organizing their network ties in a utility-maximizing manner. In addition, they allow conditioning the creation of a new tie on the focal firm's current network embeddedness as well as on actor characteristics. Hence, network partner attributes as well as the network endogenous mechanisms mentioned above can be taken into account. Controlling for network partner attributes as determinants of a company's tie creation decisions is important to draw conclusions exclusively relating to tie choice, i.e., to disentangle partner choice from tie choice. Finally, as potential interdependencies between company-level and individual-level factors as determinants of strategic tie choices have been pointed out above, multilevel research that simultaneously accounts for individuals and firms seems suitable to derive a more detailed understanding of interlock formation.

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